TALIS 2018 Technical Report

TEACHING AND LEARNING INTERNATIONAL SURVEY

OECD

TALIS

TALIS 2018 Technical Report

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Acknowledgements

The OECD Teaching and Learning International Survey (TALIS) is the outcome of collaboration among the participating countries and economies, the OECD Secretariat, the European Commission and an international consortium led by the International Association for the Evaluation of Educational Achievement (IEA).

The OECD recognises the significant contributions of members of the IEA Hamburg, Germany, IEA Amsterdam, the Netherlands, as well as Statistics Canada, who authored this report. The principal authors of the respective chapters were as follows:

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Paula Wagemaker copy-edited the report on behalf of the IEA. OECD Directorate for Education and Skills (EDU) analysts Pablo Fraser, Gabor Fulöp and Noémie Le Donné provided additional editorial support. Timothy L. Kennel, Bart Meuleman and Christian Monseur provided valuable comments during the development of some chapters. Emily Groves (EDU) provided additional proofreading and managed the layout process, with support from Eleonore Morena, who verified the final layout, and from Henri Pearson (EDU communications team). Emily Groves also provided administrative assistance.

We would like to gratefully acknowledge the contribution to TALIS of the late Fons van de Vijver, who was Chair of the Technical Advisory Group and an advisor to TALIS since the first cycle in 2008.

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Abbreviations and acronyms

Abbreviation/Acronym	Description	Comment
ACER	Australian Council for Educational Research	
AV	Adaptation verification	
BRR	Balanced repeated replication	
CFA	Confirmatory factor analysis	
CFI	Comparative fit index	
CNO	Co-ordinated national options	
DME	IEA Data Management Expert	IEA software
DPE	IEA Data Processing Expert	IEA software
EAS	IEA eAssessment	IEA software
EFA	Exploratory factor analysis	
EM	Expectation-maximization	
EU	European Union	
FSD	Factor score determinacy	
FT	Field trial	
ICC	Intra-class correlation coefficient	
ID	Identification number	
IDB	International database	
IEA	International Association for the Evaluation of Educational Achievement	
IQO	International quality observer	Contracted by IEA
IRT	Item response theory	
ISC	International study centre	For TALIS: IEA Hamburg
ISCED	UNESCO International Standard Classification of Education	Published in 2011
ISCED level 1	Primary school	
ISCED level 2	Lower secondary school	
ISCED level 3	Upper secondary school	
MGCFA	Multiple-group confirmatory factor analysis	
MLR	Maximum likelihood robust	
MOS	Measure of size	
MS	Main survey	
NA	Not applicable	
NADB	National Adaptations Database	
NAF	National adaptation form	
NDM	National data manager	
NPM	National project manager	
NQO	National quality observer	Contracted by national centre
NRBA	Non-response bias analysis	
NSM	National sampling manager	
ODC	Online data collection	
OECD	Organisation for Economic Co-operation and Development	
OSS	IEA Online Survey System	IEA software
P&P	Paper and pencil	

Abbreviation/Acronym	Description	Comment
PISA	OECD Programme for International Student Assessment	
PQ	Principal questionnaire	
PRE	IEA Participation Rate Estimator	Software
QEG	Questionnaire Expert Group	
RandA	Research and Analysis Team	Unit within IEA Hamburg
RMSEA	Root mean square error of approximation	
SAQ	Survey activities questionnaire	
SC	School co-ordinator	
SEM	Structural equation modelling	
SOP	Survey operations procedures	
SPSS	Statistical Package for the Social Sciences	Software
SRMR	Standardized root mean square residual	
StatCan	Statistics Canada	
TAG	Technical Advisory Group	
TALIS	OECDTeaching and Learning International Survey	
TGB	TALIS Governing Board	
TLF	Teacher listing form	Form produced by WinW3S
TLI	Tucker-Lewis Index	
TQ	Teacher questionnaire	
TTF	Teacher tracking form	Form produced by WinW3S
UNESCO-UIS	UNESCO Institute for Statistics	
WinW3S	IEA Within-School Sampling Software	IEA software
WLSMV	Weighted least squares mean variance	
WRMR	Weighted root mean square residual	

Three-digit operational codes of TALIS 2018 participants

TALIS 2018 participant	Code
Alberta (Canada)	CAB
Australia	AUS
Austria	AUT
Belgium	BEL
Flemish Community (Belgium)	BFL
Brazil	BRA
Bulgaria	BGR
CABA – Ciudad Autónoma de Buenos Aires (Argentina)	ABA
Chile	CHL
Colombia	COL
Croatia	HRV
Cyprus[1,2]	CYP
Czech Republic	CZE
Denmark	DNK
England (United Kingdom)	ENG
Estonia	EST
Finland	FIN
France	FRA
Georgia	GEO
Hungary	HUN
Iceland	ISL
Israel	ISR
Italy	ITA
Japan	JPN
Kazakhstan	KAZ
Korea	KOR
Latvia	LVA
Lithuania	LTU
Malta	MLT
Mexico	MEX
Netherlands	NLD
New Zealand	NZL
Norway	NOR
Portugal	PRT
Romania	ROU
Russian Federation	RUS
Saudi Arabia	SAU
Shanghai (China)	CSH
Singapore	SGP
Slovak Republic	SVK
Slovenia	SVN
South Africa	ZAF
Spain	ESP
Sweden	SWE
Chinese Taipei	TWN

TALIS 2018 participant	Code
Turkey	TUR
United Arab Emirates	ARE
United States	USA
Viet Nam	VNM

1. Note by Turkey: The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".
2. Note by all the European Union Member States of the OECD and the European Union: The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

Executive summary

This technical report details the steps, procedures, methodologies, standards and rules that the Teaching and Learning International Survey (TALIS) 2018 used to collect high-quality data. The primary purpose of the report is to support readers of the international and subsequent thematic reports as well as users of the public international database when interpreting results, contextualising information and using the data. A user guide complements this technical report and provides detailed guidance and examples for individuals using TALIS 2018 data.

The report is structured in the form of 12 chapters followed by 9 annexes.

Chapters 1 to 12 provide an overview of the conceptual framework and questionnaire development processes, translation and translation verification, further field operations and the quality observations of the fieldwork in countries/economies. It describes the sampling, weighting and adjudication procedures applied, followed by the preparation and structure of the international databases. Finally, the scaling methodology and the scaling results produced as well as information on the production and verification of the international result tables are included.

Annexes A to I focus on the individuals and groups who prepared and conducted the survey, the technical standards, forms and questionnaires used, the achieved participation rates of the various target populations and the scaling process and its results.

The following summary highlights the key operational parameters and approaches applied in TALIS 2018 and further detailed in this technical report. The summary then details the key changes made during TALIS 2018 in comparison to previous cycles, especially TALIS 2013.

Governance, management and structure

TALIS 2018 was initiated and managed by the Organisation for Economic Co-operation and Development (OECD) on behalf of participating countries and economies. The TALIS Governing Board (TGB) and its Strategic Development Group (SDG) were the primary decision-making bodies.

The TALIS 2018 International Consortium, led by the International Association for the Evaluation of Educational Achievement (IEA), with its premises in Amsterdam, the Netherlands, and Hamburg, Germany, was responsible for implementing the survey at the international level on behalf of the OECD Secretariat. The IEA's partners were Statistics Canada, based in Ottawa, Canada, and the Australian Council for Educational Research (ACER) based in Melbourne, Australia.

The TALIS International Study Centre (ISC) is located at the IEA Hamburg, Germany, and led by Steffen Knoll (IEA).

The Questionnaire Expert Group (QEG), chaired by Ralph Carstens (IEA), developed the principal and teacher questionnaires and contributed (along with others) to the TALIS analysis plan.

The Technical Advisory Group (TAG), chaired by Fons van de Vijver, Tilburg University, the Netherlands, provided on-demand and further support to the consortium and the OECD in relation to technical, methodological and analytical matters.

Participants, international options and survey phases

Forty-eight countries and economies (jointly referred to as "participants") took part in the "core" survey, that is, teachers and their principals in lower secondary level schools according to the UNESCO International Standard Classification of Education (ISCED) level 2. Within each, a national project manager (NPM) had primary responsibility for all local work.

TALIS participants were offered one or more international survey options in addition to the core. Fifteen participants administered TALIS 2018 in upper secondary schools (ISCED level 3); 11 participants conducted the survey at the primary level (ISCED level 1); and 9 participants administered it in schools selected for the Programme for International Student Assessment (PISA) 2018.

The survey was organised and conducted in three phases: (1) the pilot phase, the purpose of which was to develop and trial the content of the survey questions with a small number of TALIS participants; (2) the field trial phase, designed to test and evaluate the questionnaires and item formats as well as the survey procedures and data collection modes; and (3) the main survey phase, focused on collecting the TALIS data in the 48 participating countries and economies.

Framework and questionnaire development, translation

The TALIS 2018 conceptual framework guided the theory-driven development of the survey's school principal and teacher instruments.

Instruments reflected the participating countries/economies' interest in monitoring changes (trend data) over time, improving some instrument materials and introducing new materials for topics of emerging importance.

A core and extended Questionnaire Expert Group (QEG) translated goals and priorities into questionnaire materials and an analysis plan.

Development took place between September 2015 and August 2017 in three phases: the pilot, which used a focus group approach; the quantitative field trial; and extensive psychometric analyses prior to the main survey.

A series of experiments embedded at the field trial stage were analysed through use of a system of three different, partially overlapping forms of the questionnaire for teachers.

The resulting master questionnaire for principals and teachers was used for the ISCED level 2 core survey and, with some adaptation, for the ISCED levels 1 and 3 and the TALIS-PISA link international options. Each questionnaire took respondents about 45 to 60 minutes to complete (English-language version).

All participating countries/economies were responsible for producing their own national survey instruments. National study centres used the international versions (English and French) of the survey instruments as the basis of their national questionnaires and used the national adaptation form to document any adaptations they made to the instruments to suit their respective national contexts.

To ensure high quality and comparability, the national instruments underwent three verification steps: national adaptation verification, translation verification and layout verification. Instruments were adapted, translated and verified for 48 countries/economies for a total of 83 samples across all ISCED levels and options and 62 language versions. Nine participants administered the survey in more than one language.

The survey activities questionnaire (SAQ) showed that most of the survey's national project managers (NPMs) experienced no difficulties translating the source questionnaires into national languages or adapting them to local contexts.

Sampling of schools and teachers

TALIS 2018's canonical sampling design was unchanged from earlier cycles, in accordance with the OECD terms of reference (TOR) of this survey. A first-stage random sample of 200 schools was followed by a second-stage random sample of 20 teachers from the selected schools.

All anticipated adaptations to national conditions (e.g. number of schools or teachers in the population of interest; excluded areas; analytical or reporting requirements) were implemented.

The samples of schools for each participating country/economy were drawn centrally, after which the national teams used consortium-provided software to select the samples of teachers.

Main survey administration and quality observations

Main survey data collection took place between September and December 2017 for Southern Hemisphere participants (with some countries extending into January 2018 as an exception) and March to May 2018 for Northern Hemisphere participants (with some participants starting early in February and some extending into July 2018). Extensions to the data collection period were needed in 17 countries and economies to achieve the required participation rates.

All but three participants administered the survey on line, the default mode. Eleven participants administered TALIS in a mixed mode, that is, online and paper instruments. During the main survey, 91.3% of the respondents completed the survey on line and 8.7% completed it on paper.

Three different quality observation activities were implemented: an international quality observation (IQO) programme overseen by the IEA Amsterdam (main survey only); a national quality control programme run by the NPMs (field trial and main survey); and an online survey activities questionnaire, used to gather national study centres' feedback on the different survey activities (field trial and main survey).

For the international quality control programme, the IEA Amsterdam recruited independent observers who monitored the administration of the survey in a subsample of the participating schools.

The findings from the international quality control programme generally confirmed that all participating countries/economies implemented the procedures related to the survey administration in accordance with technical standards.

Information from the survey activities questionnaire showed that collaboration between the national study centres and the TALIS 2018 Consortium facilitated the successful administration of TALIS 2018.

Data collection, processing, weighting and adjudication

The IEA Hamburg applied a vast number of checks and cleaning routines to the data and continuously sent data to the partners, the analysis teams and the OECD. Countries/economies were provided with regular data updates for verification.

The average participation rate for ISCED level 2 principal/school data before replacement was 85.9% (91.6% after replacement); rates ranged from 49.9% to 100.0% before replacement. The average overall ISCED level 2 teacher participation rate was 84.3%, with the rates ranging from 52% to 99.9%. The average overall participation rates of teachers and principals in countries/economies that also participated in TALIS 2008 or 2013 did not vary from the participation rates in 2018 although some countries showed improvements while others experienced drops.

Adjudication was performed to determine the overall quality of the data, that is, whether the data released to participants and OECD were "fit for use" as intended under the lead of the sampling referee for TALIS 2018. The design and application of the quality assurance processes drew on expert advice and opinion, on qualitative information and learned judgement, and on quantitative information.

Each individual data set from all countries and economies was examined by the consortium and arising issues were discussed and clarified with other actors as necessary. The consortium considered the overall quality of the survey implementation and the data yielded to be high.

The adjudication resulted in recommendations for data users regarding the quality of the collected teacher data (samples rated as 59 good, 11 fair, 3 poor, 2 insufficient) and principal data (samples rated as 57 good, 15 fair, 0 poor, 3 insufficient) in ISCED levels 1, 2 and 3. Recommended ratings were based on the participation rates (weighted or unweighted) most favourable to the participants.

Two versions of the international database were created: a public-use file (PUF) available on the OECD's website for secondary data users and researchers; and a restricted-use file (RUF) available only to accredited members nominated by the respective national TALIS Governing Board members and who also accepted the respective confidentiality and embargo rules.

Scaling, analysis and results table production

Indices created in TALIS 2018 encompassed simple indices (e.g. ratios) and complex indices (i.e. scale scores).

The scaling procedure for the complex indices was conducted by the IEA Hamburg within the framework of multiple-group confirmatory factor analysis (MGCFA) and consisted of two major steps – scale evaluation and scale score computation.

Measurement invariance techniques were used to test cross-country comparability. Across the two instruments (teacher questionnaire and principal questionnaire), the majority of scales reached the metric level of invariance allowing comparisons of correlational analysis across countries/economies. Only two scales reached the scalar level of measurement invariance allowing comparisons of scale score means across countries/economies.

The preparation of the tables consisted of two major steps. The first was the development, review and revision of table shells. The second was data analysis and table production, followed by independent verification.

The main goal of the TALIS surveys is to generate reliable, valid and comparable population estimates based on sample data. All parameters presented in the tables for the TALIS 2018 international report were weighted. Fay's variant of the balanced repeated replication (BRR) technique was used to estimate the standard errors.

Differences between TALIS 2018 and the 2008 and/or 2013 cycles

The following aspects describe key technical changes applied in TALIS 2018 since 2013 especially and should be read as initial guidance to users of the public-use files until the user guide is published later in 2019.

- In keeping with the TALIS terms of reference for TALIS 2018, the sampling team introduced a provision to control for possible shifts in coverage due to the evolution of ISCED level definitions (ISCED-2011, previously ISCED-97). None of the participating countries/economies reported changes to their mapping to ISCED levels that could have adversely affected comparisons of the TALIS 2018 results with the results of the previous two cycles.
- Principal/school data were adjudicated on their own in 2018, an occurrence that resulted in the notion of a "participating school for principal/school data" being introduced. A school was considered "participating" if its principal returned his or her questionnaire with at least one valid response. For the teacher data, the minimum of 50% teacher participation remained the criterion for determining whether a school was "participating" or not. Consequently, and in contrast to TALIS 2008 and 2013, a school record remained on the school file if the principal responded to the questionnaire, even if fewer than 50% of the teachers in the school participated in the survey.
- The scale score estimation implemented in TALIS 2018 was, on the one hand, more rigorous than in TALIS 2013 and, on the other hand, more tailored to each education system than in previous TALIS cycles. The scale scores for the 2018 cycle reflect the level of comparability across countries/economies as well as between different ISCED levels within countries/economies. The applied procedure enhances cross-country comparability by reducing the bias while providing additional opportunities for comparisons between ISCED levels for national purposes.

In this TALIS cycle, the tables for the international report were produced by the IEA and verified by experts at the Australian Council for Educational Research (ACER) in Melbourne, Australia.

Chapter 1. Introduction

This chapter provides an overview of the survey components and the preparation and implementation of the Teaching and Learning International Survey (TALIS) 2018, initiated and co-ordinated by the Organisation for Economic Co-operation and Development (OECD). It introduces the management structure established to administer this third cycle of the survey, the survey's target populations and educational levels investigated, the role of the national project managers, the key development phases of the study and the standardised procedures implemented to allow the collection of high-quality data in 48 countries and economies.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

1.1. TALIS in brief

This *OECD Teaching and Learning International Survey (TALIS) 2018 Technical Report* documents the development of the TALIS survey instruments as well as the methods used to conduct the following: sampling; data collection, weighting, scaling and analysis; and production of tables. It enables readers to review and understand these procedures and to gain insight into the rigorous quality control programme that encompassed all phases of the survey.

TALIS, the first international series of surveys to focus on the learning environment and the working conditions of teachers in schools, offers teachers and school principals the opportunity to provide their perspectives on school contexts. Countries can then use this information to deepen analysis of the questions TALIS examines and to aid the development of policy relating to these matters. TALIS data also allow countries to identify other countries facing similar challenges and to learn from their approaches to policy development.

The first cycle of TALIS, conducted in 2008, involved 24 countries and economies.[1] The success of this cycle, especially its valuable contribution to teacher policy development in those countries, led to the TALIS Board of Participating Countries (BPC) and the OECD Secretariat agreeing to conduct a second cycle, TALIS 2013.

TALIS 2013 included 34 countries and economies.[2] Four additional countries and economies[3] decided to join this second TALIS cycle on a shifted schedule, which meant they collected their main survey data in 2014, one year after the main group of participants completed their main data collection. To ensure comparability, the four additional participants followed the same rules, standards and principles employed for the main group. They also used the same manuals, forms and materials.

From the time of its first cycle (2008), TALIS has required all participants to conduct its "core" survey at the lower secondary level of education, that is, level 2 of the International Standard Classification of Education (UNESCO-UIS, 2006[1]). Since 2013, countries have also been able to elect to administer the survey at ISCED level 1 (primary education) and/or ISCED level 3 (upper secondary education). A third option during TALIS 2013 invited countries that took part in the OECD 2012 Programme for International Student Assessment (PISA) to implement TALIS in the same schools that participated in PISA. This option was called the "TALIS-PISA link". Six of the 2013 countries/economies conducted the ISCED level 1 survey, 10 the ISCED level 2 option, and 8 the TALIS-PISA link option.

After the two successful TALIS cycles in 2008 and 2013, the TALIS BPC, the decision-making body for the TALIS programme, now transformed into the TALIS Governing Board (TGB), decided to conduct the third cycle of TALIS (TALIS 2018) between 2015 and 2019, with a main data collection between September and December 2017 for Southern Hemisphere participants and between February and May 2018 for Northern Hemisphere participants.

In 2018, 48 countries/economies participated in TALIS. As in the previous two cycles, the "core" populations were ISCED level 2 teachers and their school leaders, that is, teachers and leaders at the lower secondary level of school education (UNESCO-UIS, 2012[2]).[4] In addition, countries could again elect to administer the survey at ISCED level 1 and/or ISCED level 3. Because the OECD PISA 2018 and TALIS 2018 were administered at the same time in 2017/18, those countries/economies that took part in both programmes again

had a third option, that of implementing TALIS in the same schools that participated in PISA. This option was again described as the TALIS-PISA link. Fifteen participants used the ISCED level 1 option, 11 the ISCED level 3 option, and 9 the TALIS-PISA link option.

The themes and topics covered in TALIS 2018 include not only those addressed in previous cycles but also new topics (e.g. diversity, innovation, well-being). In particular, TALIS 2018 addressed the following 11 themes and priorities related to professional characteristics and pedagogical practices at institutional and individual levels:

- teachers' instructional practices
- school leadership
- teachers' professional practices
- teacher education and initial preparation
- teacher feedback and development
- school climate
- job satisfaction (including motivation)
- teacher human resource measures and stakeholder relations
- teacher self-efficacy
- innovation
- equity and diversity.

The TALIS 2018 conceptual framework, which guided the survey's development and also the TALIS Consortium's analysis plan and the OECD's reporting plan, was released as *OECD Education Working Papers*, No. 187 (Ainley and Carstens, 2018[3]). It includes more detailed illustrations, covers priority areas and describes the mapping between these and the initial policy aspects driving TALIS to date. It also explores the limitations evident in such work. We strongly recommend readers of this technical report to review key aspects of the conceptual framework as well.

Because of the positive experience in TALIS 2008 and 2013 and in recognition of the growing number of TALIS participants interested in and capable of collecting data on line, the OECD Secretariat decided, in 2018, to make the online mode of data collection the default mode. Forty-five of the 48 participating countries/economies decided to collect TALIS data predominantly on line. Only three participants opted for the paper-and-pencil-only data collection mode. In 2013, 27 of the 34 participants collected their data on line.

The remainder of this chapter briefly describes the management of TALIS 2018 at the international and national levels and outlines the survey's three major phases and milestones.

1.2. Participating countries and economies

The following table (Table 1.1) lists the TALIS 2018 participants for all ISCED levels and survey options.

Table 1.1. TALIS 2018 participants in ISCED level 2 (core survey), ISCED levels 1 and 3 options and the TALIS-PISA link

Participating country/economy	ISCED level 2 (core)	ISCED level 1	ISCED level 3	TALIS-PISA link
Alberta (Canada)	●		●	
Australia	●	●		●
Austria	●			
Belgium	●			
Flemish Community (Belgium)	●	●		
Brazil	●		●	
Bulgaria	●			
Ciudad Autónoma de Buenos Aires (Argentina)	●	●		●
Chile	●			
Colombia	●			●
Croatia	●		●	
Cyprus[1,2]	●			
Czech Republic	●			●
Denmark	●	●	●	●
England (United Kingdom)	●	●		
Estonia	●			
Finland	●			
France	●	●		
Georgia	●			●
Hungary	●			
Iceland	●			
Israel	●			
Italy	●			
Japan	●	●		
Kazakhstan	●			
Korea	●	●		
Latvia	●			
Lithuania	●			
Malta	●			●
Mexico	●			
Netherlands	●	●		
New Zealand	●			
Norway	●			
Portugal	●		●	
Romania	●			
Russian Federation	●			
Saudi Arabia	●			
Shanghai (China)	●			
Singapore	●			
Slovak Republic	●			
Slovenia	●		●	
South Africa	●			
Spain	●	●		
Sweden	●	●	●	
Chinese Taipei	●	●	●	

Participating country/economy	ISCED level 2 (core)	ISCED level 1	ISCED level 3	TALIS-PISA link
Turkey	●	●	●	●
United Arab Emirates	●	●	●	
United States	●			
Viet Nam	●	●	●	●

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2. Note by all the European Union Member States of the OECD and the European Union: The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

1.3. Managing the survey internationally

In January 2016, the OECD entered a partnership with the International Association for the Evaluation of Educational Achievement (IEA) and its consortium partners, Statistics Canada (Ottawa, Canada) and the Australian Council for Educational Research (ACER, Melbourne, Australia). Under this partnership, the OECD commissioned the IEA Hamburg office as the international study centre (ISC) to conduct TALIS 2018. The consortium included staff from both IEA offices in Amsterdam and Hamburg and from Statistics Canada and ACER.

The team at the ISC was led by Steffen Knoll (co-director for operations) and Ralph Carstens (co-director for content) and included Friederike Westphal (study co-ordinator until May 2016), Viktoria Böhm (study co-ordinator since May 2016), Malgorzata Petersen (study co-ordinator assistant since October 2017), Juliane Kobelt (study co-ordinator since November 2018), Alena Becker (international data manager), and Christine Busch (deputy international data manager). Ralph Carstens (IEA Hamburg) chaired the Questionnaire Expert Group (QEG). Its role was to co-ordinate the team of internationally selected researchers responsible for developing the TALIS 2018 questionnaires. John Ainley (ACER), in collaboration with the QEG members, prepared the conceptual framework. The analysis team at the IEA Hamburg, led by Agnes Stancel-Piatak, was responsible for data scaling and table production. The team developed and implemented the validation and scaling procedures, produced the scale scores, prepared the datasets for analysis and produced the tables according to pre-agreed analysis and reporting plans.

At the IEA Amsterdam, the IEA financial director Roel Burger managed the financial and contractual affairs in co-operation with Christian Groth, head of accounting and controlling at the IEA Hamburg. David Ebbs co-ordinated the translation verification of the national survey questionnaires in 62 language versions. cApStAn Linguistic Quality Control, specialising in semantic quality control of translations in a range of international surveys and based in Brussels, Belgium, was contracted to support this work. Michelle Djekic was responsible for managing the international quality observation programme in all participating countries/economies by contracting, training and supervising independent quality observers. She was supported by Sandra Dohr, who took over this responsibility in August 2018.

The study's sampling referee, Jean Dumais, and the sampling team manager, Yves Morin, both of Statistics Canada, were responsible for the survey's international sample design and its national sampling plans, implementation, weighting and adjudication.

The OECD Secretariat's Directorate for Education and Skills in Paris, France, responsible for the overall supervision of the project across the participating countries/economies and TALIS governing bodies, was led by Karine Tremblay. She was supported by Pablo Fraser and Noémie Le Donné.

The OECD Secretariat appointed Fons van de Vijver (Tilburg University) as chair of the TALIS 2018 Technical Advisory Group (TAG). Its task was to provide the OECD and the TALIS Consortium and QEG with expert advice and guidance on methods, processes and analyses.

1.4. Working with national project managers

In November 2015, the BPC initiated the process of establishing a national centre in each participating country/economy. Each centre was to be led by an experienced national project manager (NPM) who would be asked to adhere to consortium guidance on NPM roles and responsibilities and would have primary responsibility for preparing and co-ordinating the survey at the national level. The experience and expertise of the NPM and the staff in his or her centre (e.g. involvement in other international large-scale assessments) strongly influenced how the various centre tasks were apportioned and managed.

The consortium also recommended that each centre appoint not only a national data manager (NDM) to oversee and implement technical and data-related work but also a national sampling manager (NSM) to support the work of the NPM in situations involving complex sample designs and possible national additions and extensions to the survey. The number of staff members in the centres varied considerably from one country/economy to the next depending on its size and how it chose to organise the national data collection work. Some NPMs tendered for and contracted external survey organisations to help them conduct the study centre's scientific and/or operational work.

The tasks required of the NPMs, data managers and/or sampling managers included the following:

- establishing an overall preparation and administration schedule in co-operation with the ISC
- attending NPM meetings in order to become familiar with all instruments, materials and survey procedures
- providing Statistics Canada with an up-to-date national sampling frame of ISCED level 2 schools and, where applicable, ISCED levels 1, 3 and PISA schools
- discussing national design options, such as oversampling, with Statistics Canada's sampling experts
- performing within-school listing, sampling and tracking
- carrying out quality control and plausibility checks on teacher lists and samples to identify, for example, teacher lists that had been abbreviated to include only those teachers who had agreed to participate or that were otherwise incomplete/inaccurate
- liaising, with respect to the TALIS-PISA link option, with the PISA 2018 NPM to obtain the school frames, files and other data items required to successfully implement the link

- appointing experienced translator(s) to produce the national versions of the international instruments
- documenting required national adaptations of the instruments on national adaptation forms
- preparing for online data collection (unless opted out of)
- identifying and training school co-ordinators
- appointing and training national quality observers (NQOs)
- nominating possible international quality observers (IQOs) and supporting their work
- monitoring the return status of all questionnaires and projected response rates
- capturing responses on paper manually and performing consistency checks
- completing a survey activities questionnaire (SAQ) after survey administration
- submitting data and documentation to the consortium and responding to data queries during data processing and analysis.

Regular communication between the NPM and the ISC ensured that survey administration proceeded according to the international schedule. Deviating survey schedules were developed for two participants to accommodate their late-joining and to ensure that their data could be included in the international database and reports. With minor exceptions, all participating countries/economies met the international collection milestones and submitted all data and documentation on time.

Countries in both the Northern and Southern Hemispheres collected their TALIS data towards the end of the school year and in line with the TALIS 2018 technical standards (see Annex B). National centres distributed paper questionnaires or login details to teachers and principals, who then completed the questionnaires either on paper or on line within a defined survey window.

Although the TALIS Consortium and OECD Secretariat assumed that the survey would be implemented on a voluntary basis in most instances, as had occurred during TALIS 2008 and 2013, some participating countries/economies made it mandatory for sampled schools and the selected teachers and principals within them to participate in the study. In some instances where the survey remained voluntary, convincing teachers and school leaders to participate in the survey proved to be a challenging exercise in a sizable number of cases. Based on experience in previous TALIS cycles, the ISC sent template strategies and best practice examples to the national centres to support their efforts to achieve the required participation rates.

National centres worked very closely with teacher unions, principal organisations, local, regional and state authorities and/or the national education ministry (as applicable) to endorse the survey and enable sufficient participation. Participants also engaged in extensive public relations activities to raise survey awareness among principals and teachers before the main data collection. Many centres also created their own TALIS websites.

The working language throughout the project was English, that is, for all international materials, communication and meetings. Most communication relied on email. The consortium used Microsoft SharePoint as the collaboration system for document and data

exchange between all involved parties. All systems were operated by the ISC and, in the interests of ensuring confidentiality and security, only authorised personnel could access information.

During the four-year survey cycle, the consortium held four meetings for all NPMs and NDMs, during which survey progress was reported and discussions on materials, procedures, standards and results were held. NPMs also had bilateral and plenary opportunities to exchange experiences and learn about approaches to, for example, coping with survey fatigue, ensuring confidentiality and simultaneously managing the international options and other surveys.

1.5. Standardised procedures

The TALIS 2018 technical standards (see Annex B of this current report), prepared by the consortium and approved by the TGB, provided participants with a high level of guidance during all stages of preparation, administration and data work. The standards encompassed the generally agreed-upon best practices in survey research to adhere to when conducting a project (see, for example, Biemer and Lyberg (2003[4])); Martin, Rust, and Adams (1999[5])); OECD (2013[6]); and Statistics Canada (2009[7])). According to the total survey error framework (Biemer and Lyberg, 2003[4]), adherence to these standards is key to ensuring the validity, reliability and comparability of questionnaires and data. The consortium also developed an extensive set of operational manuals and guidelines describing the steps that all participants needed to take to ensure successful implementation of the survey.

TALIS used two questionnaires to collect data: a principal questionnaire, completed by school leaders, and a teacher questionnaire, completed by the sampled teachers. Respondents could choose to fill in the questionnaires on line or with paper and pencil. The ISC provided the source versions of the questionnaires in English and in French. National study centre personnel then adapted the instruments to suit local contexts, applying standardised adaptation rules as they did so. After the consortium had verified all adaptations, the national centres translated the English or French source versions of the questionnaires into the local language(s).

For the field trial stage of TALIS 2018, the national study centres used the IEA eAssessment System to translate the source versions of the survey instruments into the local language(s). For the main survey, participants used the IEA Online Survey System (OSS) for this purpose (see Chapters 6 and 8). Independent translation verifiers were employed to conduct international translation verification of all translated survey instruments. The TALIS consortium at the IEA Amsterdam was responsible for centrally co-ordinating the work of the translation verifiers.

The Statistics Canada team performed all school sampling and weighting procedures in line with established standards and guidelines (more details on the sampling procedures and on the sampling weights and participation rates appear in Chapters 5 and 9 respectively). The TALIS NPMs used the IEA Within-School Sampling Software (WinW3S) to draw the teacher sample for each nationally sampled school and to estimate participation rates.

The IEA Amsterdam co-ordinated the quality observation of the data collection at the international level, while the NPMs took on this responsibility at the national level. International quality observers (IQOs) received an intensive two-day period of training (see Chapter 7).

Once the TALIS Consortium was confident all data quality standards had been fully met, they recommended the data for inclusion in the TALIS 2018 database and subsequent reports of findings. If, however, the consortium considered standards had not been fully met, it implemented an adjudication process in consultation with the OECD Secretariat and TAG and used it to ascertain the extent to which the data quality had been compromised. The results determined whether data could (or could not) be recommended for unconditional inclusion in the datasets and consequent reporting.

1.6. Key survey phases

The TALIS design included three main phases: a qualitative pilot study conducted with a reduced number of participants, a field trial and the main survey. Each phase included all TALIS participants.

Based on the positive experiences in previous TALIS cycles, the consortium asked participants to establish focus groups that included teachers and principals. The purpose of these groups was to discuss the proposed field trial survey items and to provide feedback on their functioning, cultural applicability and other aspects (see also Chapter 3).

The field trial and main survey followed a quantitative approach. The consortium required all participants to run the trial according to the standardised procedures outlined in the TALIS 2018 technical standards (see Annex B). Countries that had opted to participate in one or more of the international options had to trial them as well.

The consortium held the first meeting of NPMs at the end of April 2016 in Lübeck, Germany, prior to administration of the pilot study. The purpose of the meeting was to present and discuss the survey's draft conceptual framework, the sampling procedures, the roadmap for instruments and materials, the planned survey operations procedures and the overall project governance and responsibilities. NPMs were also introduced to the overall schedule for TALIS 2018, to communication procedures and to best-practice survey development, administration and implementation procedures collated during TALIS 2008 and 2013.

1.6.1. Pilot study

The main purpose of the pilot study was to test "regular" respondents' (teachers and principals in a variety of national settings) understanding of the items. The goal was to fine-tune the questionnaires for the field trial based on the analysis of the pilot outcomes. The pilot questionnaires included new, revised and trend items that the pilot respondents checked against the following criteria:

- sufficient conceptual coverage from the perspective of teachers and principals (important given that TALIS is seen as the voice of teachers)
- conceptual understanding and clarity
- international and cultural applicability
- continued feasibility of an adaptable questionnaire template for ISCED level 1, ISCED level 3 and the TALIS-PISA link
- feasibility of new, modified or alternative formats of new and adapted items as developed by the QEG

- ease with which they could be fine-tuned for the field trial (with ease based on analysis of the pilot outcomes).

In March 2016, the ISC conducted a webinar to initiate preparation of the pilot study. The centre also released pilot guidelines to national centres.

The pilot study, conducted in May 2016, involved 11 countries from different locations and cultural and language backgrounds. Five countries contributed to the piloting with respect to ISCED level 1 and four with respect to ISCED level 3. NPMs established focus groups of seven to nine members to discuss the pilot instruments. Although translating the instruments into national languages was not required if all focus group members were fluent in English, some countries did complete translation work.

The teacher questionnaire included a larger number of items than were needed for testing and trialling. This number meant that a rotated design could be used later during placement of items in the field trial instruments. Because of the large number of items during the pilot study, each group of teachers focused on only half (A or B) of them to keep their questionnaire completion time within acceptable limits. However, the ISC advised that each country/economy needed to have only one principal focus group because the number of items used in the principal questionnaire for the pilot was similar to the number in the 2013 main survey principal questionnaire.

1.6.2. Field trial

The purpose of the field trial was two-fold. The first purpose was to gather as much data as possible and then to use the information drawn from statistical and substantive review of those data to fine-tune the instruments for the main survey. The second purpose was to test all operational procedures in all participating countries and all options in preparation for the main survey. This second bout of work included the within-school sampling, national instrument production, survey operations, data collection and data entry.

The second meeting of NPMs took place in September 2016 in Rome, Italy. NPMs and the TALIS Consortium members discussed the outcomes of the pilot study and the required changes to the instruments for the field trial. Each NPM also met with the consortium to discuss their national centre's sampling plans, individual survey preparation schedules and strategic plans to achieve high participation rates. After the NPM meeting, the consortium conducted a data-management seminar to train national data managers in using IEA software and related procedures. Forty-four of the 46 participants trialled the online procedures for data collection during the field trial; 2 participants trialled the paper data collection procedure and data entry.

All participating countries/economies conducted the field trial between January and March 2017. At the end of 2017, two late-joining participants entered TALIS after completing a deferred survey schedule for the field trial and main survey. These participants conducted the field trial in February through March of 2018.

The field trial sample size per country and option was 600 teachers and 30 principals from 30 schools. Exceptions were made for some countries/economies where the samples were smaller due either to a relatively small total number of schools or to other local circumstances (see Chapter 5 for more details). No separate trialling was done for the TALIS-PISA link.

NPMs and their teams monitored data collection and supervised data entry (if applicable). The NPMs then submitted their national datasets to the ISC for processing and quality

checks. Extensive analysis of the field trial data by the IEA's analysis team and QEG (the core group as well as an extended set of experts), consultations with the TAG, the OECD Secretariat and the TGB led to key improvements and changes in the main survey instruments, released for translation in August 2017 (refer to Chapter 3 for more details).

The IEA analysis team referred to the field trial data when conducting the scaling of simple and complex scales and preparing table production syntax for the main survey. They also carried out detailed analyses designed to evaluate the scales across TALIS cycles and across ISCED levels.

1.6.3. Main survey

The purpose of the third four-day meeting of NPMs, held in July 2017 in Lisbon, Portugal, was to prepare the project managers for administering the main survey in accordance with the outcomes of the field trial and in light of the draft main survey instruments. Participants continued to discuss sampling and survey operation procedures with the consortium and held individual consultations on the field trial data. The third meeting also provided an opportunity to present the approach and tasks concerning the international and national quality control observations (see Chapter 7). In contrast to the field trial, the main survey involved external quality observers at the international level.

Most Southern Hemisphere countries/economies conducted the main survey in the fourth quarter of 2017 and submitted their data in early 2018. However, some countries/economies extended the time period into January 2018 as an exception. Northern Hemisphere countries/economies administered the survey within a self-selected period during the first and second quarters of 2018, with a final data submission date of no later than the end of May 2018. However, some of the Northern Hemisphere countries/economies extended the time period into July 2018. All data were then processed and cleaned at the ISC, after which Statistics Canada conducted data weighting procedures during the second and third quarters of 2018.

During the third quarter of 2018, the ISC began transferring all available main survey data to the analysis team at the IEA Hamburg for scaling, analysis and table production. In September 2018, the consortium, with the OECD Secretariat in attendance, met for three days to review the main survey and adjudicate the data.

In October 2018, the fourth NPM meeting took place in Seoul, Korea. The purpose of this meeting was to finalise, during plenary sessions, all collection work, to sign-off on data and to review table shells and data for inclusion in the first international report. Participants also had the opportunity to discuss their data in individual country sessions, while the consortium's sampling experts discussed sampling outcomes and weights in bilateral country consultations. During the meeting in Seoul, the consortium asked NPMs to provide feedback about the main survey collection experience. This feedback was deemed particularly important because it would be used to inform future cycles of TALIS.

In March 2019, the NPMs and other national centre staff received training in the correct use of the international database so that they could either replicate analyses in the international report or run their own analyses to prepare national reports on the study's findings.

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Notes

[1] TALIS 2008 participants: Australia, Austria, Belgium (Flemish Community), Brazil, Bulgaria, Denmark, Estonia, Hungary, Iceland, Ireland, Italy, Korea, Lithuania, Malaysia, Malta, Mexico, Norway, Poland, Portugal, Slovenia, the Slovak Republic, Spain, Turkey.

[2] TALIS 2013 participants: Abu Dhabi (United Arab Emirates), Alberta (Canada), Australia, Brazil, Bulgaria, Chile, Croatia, Cyprus,* the Czech Republic, Denmark, England (United Kingdom), Estonia, Finland, Flanders (Belgium), France, Iceland, Israel, Italy, Japan, Korea, Latvia, Malaysia, Mexico, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Singapore, the Slovak Republic, Spain, Sweden, the United States (*See footnotes 1 and 2 in Table 1.1).

[3] TALIS 2013 additional participants: Georgia, New Zealand, Russia, Shanghai (China).

[4] In TALIS 2018, the updated International Standard Classification of Education (ISCED), as published by UNESCO-UIS in 2012, was used to identify ISCED levels in schools.

Chapter 2. Development of the conceptual framework

This chapter describes the development of the conceptual framework that guided TALIS 2018. It describes the theoretical and policy underpinnings of the survey, articulates its research emphases and links to existing knowledge, and sets out the indicators included in the TALIS 2018 instruments. TALIS 2018 not only retains a focus on enduring issues previously surveyed in TALIS 2013 and TALIS 2008 but also introduces some new and changing aspects of teaching and learning.

2.1. Introduction

This chapter outlines the process involved in developing the conceptual framework for the Teaching and Learning International Survey (TALIS) 2018, which was published as *OECD Education Working Papers*, No. 187 (Ainley and Carstens, 2018[1]). This chapter has three sections: TALIS's general purpose and policy focus; knowledge relevant to the survey's themes and main indicators; and the design of TALIS 2018.

2.2. General purpose of TALIS and policy focus for 2018

2.2.1. The rationale for and aims of TALIS

The Teaching and Learning International Survey (TALIS) was developed as part of the OECD Indicators of Education Systems (INES) project. TALIS is an ongoing large-scale survey programme of teachers, school leaders and school learning environments designed to address policy-relevant issues chosen by the participating countries/economies. The origins of TALIS lie in a data strategy designed to create a coherent set of indicators to facilitate studies of teachers and teaching and the impact that teachers can have on student learning in OECD and partner countries/economies. The TALIS programme of surveys was influenced by the OECD review of teacher policy, which generated the report *Teachers Matter: Attracting, Developing and Retaining Effective Teachers* (OECD, 2005[2]).

The main goal of TALIS is to generate internationally comparable information relevant to teachers and teaching with an emphasis on aspects that affect student learning. It seeks to provide reliable international indicators and policy-relevant analyses of teachers and teaching to enable reviews of policies that promote conditions for effective teaching and learning. TALIS describes the conditions of teaching and learning, as well as the functioning of education structures, thus offering a means of comparing approaches to teaching and school leadership.

Knowledge generated from TALIS contextualises the ways countries/economies develop the educational outcomes of their education systems. It has therefore developed instruments for comparing these contexts cross-culturally. Large, carefully selected representative samples of survey respondents and modern quantitative methods of data collection and analysis enable formulation of broad inferences about the surveyed populations. They also allow the development of conclusions about important relationships between and among factors of interest within and across countries/economies. Use of the same data collection instruments across countries/economies allows TALIS to validly document the variation in teacher practice and development that exists among countries/economies and within each country/economy. TALIS also generates time-series data, making it possible to produce reliable information about changes in key teacher-related aspects and in associations between indicators, for each country/economy and across countries/economies.

TALIS 2008 established six principles that are still relevant to the current cycle. These principles guided the survey strategy and are set down in the *TALIS 2008 Technical Report* (OECD, 2010, pp. 24–25[3]):

- *Policy relevance:* A focus on the policy issues and on inclusion of the questions most relevant for participating countries/economies is essential.
- *Adding value:* Opportunity for each participating country/economy to compare its findings with those of the other participating countries/economies must be a key benefit of study participation.

- *Indicator-oriented:* Study findings need to yield information that participating countries/economies can use to develop indicators of the conditions of teaching and learning in their education systems.
- *Validity, reliability, comparability and rigour:* In accordance with a rigorous review of relevant research, the survey should yield information that is as valid, reliable and comparable as possible across participating countries/economies.
- *Interpretability:* Participating countries/economies need to be able to interpret the results in a way that is meaningful in their national or regional context.
- *Efficiency and cost-effectiveness:* All work relating to the study needs to be timely and cost-effective.

2.2.2. TALIS 2018 and its relation to previous cycles of TALIS

The TALIS programme of surveys encompasses two previous surveys – TALIS 2008 (OECD, 2009[4]) and TALIS 2013 (OECD, 2014[5]). TALIS 2018 continues this programme, with its core focus remaining as teaching and learning in schools providing education at ISCED level 2 (UNESCO-UIS, 2012[6]) and with the three population options again evident in 2018. The TALIS 2018 conceptual framework builds on the previous two cycles and underpins the survey's focus on instructional and institutional conditions that enhance student learning. It seeks to describe how these vary within and across countries/economies and over time.

Retaining important issues over time is central to TALIS because this approach allows countries/economies to measure and monitor change. The 2013 survey used many of the same questions as TALIS 2008 to facilitate comparisons. Although TALIS 2018 addresses themes, topics and headings akin to those that TALIS addressed in the past, there are substantial differences regarding the depth and scope of the questions and indicators.

TALIS 2018, like TALIS 2013, also developed and included new material so as to remain relevant to emerging policy interests based on insights arising from prior TALIS findings and the impact of newly implemented policies. This material took the form of new themes or new aspects of enduring themes (e.g. shortages of teachers and candidates for initial teacher education, teachers prematurely leaving the profession and other aspects related to the attractiveness of the profession).

Two themes are new to TALIS 2018: innovation, and equity and diversity. Teachers' openness to adopting innovative practices and teachers' perceptions regarding the barriers to and incentives for adoption of innovation are among the indicators developed for TALIS 2018. Perceptions of issues regarding student diversity and provisions at the school and classroom level to accommodate diversity (encompassing gender, culture and socio-economic dimensions) have also become part of TALIS 2018. TALIS 2018 furthermore includes changes within themes, such as school leadership. The school leadership change is informed by concepts and ideas concerned with distributed leadership and teacher feedback and development that emerged following completion of planning for TALIS 2013. Other changes in TALIS 2018 reflect perspectives that come from analyses of data from earlier cycles.

2.3. Developing and refining the conceptual framework

2.3.1. Themes for TALIS 2018

The themes for TALIS 2018 were shaped by deliberations of the TALIS Board of Participating Countries (BPC), which became the TALIS Governing Board (TGB) from 1 January 2016, and of the OECD Secretariat (OECD, 2015[7]). Additional input was provided from ongoing policy dialogues and networks, and from a priority rating exercise conducted in 2015. During the rating exercise, TALIS countries/economies answered questions and gave priority ratings to listed issues. This exercise helped determine the structure of the TALIS 2018 themes and indicators.

Deliberations during the 2014 OECD Informal Meeting of Ministers of Education provided further guidance on the issues that education systems deem a high priority. The deliberations focused on "how to reflect changes in the demand for skills in the design of educational systems and teacher professional development, how to raise teacher effectiveness, and how to build rewarding career structures that advance the profession and attract the most talented teachers into the most challenging classrooms" (OECD, 2015, p. 4[7]).

The summary section of the OECD report highlighted the role of innovation in fostering more effective learning environments and creating the environments in which innovation can take place. The summary also identified the need for greater effort in fostering effective pedagogical practices, generating collaborative practices and mobilising resources to ensure that every student benefits from excellent teaching. The fourth International Summit on the Teaching Profession (ISTP), held in 2014, identified similar needs, three of which were fostering the conditions for innovation, fostering deeper forms of collaboration and strengthening relationships between stakeholders.

Discussions at the ministerial level highlighted several questions that TALIS could address (OECD, 2015, p. 5[7]). One concerned teachers' preferences regarding the resources they think education systems should provide to support effective teaching and learning in schools; another focused on the types of career-related incentives (including horizontal and vertical career structures) that teachers value. Other potential questions related to teachers' views on the following: the conditions that enable innovation in the classroom and in schools; the role teachers should play in educational reforms and the extent of their involvement in educational reforms; the mechanisms essential to ensuring the professionalism of teaching; and the ingredients needed to foster collaboration in schools, between and across schools, and between schools and the wider community.

Another policy consideration was the potential contribution of TALIS to the United Nations (UN) Sustainable Development Goals (SDGs). In 2015, the United Nations adopted the SDGs as a framework for continuous and sustainable progress in social areas considered fundamental for the improvement of nations. The SDGs established a universal agenda and do not differentiate between rich and poor countries, and the UN challenged countries to achieve them (UNESCO, 2016[8]). Goal 4 seeks to "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" (United Nations, 2015[9]). Goal 4 requires education systems to monitor the actual learning outcomes of their young people and it identifies seven targets and three means of monitoring achievement of this goal.

TALIS is relevant to this endeavour because Target 4.c of Goal 4 specifically addresses the role of teachers in ensuring quality education: "By 2030, substantially increase the supply of qualified teachers, including through international co-operation for teacher training in developing countries, especially least developed countries and small island developing States" (United Nations, 2015, p. 17[9]).

Target 4.c consists of one global indicator and six thematic indicators. The global indicator is "Proportion of teachers in: (a) pre-primary; (b) primary; (c) lower secondary; and (d) upper secondary education who have received at least the minimum organised teacher training (e.g. pedagogical training) pre-service or in-service required for teaching at the relevant level in a given country" (UNESCO, 2016, p. 81[8]).

The six thematic indicators are the pupil to trained teacher ratio by education level; the proportion of teachers qualified according to national standards, by education level and type of institution; the pupil to qualified teacher ratio, by education level; the average teacher salary relative to other professions requiring a comparable level of qualification; the teacher attrition rate, by education level; and the percentage of teachers who received in-service training in the last 12 months, by type of training. TALIS provides data on teacher certification and the highest educational level attained as a proxy for qualified teachers and thereby addresses the extent to which countries have achieved Goal 4. In addition, the TALIS indicator of professional development provides information on the percentages of teachers who received in-service training in the last 12 months.

2.3.2. Prioritising themes for TALIS 2018

The OECD Secretariat invited not only OECD member countries, partner countries and economies that had expressed interest in taking part in the survey but also the European Commission to complete a priority rating exercise. Twenty OECD countries and 5 partner countries and economies completed the exercise, which was conducted between February and April 2015. The participating countries answered questions and provided ratings that would help determine the following:

- the structure of the TALIS 2018 questionnaires
- which themes and indicators to include in TALIS 2018
- which repeated indicators from the first two cycles of the survey to include in TALIS 2018 in order to develop trend data
- the preferred cycle frequency for future TALIS cycles.

Responses to these issues were sought in relation to ISCED levels 1, 2 and 3. All participating countries/economies provided ratings for ISCED level 2. Six countries completed this exercise for ISCED level 1 and 5 countries completed it for ISCED level 3. Overall, participants indicated a preference for maximising international comparability and, therefore, minimising optional modules for individual countries/economies or groups of countries/economies. Respondents also wanted TALIS 2018 to have fewer themes than TALIS 2013 and TALIS 2008 had (these 2 earlier iterations encompassed approximately 15 themes). The highest rating was for the proposition that the 2018 questionnaires should cover between 10 and 13 themes.

The priority rating exercise involved three steps. During the first step, countries were asked to allocate 100 rating points among 20 proposed themes, with higher points representing a higher priority. Ratings were generated by aggregating the points the countries allocated to each theme. Table 2.1 presents the results of the thematic priority rating exercise.

Participating countries regarded some themes as very high priorities (e.g. school leadership and teachers' instructional practices) and other themes as less important (e.g. teacher attrition and turnover rates and the sociological composition of teachers). Substantial cross-country variation was evident in these rankings. In general, the highest-rated themes were those that most closely matched the countries'/economies' priorities. For example, one-third of countries/economies gave a relatively low rating to the theme of teachers' professional practices.

During the second step, countries were asked to consider the 20 themes to which they had assigned points and to state which of the 94 indicators should be assigned to each of these themes. The third step asked countries to indicate which of the indicators used in TALIS 2013 they thought should be maintained in TALIS 2018 to permit analysis of change between these two cycles.

Table 2.1. Country priority ratings of themes for inclusion in TALIS 2018 ISCED level 2

Theme	Average (OECD)	Average (all countries)
School leadership	6.9	6.3
Teachers' instructional practices	6.7	9.0
Teachers' professional practices	6.7	6.7
Job satisfaction and teacher human resource measures	6.5	6.4
Profile of teachers' continuing learning and training	6.2	6.5
School climate and ethos	6.1	6.4
Attracting good students into teaching	5.5	5.0
Frequency of in-service education and training	5.3	5.3
Recognition, rewards and evaluation of teachers	5.3	5.3
Motivations and early career experience of teachers	5.2	4.3
Satisfaction and effectiveness of in-service education and training	5.1	5.3
Teachers' working time	4.6	4.5
Education and qualifications of teachers	4.5	4.0
Initial teacher education and pathways into the profession	4.2	3.8
Teacher self-efficacy	4.2	4.8
Innovation	4.1	4.3
ICT in teaching	3.9	4.0
Adequacy of teacher supply, teacher shortages	3.7	3.2
Teacher attrition and turnover rates	2.9	2.8
Sociological composition of teachers	2.5	2.3

Source: OECD (2015[7]), "Guiding the Policy and Content Focus of TALIS 2018", EDU/INES/TALIS(2015) 3 (internal document), Directorate for Education and Skills, OECD, Paris, pp. 14-15.

Because of the intention to lower the number of themes in TALIS 2018, the TGB decided to proceed with no more than ten themes that, in combination, would inform all five identified policy issues, namely, school policies supporting effectiveness, developing teachers within the profession, effective teachers and teaching, attracting teachers to the profession, and retaining teachers in the profession. Another decision was to place a slight emphasis on those themes among the 20 that addressed policies related to school and teacher effectiveness. This decision reflected the fact that themes attracting the highest ratings were those concerned with "school policies supporting effectiveness".

In addition to the policy rating exercise, ministers of education in the participating countries/economies were invited to highlight the themes they considered to be key areas of interest. During this part of the exercise, some of the initially proposed themes were combined with others, which resulted in variations to the initial list. For example, Theme 5

incorporated the two elements of teacher feedback and teacher development from the original list. In the end, nine themes were agreed to, even though the relative importance accorded to each of them varied across the participating countries/economies. Table 2.2 sets out those nine themes, together with the most frequently nominated indicators from TALIS 2013.

Innovation was initially seen as a cross-cutting issue closely related to teachers' instructional practices and school climate. However, it emerged as an explicit theme (Theme 10) during discussions by the TGB and QEG and was assigned these indicators:

- teachers' openness to adopting innovative practices
- types of innovation in the school in the past year
- types of innovation in the target classroom in the current or past school year
- perceptions regarding the barriers to and incentives for the adoption of innovation
- evaluation and dissemination of innovative practices in the school.

The TGB and QEG originally considered equity and diversity to be encapsulated in the substance of each of the nine themes, but the TALIS participants and policy stakeholders mutually decided to include this theme (Theme 11) as a theme of high contemporary importance.

One further decision resulting from the priority exercise established that although there might be a need to adapt specific questionnaire items to suit respondents at different levels of education, the questionnaires for ISCED levels 1, 2 and 3 should all address the same themes.

2.3.3. Mapping TALIS 2018 themes to policy issues

The TGB and QEG also considered, separately and during mutual consultation, the ratings of the themes within the context of the five policy areas that make up the TALIS analytical framework. This process helped to ensure that the themes would form a coherent whole during TALIS analyses and reporting. An additional check ensured that the themes arising out of the consultation process addressed the five policy areas defined for the ongoing TALIS programme. Table 2.2 shows the result of this checking.

Table 2.2. Themes for inclusion in TALIS 2018 with frequently nominated indicators from TALIS 2013

Theme	Frequently nominated indicators
1. Teachers' instructional practices	a. beliefs about teaching b. classroom climate in target class c. pedagogical practices in target class d. classroom management in target class e. individualised/differentiated teaching (including gifted students) in target class f. teachers' views regarding barriers to implementing a variety of practices g. classroom composition and class size in target class h. lesson time distribution in target class

Theme	Frequently nominated indicators
2. School leadership	a. role and function of the school leader (administrative and pedagogical leadership) b. distributed leadership (team leadership in the school) c. qualifications and experience of school leaders d. principal job satisfaction e. perception of school leadership (teacher responses) f. principal workload g. principal working hours h. principal autonomy in key areas (hiring and dismissing teachers, career ladders, pay, etc.) i. training and development of school leaders j. principal self-efficacy
3. Teachers' professional practices	a. collaboration among staff in school b. teachers' participation in decision-making at the school c. role, profile and participation in wider professional community d. teacher mobility across and within countries
4. Teacher education and initial preparation	a. characteristics of initial teacher education and training: content (e.g. pedagogy, subject matter, practice, teaching students with special needs), length, providers b. perceived effectiveness of training
5. Teacher feedback and development	a. support for in-service education and training b. barriers for further engagement in in-service education and training c. types of in-service education and training, including collaborative forms of professional development (PD) d. types of formal forms of PD e. content of formal forms of PD (new teaching practices and emerging innovations) f. types of informal forms of PD (including teacher-initiated networks, online learning) g. content of informal forms of PD (new teaching practices and emerging innovations)
6. School climate	a. student–teacher relations (including supportive environment for learning) b. parental and community relations/participation with the school c. disciplinary climate (including tolerant climate) d. teachers' beliefs about how student-teacher relations can be improved e. factors hindering instruction f. teachers' readiness for and openness to diversity g. school ethos (e.g. goal driven, high aspirations, community engagement)
7. Job satisfaction	a. overall job satisfaction (with school and with profession) b. teacher perception of the value of the profession c. teacher perceptions of national and local education policies d. satisfaction with salary and working conditions e. teacher opinions about priorities for education policies and reform
8. Teacher human resource issues and stakeholder relations	a. school policies that recognise, reward and evaluate teachers b. career ladder and prospects of teachers c. perceptions of the impact of policies that recognise, reward and evaluate teachers d. recognition for being innovative in pedagogical practices e. interventions to address underperformance
9. Teacher self-efficacy	a. teacher self-assessment of general pedagogical knowledge (instructional processes, student learning, formative assessment) b. teacher self-efficacy in general c. teacher self-assessment of non-cognitive skills/patience/motivation

Table 2.3 also shows the main connections between themes and policy areas. The connections arise either because the theme is, by definition, part of the policy area or because the theme encapsulates factors that could have potentially strong influences on the policy area. The TGB and QEG in mutual consultation agreed that the themes collectively and reasonably represent all five policy areas. Also, because there are more themes than policy areas, more than one theme necessarily addresses the policy areas. Four of the TALIS 2018 themes inform the policy area of effective teachers and teaching. Similarly, some themes inform more than one policy area. For example, the theme "teacher human resource measures and stakeholder relations" connects to attracting teachers, retaining teachers and school effectiveness.

Table 2.3. Map of TALIS 2018 themes to policy issues

TALIS 2018 theme	TALIS policy issue				
	Attracting teachers	Developing teachers	Retaining teachers	School effectiveness	Effective teaching
1. Teachers' instructional practices					•
2. School leadership				•	
3. Teachers' professional practices					•
4. Teacher education and initial preparation		•			
5. Teacher feedback and development		•	•		
6. School climate				•	
7. Job satisfaction	•		•		
8. Teacher human resource issues and stakeholder relations	•		•	•	
9. Teacher self-efficacy		•			•
10. Innovation				•	
11. Equity and diversity				•	

Source: Based on information from OECD (2015[7]), "Guiding the Policy and Content Focus of TALIS 2018", EDU/INES/TALIS(2015)3 (internal document), Directorate for Education and Skills, OECD, Paris.

Table 2.4 presents the average rating given to the themes within each of the five high-level policy headings. The top-rated policy issues were school policies supporting effectiveness and developing teachers within the profession. The very small differences in average scores across the five policy issues indicate support for balanced coverage of all five policy issues.

Table 2.4. Average rating points of themes under each policy heading, all countries (ISCED 2)

Policy issues	Average rating
School policies supporting effectiveness	6.3
Developing teachers within the profession	5.7
Effective teachers and teaching	5.1
Attracting teachers to the profession	4.7
Retaining teachers in the profession	4.1

Source: OECD (2015[7]), "Guiding the Policy and Content Focus of TALIS 2018", EDU/INES/TALIS(2015) 3 (internal document), Directorate for Education and Skills, OECD, Paris, p. 16.

2.3.4. Developing TALIS 2018 theme descriptions

Specific expert members of the QEG developed the descriptions of each theme[1] and then harmonised each theme description around a common structure:

- introduction (interpretation of the theme in terms of content discussions in planning papers)
- theoretical background (review of relevant research, links to TALIS 2013, possibilities for developing the theme in terms of new influences and perspectives)
- analytical potential (the possibilities for analyses in relation to other factors and to other themes)
- indicators (high-level descriptions of materials, such as questions, items, scales, to be retained, modified or developed).

The QEG members also described links to other themes in order to stress connections between themes. The equity and diversity theme thus accommodated policies that promoted assimilation in some countries/economies and encompassed socio-economic and gender differences as well as cultural diversity. The text on innovation distinguished between a disposition to innovate, and practices and policies that support innovation. QEG members also added a section on school context.

Development of the theme descriptions proceeded from a set of initial drafts, reviews by the full QEG, reflections on the results of the pilot studies and the field trial, as well as reviews by an extended group of experts,[2] thus providing perspectives related to world regions, country/economy characteristics and types of schools. Development also reflected feedback provided by the TGB (and previously the BPC) both at meetings and through written documentation. The consortium also held four meetings for national project managers (NPMs), during which discussions on the framework and materials took place.

The QEG began its work with online meetings in August 2015. Eight online meetings took place over the course of the framework's development. The first of the four face-to-face meetings occurred in September 2015.

2.3.5. Background information about teachers, principals and schools

The QEG also advised on the key information that TALIS 2018 should collect on teachers', principals' and schools' backgrounds. Teachers recorded personal information (e.g. gender, age, employment status, work experience, initial teacher education and teaching programme) as well as characteristics of their classrooms (e.g. the student composition of the class).

The strong influence that teachers have on instructional quality and student achievement is widely accepted (Kyriakides, Christoforou and Charalambous, 2013[10]). Within-country variability in teacher background is generally considerable and usually reflects large differences in teacher profiles. These background characteristics are accepted as affecting student outcomes through transmitted effects (e.g. teaching practices) rather than direct effects. Because trend comparisons across time are an overarching objective for TALIS 2018, the QEG wanted as many items as possible to be consistent with the relevant items in the TALIS 2013 cycle. However, to accommodate insights from recent literature and interest in more in-depth information, as well as alignment with PISA 2018, additional items were required.

Principals provided personal information, including their education and experience in schools, as well as information about the characteristics of their respective schools (e.g. location, school size, school type, funding model, student composition). The QEG perceived this information as providing context for analyses of teachers' work and the working conditions that teachers see as enabling them to function effectively. These

background data were also intended to reveal basic characteristics likely to be of interest in terms of their relationship to other indicators, as descriptive information about schools and systems, and in providing an understanding of the contexts in which data about TALIS themes and indicators are interpreted.

School and classroom context can be conceptualised either as the social composition of the school and classroom or as the neighbourhood in which the school is located. Debate continues on the extent to which the overall characteristics of the student population have an effect on student learning outcomes after statistically allowing for the effects for individual students (Borman and Dowling, 2010[11]). However, analyses of PISA results suggest that, in most of the countries participating in that study, students, regardless of their own socio-economic background, are advantaged scholastically if they attend "a school whose students are, on average, from more advantaged socio-economic backgrounds" (OECD, 2004, p. 189[12]).

Of concern to TALIS was the degree to which the effects of school composition on student achievement are influenced by differences in the characteristics of teachers and differences in approaches to teaching that are associated with differences in the composition of the school population. Students with migrant or refugee backgrounds and their education are a priority for many countries (OECD, 2015[7]). The TGB, therefore, suggested that TALIS 2018 should examine teaching and school practices in schools with varying percentages of students with an immigrant background. The TGB also expressed interest in the extent to which school structural characteristics and geographic location affect student achievement and other outcomes, with that influence mediated by the impact these characteristics and location have on how teaching takes place.

The TGB also indicated that TALIS 2018 should continue to include consideration of the influence of the percentage of teachers employed on a part-time basis. A number of countries appear to have experienced an increase in the percentages of teachers who work part-time. Williamson, Cooper, and Baird (2015[13]) documented variations in the incidence of part-time work across countries, with Ireland, the Netherlands, Switzerland and the United Kingdom having relatively high rates of part-time work. The TGB considered that TALIS 2018 provided an opportunity to investigate variations within and across countries in the percentages of teachers employed on a part-time basis and the extent to which these variations are associated with variations in other aspects of schooling.

2.3.6. Links with other OECD studies

TALIS 2018 has links to several OECD surveys, notably the Programme for International Student Assessment (PISA), which focuses on student achievement, the Starting Strong Teaching and Learning International Survey (henceforth TALIS Starting Strong Survey), which focuses on children before they commence formal schooling, and the TALIS Video Study, which is one of the studies focusing on the use of different methods of studying teaching. Another link is the use of TALIS data in the OECD Initial Teacher Preparation Study. These links were accommodated in the TALIS 2018 conceptual framework.

PISA 2018

The fact that TALIS 2018 and PISA 2018 were implemented in the same year made it possible to harmonise the two surveys, as did the fact that PISA includes questionnaires for teachers and principals. Consideration was given to the possible synergies between TALIS and PISA presented in a joint conceptual framework (OECD, 2015[14]). The TALIS and PISA teams discussed these matters not only at the OECD Secretariat but also during

exchanges with the PISA 2018 contractors, especially the Educational Testing Service (ETS) and the German Institute for International Educational Research (DIPF).

The alignment sought was in general terms for the TALIS-PISA link international option. The teams agreed that although some themes (TALIS) and modules (PISA) had similarities, they were not closely aligned. The development work for PISA 2018 had commenced in 2014, with frameworks and field trial materials finalised towards the end of 2015. Therefore, each survey considered pragmatic arrangements for 2018 in the absence of a fully developed link between the surveys. The areas in which materials aligned with PISA 2018 were those concerned with job satisfaction, self-efficacy and school climate. Both surveys also included specific questions on initial teacher education and teaching in culturally diverse settings (equity and diversity).

TALIS Starting Strong Survey

The first cycle of the TALIS Starting Strong Survey, the OECD's survey on early childhood education and care (ECEC) staff, was implemented in 2018 in nine countries. It aimed to generate data on which to base international comparisons of ECEC learning environments, the well-being of staff and children within those environments, staff pedagogical practices, staff professional development, issues related to equity and diversity, and staff and centre characteristics. The survey has two target populations – ISCED level 0.2 staff (i.e. staff working in "pre-primary education", thus typically with children from three years of age up to school age) and staff in settings serving children under the age of three years. The TALIS and PISA teams developed links between the TALIS framework and instrument development (especially the TALIS ISCED level 1 option) and the TALIS Starting Strong Survey. The TALIS Consortium and the QEG also held joint meetings with staff from the TALIS Starting Strong survey.

TALIS Video Study

The TALIS Video Study video-recorded 2 mathematics lessons taught by a representative sample of 85 lower secondary teachers in each participating country and economy. The lessons chosen covered the same specified subject content (i.e. quadratic equations) and the study included pre-tests and post-tests of student achievement. Some of the assessment items covered students' general knowledge of mathematics, while others related directly to the lesson content. Teacher and student surveys were administered before and after the lessons. The teacher surveys included questions about teacher background and teaching quality and practice (as in the TALIS main survey), as well as questions that asked teachers for their perceptions of the lessons and the unit of work. The student surveys covered family-related and peer-related conditions, and aspects of student cognitive, motivational and emotional learning traits. As with the teacher survey, the student survey asked students for their perceptions of the lessons and the unit of work. Lesson artefacts (such as lesson plans, homework and assessments) were also gathered from teachers.

The TALIS Initial Teacher Preparation Study

During development of the TALIS 2018 conceptual framework and instruments, consideration was given to policy and analysis-based findings from the OECD Initial Teacher Preparation (ITP) Study, which included secondary analyses of TALIS 2013 data. In order to effectively examine possible effects of initial teacher education on teaching, TALIS 2018 asked respondents to state when they received their teaching qualifications and to provide details on the nature of their respective initial teacher education

programmes. TALIS also collected data on the support available for new teachers, given these teachers tend to be the ones at the greatest risk of teacher attrition (OECD, 2005[2]).

2.4. Connecting the conceptual framework with proposed analyses

2.4.1. Samples and weights

TALIS is designed as a sequence of cross-sectional surveys that follows a modular approach regarding the investigated content areas and the sample design. The TGB decided that the design of TALIS 2018 would be the same as that of previous cycles of TALIS, with ISCED level 2 schools, teachers and principals as the target populations of the core survey, and with that survey being mandatory for all participants. It was also agreed that the core survey would be augmented by three international options: teachers, principals and schools at ISCED level 1; teachers, principals and schools at ISCED level 3; and teachers and their principals drawn from the schools that also took part in the PISA 2018 cycle. The third option, referred to as the TALIS-PISA link, required the drawing of a sample from within each sampled PISA school of all teachers of 15-year-old students. This procedure has enabled investigation into the teaching practices and learning environments of PISA 2018 teachers.

TALIS used two questionnaires to collect data: a principal questionnaire and a teacher questionnaire. Respondents could choose to complete the questionnaires on line or with paper and pencil. For the main survey, respondents used the IEA Online Survey System (OSS) for this purpose.

The samples for the main survey consisted of approximately 200 schools per country and 20 teachers within each school. Schools were sampled with a probability proportional to size. In some countries, sampling rates differed among strata; response rates also differed across schools. Therefore, survey weights were computed to take into account the sample design and differences in participation. This process allowed the generation of population estimates and estimates of sampling error that are representative of the population of teachers. Applying survey weights is an essential part of conducting analyses of TALIS data. To ensure that the samples are not biased by non-response, TALIS specifies a required response rate of 75% of sampled schools (after specified replacement), provided that each included school attains a minimum response rate of 50%. A minimum overall participation rate of 75% of teachers for each country is also required.

2.4.2. Analyses and reporting

The link between the TALIS 2018 conceptual framework and the initial analyses of the survey data were specified in an analysis plan (OECD, forthcoming[15]). The TALIS Consortium envisaged three types of analyses for the TALIS 2018 survey data: comparisons of indicators across countries; comparison of indicators over time, often referred to as trend analyses; and analyses of the relationships among indicators replicated across countries/economies to establish general patterns. All depend on establishing measurement invariance, that is, whether the same construct is being measured across countries/economies or across other specified groups (e.g. gender, cultural background, socio-economic background). TALIS 2018 planned analyses of measurement invariance to test the validity of cross-country and cross-time comparisons of indicators and relationships (OECD, forthcoming[15]).

The analyses outlined in the *TALIS 2018 Draft Analysis Plan* (OECD, forthcoming[15]) were conceptualised as within-theme analyses (e.g. analyses concerned with teachers'

instructional practices) and cross-theme analyses (e.g. analyses of the associations between teachers' instructional practices and teachers' professional practices). Some of these analyses can be conducted at a teacher or school level while others can be conducted only at a school or country/economy (system) level. Time-series (cross-cycle) analyses enable monitoring of changes over time (assuming measurement equivalence over time has been established).

The reporting plan for TALIS 2018 outlines the content and structure of the initial report of the survey's findings (OECD, 2018[16]). The report is planned as a policy-oriented document designed to stimulate reflection on practice and to relate to broader research on the TALIS 2018 themes. The initial report will be released in two volumes dealing with two main dimensions of teachers' and school leaders' work. The first volume will focus on the knowledge and skills dimension of professionalism and will examine contemporary teaching and learning practices, as well as mechanisms available to support teachers' and school leaders' learning throughout their career pathways in order to deliver quality schooling for all students. The second volume will then focus on teachers and school leaders' other professional practices and examine the mechanisms available to support and strengthen their professionalism.

Across these topics, there will be an emphasis on:

- reporting of results about both teachers and school leaders
- commenting on meaningful international comparisons
- discussing results in context
- reporting relations between themes (cross-theme analyses)
- describing trends (cross-cycle analyses).

Additional thematic reports or policy briefs will cover the following options and themes:

- primary education teachers and principals (ISCED level 1 option) and upper secondary education teachers and principals (ISCED level 3 option)
- schools performing against the odds (TALIS-PISA link option)
- equity issues across schools, teachers and students
- supporting teachers' well-being and retention.

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Notes

[1] The QEG members working on the themes (and the themes for which they were responsible) were S. Blömeke, R. Scherer and T. Nilsen (teachers' instructional practices, teacher education and initial preparation, teacher self-efficacy, innovation); D. Muijs (school leadership, teacher human resource issues and stakeholder relations); H. Hollingsworth (teachers' professional practices, teacher feedback and continuing development); H. Price (school climate, job satisfaction); and F. van de Vijver and J. Ainley (equity and diversity). D. Kaplan contributed to the QEG's consideration of research methods across all themes.

[2] The extended QEG reviewers were E. Aller, S. Howie, M. Mok, S. Seeber and S. Taut.

Chapter 3. Development of the teacher and principal questionnaires

The development of the survey instruments for TALIS 2018 described in this chapter was strictly guided by the conceptual framework (see Chapter 2). A Questionnaire Expert Group (QEG) was established under TALIS 2018 International Consortium management to translate the identified goals and priorities into survey questionnaires, support materials and an analysis plan. At the operational level, the development and validation of instruments were implemented in several phases, with the observations and outcomes of the previous step influencing revisions and plans for the subsequent phase. The key challenges related to the significant increase in the number of participating countries/economies, the interest in monitoring changes over time while keeping a forward-looking approach, and the intention to embed a series of experiments at the field trial stage.

3.1. General aims and principles

Throughout its existence, TALIS's main goal has been to generate valid, internationally comparable information that is relevant to teachers and teaching and maintains an emphasis on aspects at the system, school and teacher levels that are known or can be expected to affect student learning. TALIS develops instruments for comparing these contexts cross-culturally. Large, carefully selected representative samples of survey respondents and modern methods of data collection and of quantitative analysis enable formulation of broad inferences about the surveyed populations. Together, these approaches also allow the development of conclusions about important relationships between and among factors of interest within and across countries and economies.

Accordingly, TALIS 2018 strived to apply the following set of key principles to its development process to the maximum extent possible:

- a theory-driven development guided by a conceptual framework (see Chapter 2)
- maximum country/economy input (at the policy as well as the operational level) into the development and selection of constructs, questions and items
- extensive consultations with experts in the survey's corresponding thematic areas as well as experts in questionnaire and sample design
- retention of selected constructs, variables and measures from TALIS 2013 to allow analyses of changes across TALIS cycles
- improvements to questions and items as deemed appropriate and validated through comparative experiments
- descriptions of the cross-cultural validity of measures.

Use of the same data collection instruments across countries/economies, along with some minor contextual alterations for the ISCED levels 1 and 3 options, allows TALIS to validly document the variation in teacher practice and development that exists not only across countries/economies and within each country/economy but also, where applicable, across levels of education. TALIS also generates, for each country/economy and across countries/economies with available data, reliable information about changes over time in key aspects between indicators relating to teachers and the contexts of their work.

Based on the initial priorities voiced by the TALIS Board of Participating Countries (BPC) in 2015 (2015[1]), the TALIS 2018 International Consortium, in close collaboration with the Questionnaire Expert Group (QEG) members (see next section), drafted a comprehensive development plan (OECD, 2015[2]) in late 2015 designed to capture general considerations and proposals that would inform the start of the development work and also establish initial proposals for each theme/topic that the BPC could consider and comment on during its nineteenth meeting. This plan for the conceptual framework articulated the survey's initial research focus and direction. It also articulated the survey's theoretical underpinnings, existing knowledge and evidence, and the methods that would be used to guide the development of the TALIS 2018 instruments, indicators and operations. The plan described an iterative process in which academics and scholars formulated concepts, discussed them with relevant stakeholders and then revised and reformulated the concepts as necessary.

The QEG members developed for each theme (and the cross-cutting issue of innovation) initial free-format concept notes and discussed these at their first meeting in September 2015. Members standardised the notes around four headings to the extent possible:

- country priorities and other inputs
  - interpreting themes within the OECD "policy and content" focus document
  - interpreting aspects of themes as described in other OECD documents, especially PISA
- theoretical background and justification
  - a general introduction to each issue, with particular consideration given to the established TALIS 2013 legacy
  - the general direction to be taken during the development of each theme (e.g. new influences, paradigm shifts, incomplete coverage in 2008 and 2013)
  - a brief review of relevant research literature, including studies that had produced some evidence of possible causal relationships
  - a focus on the nature of TALIS, on teaching and learning from teachers' perspectives, and on the working conditions of teachers
  - a statement on why TALIS should investigate each issue
- key development directions and most important changes
  - major areas of new development as well as areas needing re-working and/or a shift in focus
  - high-level descriptions of materials (questions, items, scales) to be retained, reworked, introduced or dropped ("chopping board")
  - triangulation and possible harbouring of crosscutting issues
- analytical potential and indicators
  - outlook on the type of research questions for which data are being sought
  - relationships to other themes and systems, schools, teacher characteristics (e.g. the link to and interaction between school climate and aspects of leadership)
  - policy relevance and use (general, current, emerging)
  - a brief sketch of potential indicators.

The initial drafts of the concept notes outlined a wide range of possible directions for development and it soon became clear that full implementation of all changes would not be compatible with the aim of retaining a sufficiently high proportion of (key) materials that would enable links back to 2013.

Ensuing discussion of the development plan at the next BPC meeting, therefore, focused on:

- the need, because of the requirement to maintain an average response time of 45 minutes for the English version of the principal questionnaire (PQ) and for the teacher questionnaire (TQ), to achieve balance across each questionnaire with respect to the following: maintaining existing questions from TALIS 2013, revising

questions so as to improve the measurement of existing constructs, and introducing questions that would address new topics that had emerged within the nominated themes

- the plan to keep the themes constant across ISCED levels 1, 2 and 3 while tailoring items to suit specific aspects of each ISCED level where necessary and appropriate
- aligning TALIS 2018 with PISA 2018 in terms of instrument design, sample alignment and overlap control, especially in relation to sequencing, given that the development process for PISA 2018 was already well underway
- the possibility of linking work on the OECD Innovative Teaching for Effective Learning Teacher Knowledge Survey (ITEL-TKS) with work on TALIS 2018
- conceptual linkages between the TALIS ISCED level 1 work and the proposed Early Childhood Education and Care (ECEC) staff survey, which later became known as the Starting Strong Teaching and Learning International Survey (henceforth TALIS Starting Strong Survey).

This discussion yielded important design and content directions, notably that TALIS 2018 would:

- maintain a universal instrument across all ISCED levels, while allowing necessary adaptations to suit each ISCED level
- have a general target wherein one-third of the questionnaire would remain unaltered, one-third would be revised and/or improved, and one-third would be reserved for new materials and perspectives
- ensure overlap with the optional PISA 2018 teacher questionnaire would be minimised given PISA's focus on the subject domain of reading[1]
- emphasise that any overlap with work conducted for the ECEC staff survey would, because of that survey's trailing timeline, be mostly covered by the ECEC survey's governance structure and operational partners.

The BPC confirmed that all countries/economies would conduct the core TALIS 2018 survey at ISCED level 2. It also confirmed that a smaller number of countries/economies were interested in the international options of surveying teachers and principals in schools at ISCED level 1 (15 countries/economies), in schools at ISCED level 3 (11 countries/economies) and in schools that had participated in PISA 2018 through the TALIS-PISA link (9 countries/economies). The board furthermore confirmed that the online mode of collecting data would be the default mode in 2018, given the continuing growth in online participation during the TALIS programme of surveys (about 70% of all data were collected on line in 2008 and about 80% in 2013).

The questionnaires were designed to collect information that reflected these BPC deliberations and decisions, and this meant that they also reflected an explicit trade-off between capturing information on a wide variety of topics and measuring fewer topics in greater depth. Indicators function at different levels of depth, with greater depth providing richer information on how systems choose to influence or control these features through policy design; see, in this regard, work by Jensen and Couper (Jensen and Couper, 2015[3]).

As indicators drill deeper, the number of questionnaire items required increases. Some indicators collect information about whether particular features exist, such as a mentoring system, for example. Some indicators collect slightly richer data on the scale or frequency of certain features. Examples include the typology of mentoring offered or the frequency with which some activities occur. Other indicators aim to collect enough information to determine how something works, such as identifying the features of a professional development activity that has had a perceived positive impact. Finally, some indicators collect data on what schools, principals and teachers do, and what degree of impact can be attributed to those activities.

The types of questions that TALIS asks are, therefore, either simple questions of existence or type (typically yes/no or nominal multiple-choice questions), questions capturing frequency, extent or agreement (typically count, multiple-choice or matrix questions) or questions that are more complex in format. The latter are typically questions that combine a relatively large number of aspects as individual items, with these sometimes combined with simpler formats (e.g. a yes/no question combined with a question on perceived preparedness for certain elements of initial teacher preparation). Finally, sequences or sets of questions, for example, those that combine factual (system) information or reports of implemented activities and attitudes towards these, can be analysed jointly to obtain a deeper level of understanding of what exists or is implemented, of how it works or how its impact is perceived. In general, development of TALIS questions has followed established development principles for cross-national survey research, such as those described in work conducted by, for example, Harkness et al. (2010[4]), Johnson et al. (2018[5]) and the Survey Research Center (2016[6]).

Later sections of this chapter detail the process and key outcomes of TALIS 2018's three main development stages: the pilot in 2016, the field trial in early 2017 and the main survey in late 2017 and early 2018 (although some data collection occurred later than this, especially for the TALIS-PISA link and in the countries/economies that joined TALIS in late 2018). Annex H displays the final main survey principal and teacher questionnaires (English master version).

While this chapter describes the process and criteria for instrument development, it does not provide in-depth details about the development of specific items or questions, nor does it provide extensive discussion about these.

3.2. Timeline

Under a generally tight and challenging timeline, the key stages and milestones for the instrument development were as follows (data collection phases in bold, meetings in italics):

- *September 2015: First Questionnaire Expert Group (QEG) meeting (Hamburg) – inception and agenda setting*
- October 2015: Content proposals and drafting of the development plan
- *November 2015: Nineteenth TALIS Board of Participating Countries (BPC) meeting (Copenhagen) – review of proposals*
- December 2015 to January 2016: Ongoing development of the conceptual framework and initial development work on the instruments
- *February 2016: Second QEG meeting (Oslo) – agreement on pilot materials*

- February 2016: Release of draft framework/pilot instruments for review by the TALIS Governing Board (TGB) [2]
- *March 2016: First TGB meeting (Singapore) – review of pilot materials and operational approaches*
- February to March 2016: Country/economy recruitment into pilot study; training webinars
- April 2016: Pilot instruments finalised in accordance with TGB feedback
- *April 2016: First national project managers' (NPMs) meeting (Lübeck) – presentation of pilot instruments and plans*
- May 2016: Pilot instruments, glossary and focus group guidelines released to countries/economies
- *May 2016: First Technical Advisory Group (TAG) meeting*[3] *(Paris) – review of technical standards, field trial preparation and measurement invariance approaches*
- **May 2016: Pilot conducted in countries/economies**
- June 2016: Pilot feedback collation and analysis
- *July 2016: Third QEG meeting (Hamburg) – preparation of field trial instruments*
- July to August 2016: Work designed to ensure that all agreements to date were reflected in drafts, final revisions, further reductions, question sequencing and forms
- *September 2016: Second TGB meeting (Paris) – presentation and approval of field trial questionnaires; agreement on reducing questionnaire size as deemed necessary*
- *September 2016: Second NPM meeting (Rome) – presentation of field trial instruments and collection of operational/translation feedback*
- October 2016: Release of instruments to countries/economies for field trial adaptation/translation
- November 2016 to Jan 2017: Instrument translation and verification; field trial preparation
- **February to March 2017: Field trial data collection, followed by data submission**
- March to May 2017: Analyses of field trial data by TALIS 2018 Consortium and QEG
- *May 2017: Fourth QEG meeting (Paris) – main survey instruments prepared and validated*
- June 2017: Further revision and analyses
- *June 2017: Second TAG meeting (Paris) – review of field trial outcomes*
- *July 2017: Third TGB meeting (Lisbon) – review and confirmation of main survey instruments and presentation of the analysis plan (in outline form)*

- *July 2017: Third NPM meeting (Lisbon) – collection of operational advice on translation of instruments*
- August 2017: Release of instruments, glossary and support materials for main survey adaptation/translation
- September 2017: Commencement of main work on data analysis plan
- **September to December 2017: Main survey data collection in Southern Hemisphere countries/economies**
- December 2017 to June 2018: Drafting of analysis plans
- **March to May 2018: Main survey collection in Northern Hemisphere countries/economies**
- September 2017 to February 2018: Analysis plan finalised
- *November 2018: Third TAG meeting (Paris) – review of main survey issues; implications for reporting of findings and for future TALIS cycles.*

3.3. Questionnaire Expert Group (QEG) role, membership and collaboration

The QEG was responsible for developing the TALIS 2018 conceptual framework (see Chapter 2) and the survey instruments. The IEA convened the group in July 2015, which was when the TALIS 2018 Consortium began its activities. The IEA created a long list of potential experts for the group. Some of these individuals were sourced from the IEA's expansive research network, some had been involved in the TALIS 2013 Instrument Development Expert Group (IDEG) and others were individuals suggested by the BPC. Conditional on availability and interest, the IEA, in consultation with the OECD Secretariat, invited those experts who provided the best possible and contemporary coverage of the topics within the TALIS 2018 purview to be members of the group. The QEG, as eventually constituted, included the following education, policy and survey experts:

- Sigrid Blömeke, Centre for Educational Measurement (CEMO), Norway
- Hilary Hollingsworth, Australian Council for Educational Research (ACER), Australia
- David Kaplan, University of Wisconsin-Madison, United States[4]
- Daniel Muijs, University of Southampton, United Kingdom
- Trude Nilsen, University of Oslo, Norway
- Heather Price, Basis Policy Research and Marian University, United States[5]
- Ronny Scherer, Centre for Educational Measurement (CEMO), Norway.

The QEG also included *ex-officio* members from:

- The IEA: Ralph Carstens (QEG chair, consortium co-director of content), Steffen Knoll (consortium co-director of operations), Agnes Stancel-Piatak (analysis lead) and Deana Desa (analysis expert)
- ACER: John Ainley (framework lead)

- RAND Europe: Julie Belanger (liaison to the TALIS Starting Strong Survey, QEG chair of that survey)
- Statistics Canada: Jean Dumais (sampling referee)
- OECD Secretariat: Karine Tremblay (project lead), Pablo Fraser, Katarzyna Kubacka and Noémie Le Donné
- Technical Advisory Group (TAG): Fons van de Vijver (TAG chair).[6]

The QEG began its work, the first major development phase, with a virtual meeting in August 2015 that introduced the survey's content focus, inputs and related information, as well as the group's intended work process. After that meeting, members developed a set of draft concept notes that they reviewed at a two-day in-person meeting in Hamburg (September 2015). Those concept notes informing the development plan were further revised and incorporated into the conceptual framework. This process was guided by deliberations from the BPC (later TGB) and additional input from ongoing policy dialogue and networks among members of the OECD Directorate for Education and Skills' senior management team.

Having noted the general aim of reducing the number of themes (or headings) covered by each cycle of the TALIS survey, the QEG determined that nine themes would initially structure their work. Note, however, that the fifth theme in the following list incorporates the two elements of teacher feedback and teacher development that were covered separately during TALIS 2013. Note, too, that the QEG had no intention of assigning equal importance (as expressed by, for example, response time or number of questions) to all themes. The list below provides the themes as well as the leading QEG expert (or experts) for each.

1. Teachers' instructional practices and beliefs:[7] Blömeke, Scherer and Nilsen
2. School leadership: Muijs
3. Teachers' professional practices, including mobility issues advocated by the European Commission: Hollingsworth
4. Teacher education and initial preparation: Blömeke, Scherer and Nilsen
5. Teacher feedback and development, combining teacher feedback and continuing development: Hollingsworth
6. School climate: Price
7. Job satisfaction: Price
8. Teacher human resource issues and stakeholder relations: Muijs
9. Teacher self-efficacy: Blömeke, Scherer and Nilsen.

The BPC/TGB discussions on the content focus document resulted in the suggestion to include questions on *equity and diversity*, later covered by Ainley and van den Vijver in 2016 as standalone theme number 10. The development plan also included a concept note on the cross-cutting issue of *innovation*, later covered by Blömeke, Scherer and Nilsen as a separate theme (number 11). The QEG deemed this theme to be an issue of particular importance. Because members of the group saw *equity and diversity* and *innovation* as themes encapsulated in the substance of each of the nine themes, they considered there was no need (initially) to prepare separate papers on these topics. The QEG determined suitable

intersections between these two special themes and the nine general themes in order to balance analytical potential as well as survey priorities and space.

After the initial in-person meeting, the QEG held a series of in-person or virtual meetings, each of which lasted for about one to three hours. These occurred in December 2015 (virtual), January 2016 (virtual), February 2016 (in-person, Oslo, hosted by the Centre for Educational Measurement), March 2016 (virtual), June 2016 (virtual), July 2016 (in-person, Hamburg, hosted by the IEA), August 2016 (virtual), November 2016 (virtual), February 2017 (virtual), May 2017 (in-person, Paris, hosted by the OECD) and August 2017 (virtual). All meetings were scheduled in accordance with TALIS 2018's general development and operational timeline, that is, in keeping with the scheduled data collection phases for the pilot, field trial and main survey, and the subsequent availability of empirical data, feedback from NPMs and analytical outputs.

While the QEG's core group of experts and *ex-officio* members remained constant throughout the 2015 to 2017 developmental work, the IEA invited five additional academic experts to provide specific perspectives on the pilot and field trial instruments, with their reviews starting in May 2016 and due in June 2016. These "extended" members were:

- Elsebeth Aller (Ministry of Education, Denmark; formerly Metropolitan University College, Denmark), who provided perspectives on teaching and learning contexts at the primary education level
- Sarah Howie (University of Stellenbosch, South Africa), who provided perspectives from low-income and middle-income countries/economies
- Magdalena Mok (The Education University of Hong Kong, Hong Kong, China), for an Asian perspective, given that no countries/economies from Asia contributed to the TALIS 2018 pilot
- Susan Seeber (Georg-August-Universität Göttingen, Germany) in relation to teaching and learning contexts at ISCED level 3 and, in particular, vocational education and training (VET)
- Sandy Taut (Educational Quality Agency, State of Bavaria, Germany; formerly Pontificia Universidad Católica de Chile, Chile) for a Latin American perspective.

The QEG's later work, especially in regard to the consortium's analysis plan, was managed solely via desk reviews and written exchanges. As stipulated by the OECD's terms of reference for TALIS 2018, the QEG's responsibilities ended with the development of the draft main survey instruments and accompanying analytical advice and recommendations; members were not involved in the production and/or review of the international reports.[8] However, some members provided advice (Scherer and Nilsen, through the OECD Secretariat) or were involved in reviewing draft chapters of the report in early 2019 (Price, through the consortium).

3.4. Pilot phase

3.4.1. Proposing new, revised and retained materials for ISCED level 2

The TALIS 2018 consortium, in close co-operation with the QEG and the OECD Secretariat, and seeking advice from the TAG at key stages, moved from the development plan to the second major phase of developing the teacher and principal questionnaires.

During this second phase, the consortium generally addressed all interests and needs voiced by stakeholders or indicated by the literature cited in the development plan.

The consortium presented the first drafts of the instruments at the TGB's first meeting in Singapore in March 2016. Subsequent feedback included written comments from the board, additional reviews from the extended QEG, additional feedback from institutional partners and observers to the TGB (such as Education International), as well as from the OECD Directorate for Education and Skills' senior management. The work at this stage also focused on earlier input from policy work associated with the TALIS Initial Teacher Preparation (ITP) study and from initial work on the TALIS Starting Strong Survey.

During the meeting in Singapore, the TGB considered and then provided advice on the extent to which the content of the survey instruments needed to be balanced between existing questions from TALIS 2013, questions designed to improve the measurement of existing constructs and questions addressing new topics that had emerged within the nominated themes. To yield the type of feedback that would advance the instrument design parameters from the initial content focus and incorporate the consortium's development proposals, meeting participants worked in small groups and developed plenary summaries.

Suggestions on improving the measurement of existing constructs were generally based on reflections on analyses of TALIS 2013 data. Introduction of questions reflecting new topics within the survey themes typically arose from scrutiny of recent research literature or from areas of interest identified by countries and economies or by institutional stakeholders. Increasing synergy between TALIS and, most importantly, the TALIS Starting Strong Survey and the PISA 2018 survey contexts, yielded other areas of interest. It soon became clear that effort to fully implement all desired changes and additions could result in the instruments not retaining a sufficient amount of (key) content that would elicit the data needed to support analyses of changes over time. The TGB was also mindful of the necessity to review any proposed extensions (and their intended indicators) to the instruments in terms of survey time and burden for teachers.

In pragmatic terms, the TGB wanted to achieve a balance of instrument content within an average response time (for the English version) of 45 minutes. However, the board also recognised that the issue of time itself was still under review and would not be resolved until after the field trial when reliable timing information based on larger volumes of data would be available. In the meantime, the TGB invited the OECD Secretariat and the TALIS 2018 consortium to use evidence from previous rounds of TALIS as the basis of discussion on questionnaire length and the potential consequences of varying questionnaire lengths for data quality. The consortium accordingly re-analysed timing and other process data from the 2013 field trial in terms of survey fatigue and disproportionate increases of item non-response as a function of time. The 2013 data indicated that while the percentages of respondents who did not complete the survey varied substantially across countries/economies and contexts, the percentages generally increased in a linear way along the question sequence. The actual time it took respondents to complete the survey also varied considerably, with the averages exceeding the 45-minute target in many cases.

Limitations with respect to time (including those for national additions) also directly affected ability to revise materials, introduce new materials or keep core questions constant. Because decisions on these matters would be necessary and feasible only when the main survey administration began towards the end of 2017, the consortium foresaw the need to conduct a priority rating exercise that would facilitate work directed towards managing and reducing survey content after completion of the field trial.

The consortium presented NPMs with drafts of the instruments during the first NPM meeting in April 2016. The NPMs, in turn, provided helpful feedback relating to local relevance, translatability and validity in general. The consortium collated feedback pertaining to survey implementation, including clarity of terminology, and shared and discussed it with the QEG. As had occurred during previous development rounds, deep discussion emphasised instrument length and related response burden and resulted in a recommendation to significantly reduce both before the field trial and then again prior to the main survey.

3.4.2. Pilot operations

The main purpose of the pilot was to test the extent to which "regular" respondents (teachers and principals) across a variety of national settings understood the instruments' questions and items. The goal would then be one of using the insights and feedback obtained during the pilot to fine-tune the questionnaires for the field trial.

The pilot questionnaires included a "super-set" of all new, revised and retained items, each of which had to be checked against the following criteria:

- sufficient conceptual coverage from the perspective of teachers and principals, given that TALIS continues to be seen as the "voice of teachers" (see also Chapter 2)
- conceptual understanding and clarity
- international and cultural applicability
- continued feasibility of an adaptable questionnaire template for ISCED level 2 and the ISCED level 1, ISCED level 3 and TALIS-PISA link international options
- feasibility of the universal instrument, especially for ISCED level 1 (e.g. with respect to potentially different approaches to initial teacher preparation)
- feasibility of bringing in new, modified or alternative formats of new and adapted items developed by the QEG.

For the pilot, and in keeping with practice in 2013, the TALIS 2018 consortium recruited small focus groups of teachers and principals from the participating countries and economies. There was no need during the pilot to recruit the larger number of schools and teachers evident during the field trial because the consortium had no intention of conducting quantitative analyses of the pilot data. The expectation with regard to the focus group discussions was to gain the types of information and insight that are best elicited through deep interaction. Opportunity to listen to others' experiences typically stimulates perceptions, ideas and experiences or may refine or emphasise one's own. Focus groups are also useful in bringing together a range of perceptions and perspectives on specified matters.

The focus group work was additionally guided by "probing questions" developed by the QEG. One such question, "Are the concepts used in the items relevant for your country, region and school?", fitted into questions designed to address teaching in culturally diverse environments. The feedback and information collected during this work put the QEG in a better position to revise the content, response categories, wording, and item and question structures of the field trial questionnaires.

More specifically, the review of the pilot questionnaires focused on the following key dimensions:

- applicability of concepts and validity
- level of complexity of the questionnaires
- organisation of topics and items
- applicability of items across ISCED levels and programmes (academic/vocational)
- international versus local applicability of items
- item wording and definition of terms
- appropriateness and cultural relevance
- mandatory national adaptations
- foreseen translation issues
- flow of questions (overall and specifically with respect to skipping instructions)
- length of questionnaires.

The TALIS 2018 Consortium planned that around ten countries/economies would contribute to the pilot by translating the generic source version of the questionnaires from English into the national target language and by having a group of target population members review the questionnaire items under the oversight of the respective NPMs. However, when the schedule for this work proved to be too tight, the possible solution offered was that of making only the mandatory national adaptations to the generic English source version, provided that all focus group members were bilingual. Eventually, 11 of these countries and economies contributed to the pilot study.[9] It is important to note that there was never an intention to test applicability and functioning of the pilot questionnaires in all national settings and contexts, that is, in the 48 countries, economies and educational systems that participated in TALIS 2018.

The pilot instruments (along with a draft glossary) were finalised in late April 2016 and released for the data collection in May 2016. The consortium held preparation webinars with representatives from the pilot countries/economies in late March and early April 2016 and also released a comprehensive guidance manual that included a concise list of general and per-item probing questions. The pilot was conducted in May 2016. Six countries/economies translated the questionnaires into one national language and one country translated them into two languages. The remaining four countries/economies used the English source version of the questionnaires with necessary local adaptations. The pilot was conducted using paper instruments and the only data entry work required was that NPMs filled in an online structured-session feedback questionnaire at the end of the focus group work. To manage the response burden at the pilot stage, the consortium and QEG split the teacher questionnaire into two partially overlapping versions, A and B. Although the QEG expected each focus group to discuss only one part in detail, members of each group received the full teacher questionnaire so that they could see and understand the full scope of topics, materials and contexts. There was no commensurate split for the principal questionnaire.

The pilot countries/economies had used various convenience (i.e. non-probabilistic) methods to gain teacher and principal collaboration (e.g. support from the ministry of education; using existing ties with teachers' networks developed during earlier research

projects). The pilot countries/economies also reported using a variety of incentives and rewards (i.e. a combination of monetary and non-monetary support as well as giveaways) or none at all. Most of the principal and teacher focus groups consisted of about five to ten people. In general, countries/economies tried to maintain a balance between male and female respondents, private and public schools, and urban and rural representatives, as well as between age groups. However, few participating principals were younger than 50 years old. Total average session duration for answering and discussing one instrument in the focus group was about three to three-and-a-half hours.

In terms of response burden, the majority of principals reported taking, on average, about 60 minutes to respond to the principal questionnaire, with individual times ranging from about 30 to 80 minutes. Because the teacher questionnaire was administered in two versions (A, B), each of the two groups of teachers responded to and discussed about two-thirds of the materials. Some teachers were able to complete the questionnaire (again, about two-thirds of all teacher questionnaire materials) in as little as 30 minutes, whereas some required up to 2 hours. The average time for completing the partial teacher questionnaire was similar to the principal questionnaire, that is, 60 minutes, indicating that teachers would need 90 to 95 minutes to complete the full set of teacher questionnaire materials.

In general, the results and inputs from the focus groups reflected various aspects relevant to development of the questionnaires. These included the acceptability and relevance of the questions, the clarity of the language used in the questions, ambiguity with respect to terminology, overburdening in terms of response detail or the need to recall past events and facts, and preferences for the alternatives presented to respondents (e.g. two versions of career plan questions or regarding preferred resource allocation). While most of the feedback was incidental (i.e. raised in just 1 of the 11 countries), some of it exhibited commonality and some of it clearly represented opposing views and feedback, with some of the latter impossible to reconcile. The results also showed that teachers and principals did not indicate any substantial areas, topics or issues that they might have thought were overlooked during the TALIS 2018 thematic scoping. As expected, respondents repeatedly reported that the questionnaires took too much time to complete.

The input and recommendations from the extended QEG, collected in June 2016, were equally rich in nature, such as those relating to the applicability of conceptual deliberations, literature and earlier insights from research in the context of low-income countries or in particular regions. When the experts were asked to reflect on the applicability of universal questionnaire templates for ISCED levels 1 and 3 (including VET), they overwhelmingly confirmed that the materials were relevant and applicable at all targeted levels of education. However, they did recommend the inclusion of particular materials that were not only relevant at ISCED level 1 but also aligned with TGB interests.

3.5. Field trial phase

3.5.1. Key areas of instrument revision and further development

The QEG members revised and substantially reduced the questionnaire materials between the pilot and the field trial with the aim of enhancing clarity and specificity and thus reducing erroneous interpretation of question intent. Members developed their initial proposals for changes as a desk exercise, with that work drawing on findings from the pilot study and from insights from the extended QEG in June 2016. During the third QEG meeting (in July 2016), members reviewed, discussed and implemented these proposals and identified other issues requiring additional work and input. They also ensured that all

initially agreed-on deletions, changes and additions were compiled in time for consideration at the second QEG meeting of the TALIS Starting Strong Survey. During this meeting, which took place later in July 2016, the experts from the early childhood perspective noted and reflected on the changes that the TALIS QEG had made to the materials that needed to be aligned between the two surveys. The early childhood experts also made several salient recommendations for changes to the TALIS materials in terms of language or clarity, as well as changes that they thought would improve the conceptual link and analytical potential between ISCED levels 0 and 1.

The TALIS QEG members subsequently incorporated a relatively large number of edits and changes into the TALIS materials to improve the clarity of the language used (i.e. at the word level). Editing also focused on harmonising language across questions and items, across response options and between the two surveys (TALIS and TALIS Starting Strong), with the latter involving close collaboration between both QEGs. Examples of the latter kind included, but were not limited to, consistent question instructions; consistent response options; the highlighting of required adaptations; the consistent use of certain terminology (e.g. "migration background", "children and young people", "parents or guardians"); and, finally, the use of the personal pronouns "your/my", but only in those instances where a proximate personal characteristic of the respondent was meant (in contrast to, say, "your school"). Such changes were also applied to questions retained from TALIS 2013, provided that the QEG was assured, after careful consideration, that the change would not have an impact on the statistical properties of the responses. Some of these changes were nonetheless recommended for experimental comparison as part of the field trial, in the interest of retaining the revised version or of reverting to the original in the main survey.

Some of the key substantial and structural revisions to the principal and teacher questionnaires were the following:

- *The merging of two sets of questions relating to initial teacher preparation:* The first set concerned elements covered in initial teacher preparation and asked the teachers to give a self-reported rating of their level of preparedness for each element. The second asked teachers to identify, from a listing of subjects, if they had specialised in any of them during their initial teacher preparation and whether they were currently teaching the subject. The intention behind both mergers was to extend analytical possibilities, with the latter also relating to a corresponding question in the PISA 2018 teacher questionnaire.
- *A re-allocation of a set of questions relating to self-reported activities and practices (conceptually related to instructional quality dimensions):* These received separate sets of response options depending on whether or not the practices were directly observable (low/high or shallow/deep inference).
- *Changing the format of some of the questions that allowed multiple responses:* These were extended, to the extent possible, to a yes/no format. Some questions were similarly converted from detailed counts (e.g. for certain categories of staff) to censored intervals (e.g. "1–5", "6–10", etc.) on the premise that these are easier to respond to.
- *Revisions to materials relating to the theme of equity and diversity:* These changes were the result of changes in items related to the global competency theme in PISA 2018, and of the TGB and NPM feedback received in March and April 2016. In particular, filter questions were used in cases where practices related to equity and diversity did not apply according to principals and teachers because of the local

composition of a school. Another question was substantially extended and split in response to comments regarding the need to include other dimensions of diversity (e.g. gender and socio-economic status).

- *Revisions to section headings, number of sections and the sequence and allocation of questions to sections:* These revisions were the result of substantial development work for TALIS 2018. In particular, the previous teacher questionnaire section on "background" had become too extensive and was subsequently partitioned into one section focused on personal background characteristics and qualifications and another focused on work experience and the current job. The allocation of some questions in the section "School Climate and Job Satisfaction" was revised (i.e. moved to other sections), as appropriate.
- *Inclusion in the field trial teacher questionnaire of an additional set of initial teacher preparation elements for teachers at ISCED level 1, which were also seen as relevant in ECEC contexts at ISCED level 0:* The TALIS and TALIS Starting Strong QEGs decided to synchronise these materials in order to improve the analytical potential of both surveys, especially for countries/economies participating in both the TALIS ISCED level 1 international option and the TALIS Starting Strong Survey at ISCED level 0.2.

As part of the QEG deliberations and processes during June to August 2016, several items and questions were deleted, generally in response to clear evidence and input from the pilot's focus groups regarding problematic aspects. Deletions were also a product, to a lesser degree, of input from the extended QEG. Examples of the deletions included items focused on specified leadership practices by principals, and also on teachers' school grades, teachers' feedback experiences and teachers' spending priorities (here, one alternative was retained and a forced-choice alternative was deleted).

Individual items were deleted in a number of cases, most frequently because of redundancy or conceptual vagueness (as evident from the pilot) or because the pilot intentionally included more items and questions than were needed for the field trial. Although the QEG agreed that the field trial should include some alternative item formats, they considered "anchoring vignettes" and "over-claiming" formats unsuitable for application in TALIS for ethical reasons and/or because of the excessive reading load generated by these item formats.

The pilot included some "situational judgement items". Because these performed reasonably well during the pilot, they were retained in the field trial but with the order of the response options reversed (i.e. in the direction of the latent trait signifying endorsement of the particular practice). The pilot also employed multiple alternative versions for some constructs. A notable example was a "ranking" and a "forced-choice" version of a question focusing on resource spending priorities from the perspective of teachers. As described above, the pilot feedback and the QEG's own evaluation work led to the better performing version being retained.

3.5.2. Assembling questionnaires

During its work, the QEG considered the original policy priorities provided to the consortium and reflected not only on all emerging perspectives and interests but also on inputs and interests emanating from sibling work (i.e. the TALIS Starting Strong Survey, TALIS Video Study, TALIS ITP Study, PISA 2018 general and global competency). The QEG carefully considered the balance of the priorities, as well as the number of questions

and indicators allocated to each area and theme. The QEG assessed, as a crude and, arguably, imperfect measure, that the correlation between these 2 metrics (priority and volume of material in terms of data points, questions and pages) was approximately equal to 0.8 for both the principal and teacher questionnaires. While this correlation reflected a general match between the development work at that stage and the TGB's mandate, the match was not perfect in all areas, in particular for school leadership in the principal questionnaire and for the combined theme of feedback and development in the teacher questionnaire.

This situation presented the QEG with an opportunity to choose the most appropriate balance of materials for the field trial and, by extension, the main survey. This opportunity aligned with the stipulation that, in keeping with technical standards, statistical considerations, and established practices in large-scale assessments, no new materials could be developed or admitted to the survey after the field trial.

The main concern in regard to the teacher questionnaire was that the volume of all material in it meant a response time of about 90 minutes in total. However, the total amount of all material that the field trial could accommodate under a form-based design meant a response time of 75 minutes, including a maximum time of 5 minutes to answer the national additions. As a result, the QEG needed to remove about 20% of the material from the field trial teacher questionnaire.

Alternative versions (forms) of the teacher questionnaire were used in a rotated design for the field trial. This approach meant the total amount of material could be trialled while ensuring that the response burden for any one teacher would not exceed the targeted response time for the main survey instrument, that is, 45 to 60 minutes on average for the English version, unless analysis of timing, fatigue and non-response indicators suggested that the total response time of 45 minutes should be closer to the time stated originally in the survey's terms of reference.

A second reason for using the rotated design related to the need to trial some alternative question wordings or formats, while a third reason came from the TAG's recommendation that the relative position of at least one section of the teacher questionnaire should alternate between forms to allow study of positional effects related to, for example, fatigue, effort, or other order effects, such as priming. Full randomisation of sections was not feasible because TALIS needed to continue to rely on a logical order of survey themes, from initial preparation through to current teaching activities and overall satisfaction with teaching. The QEG and consortium rejected suggestions to implement more complex designs, that is, those with more than three different forms, for reasons of operational complexity, especially in regard to paper-based administration of the survey instruments and in regard to analytical requirements.

To collect the views and inputs of TGB members on what materials to retain/delete, the consortium, in consultation with the OECD Secretariat, developed an Excel format input sheet for the teacher questionnaire (only). The sheet listed all developed questions, the key links to sibling activities (PISA and the Starting Strong Survey), an estimate of response time by question and section, and the QEG's identification of possible reductions. Because questions deemed important for cross-cycle comparison were locked in, they were not eligible for deletion. The consortium asked the TGB members to indicate, for each question, whether they thought it should be dropped from the field trial teacher questionnaire. The consortium also asked members to keep in mind, when making their decisions, the target response time of 75 minutes total.

The following tables illustrate the final field trial approach, which combined the TGB's ratings and wider considerations. Table 3.1 lists the questionnaire sections used in the field trial along with the number of core questions determined after the TGB meeting. It also gives the number of co-ordinated national options (CNOs) – questions that were not part of the international core questionnaire content but ones that several countries/economies wanted to leave in the questionnaire templates (note that CNOs counted towards the allowance for national adaptations; see Chapter 4 for details).

Table 3.1. Field trial questionnaire sections

	Core questions	Co-ordinated national options (CNOs)
A Background and qualification	8	2
B Current work	10	3
C Professional development	11	
D Feedback	3	
E Teaching in general	8	
F Teaching in the target class[1]	12	
G School climate and job satisfaction	11	
H Teaching in diverse environments	5	

1. Consistent with TALIS 2008 and 2013, a section on classroom-based characteristics, activities and perceptions was contextualised to a specific "target class" (i.e. group of students), operationalised as the first class that teachers taught in the school after 11 a.m. on the previous Tuesday.

Table 3.2 lists the sequence of blocks included in each of the three questionnaire forms. The design followed substantial considerations more than statistical ones. The inclusion of Section A on background in each version enabled basic breakdowns of the data during the field trial analyses. Each of the other two sections had two forms that differed in number of sections. However, the two sections balanced overall with respect to the number of questions and the estimated amount of time needed to respond to materials (between 58 and 59 minutes per questionnaire, including national options of up to 5 minutes). The page count (about 24 to 25 pages) was roughly equivalent between versions but varied by national version and the degree of text expansion following translation.

The asterisks (*) in Table 3.2 indicate sections that included an experimental version. The experimental version was one that the QEG included to assess the functioning of a revised approach to measuring an indicator and one that the group expected would not be immediately successful and therefore would not be retained in the main survey. Intentionally, Section G on school climate and job satisfaction appeared in two sequences designed to assess primacy and recency effects: once in a late final position, as was the case in TALIS 2013 (Form B), and once in an earlier position (Form C). Section H was included as the last section because it was fairly experimental at the field trial stage and its continued inclusion had yet to be formally decided.

Table 3.2. Field trial questionnaire design

Form A	Form B	Form C
A	A	A
B	B	D
C*	C	E*
E*	D	H
F	G*	F
x	H*	G
54 questions	**53 questions**	**49 questions**

x : not applicable

The consortium considered the size of the sample required for the field trial in light of this instrument structure (see also Chapter 5). Because a slightly larger number of schools and teachers were needed for the field trial in 2018 than in 2013, the consortium fixed the number at 30 schools and 20 teachers within each sampled school. Attrition aside, either 600 (common sections), 400 (materials used in 2 of 3 forms), or, as a minimum, 200 data points (for question alternatives/experiments) would then be available per country/economy for analyses. The above design made it possible to analyse all themes with one another even though this possibility was not a key design goal.

Given the much smaller size of the school/principal population (about 30 schools per country/economy), the use of a rotated administration design for the principal questionnaire was not feasible. Timelines, resource constraints and planned analyses also precluded a rotational or otherwise partial design in the main survey, which meant only a single/common teacher questionnaire could be used for each target population.

3.5.3. Embedded experiments and their subsequent evaluation

Views differ somewhat on the purpose of a field trial but it is generally agreed that its primary purpose in all large-scale assessments and surveys is to provide a "dry run" for the main data collection, with the particular focus being on the efficacy of the survey instruments as well as its operations. Some survey experts maintain that a field trial can and should be used for experimentation because no other stage in a project provides room for trialling new materials, formats or approaches. Long-term innovation in a project such as TALIS and beyond is hence critically dependent on field trials.

As part of the field trial, the consortium, in consultation with the QEG, the TAG and members of the PISA 2018 contractors, planned several experiments intended to shed light on how the alternative question formats and wordings differed in terms of function. The above design (alternative versions of certain sections) meant that while these experiments did not add to the overall response burden on individual teachers, they did increase the time countries/economies had to spend on translating questionnaire content. The experiments also reduced the analytical power to, on average, 200 rather than 400 cases per country/economy. For that reason, the consortium used the experiments sparingly.

The consortium agreed not to include experiments in the principal questionnaire because of the lack of alternate versions as an enabling requirement. The experiments were confined to the field trial and they included:

- alternative frequency scales for "extent" questions
- alternative wording for family-related aspects
- substantial revision of a question on teacher collaboration
- context priming in question stems
- alternative version of the resource allocation/spending question.

Advice received from the TAG in May 2016 and afterwards suggested that the assignment of experiments should be randomised; in other words, only subsets of countries/economies would receive the material relating to a particular experiment. However, the consortium rejected this recommendation because it conflicted with the technical standard that all questionnaire materials for the field trial had to be translated into all applicable languages of each country/economy. The TAG also recommended that experiments be assigned to respondents in a fully randomised way but the consortium disregarded this recommendation as well, given that some of the TALIS 2018 countries/economies would still be using paper administration. However, the consortium did acknowledge that a randomised design would be preferable in the fully online delivery of surveys anticipated for the future. The next section of this chapter reports the results of the experiments conducted during the field trial.

3.6. Main survey phase

3.6.1. Analysing the field trial response and process data

Forty-six countries participated in the field trial and the consortium worked with them to manage the adaptation and translation process, which, in many cases, involved more than 1 population besides ISCED level 2 (i.e. ISCED levels 1 and 3 and the TALIS-PISA link) as well as additional languages.[10] Notably, in comparison to the 2013 survey, the consortium discussed, in addition to semantic issues, a significantly larger number of suggested deviations from the structure of the questionnaires. The consortium also had to respond to an increase in countries/economies wanting to "opt out" of specific questions that they considered not relevant to their location and setting. This situation had not been foreseen as an area of potential concern during TALIS 2018 because it had not arisen during TALIS 2008 and 2013 or been foregrounded in the TALIS technical standards. It also contradicted the results of the 2015 priority-rating exercise, which showed countries and economies expressing a preference for a questionnaire structure that covered the same themes for all countries/economies and offered some allowance for national adaptations.

The consortium collated a log of potential questionnaire edits and improvements in parallel with the field trial adaptation and translation work. The consortium also received suggested edits from experts, including the OECD Secretariat, and integrated them into the log. consortium members then prepared an inventory of these potential improvements for the QEG. Improvements covered minor spelling, grammar and capitalisation amendments, as well as more substantive changes relating to the scope, structure and/or wording of items.

Following on from the work done in preparing the field trial instruments, editing focused on harmonising language use across questions and items, across response options and across surveys. Examples include the capitalisation of units, consistent question instructions and the use of the *OECD Style Guide* (3rd edition). These changes were also applied to questions from TALIS 2013 that were included in TALIS 2018 but only if the

QEG was confident, after careful consideration, that these questions would not affect the statistical properties of the responses.

Evaluation of complex scales and constructs

The analysis of the field trial data undertaken by the IEA Hamburg's Research and Analysis Unit encompassed: (1) scale and item evaluation; (2) cross-country/economy and cross-populations (ISCED levels and the TALIS-PISA link population) and evaluation of scales; and (3) cross-cycle evaluation of the scales. The QEG received the results of these analyses as they became available prior to the fourth QEG meeting in Paris.

The scale and item evaluation in (1) consisted of item statistics for the pooled data and the country-specific data and analysis of dimensionality via exploratory factor analysis (EFA) for the selected scales (upon QEG request). The Hamburg team used confirmatory factor analysis (CFA), Cronbach's alpha and other coefficients to evaluate scale validity and item reliability, and they used country/economy-specific model fit indices, factor loadings, item intercepts and coefficients to evaluate the cross-country/economy and cross-population applicability of the model in (2). The team also conducted measurement invariance analyses for ISCED levels 1, 2 and 3 and for the TALIS-PISA population. To evaluate the applicability of the scales across cycles in (3), the team used ISCED level 2 data from 2018 to estimate the model with the estimated parameters from the 2013 ISCED level 2 data. They used model fit indices and item parameters to evaluate the scales. All analysed data were weighted to ensure an equal contribution from each country/economy.

The procedures just described built on the procedures established for analysing the TALIS 2013 field trial and main survey data, and the Hamburg Research and Analysis Unit shared all findings from their analyses with the QEG, OECD Secretariat and the TAG. Chapter 11 of this report provides additional details on this process.

In general, the models for the overall ISCED level 2 model were deemed good and acceptable for many of the scales. However, some models did not satisfactorily fit for many countries/economies and scales. However, model and item properties were deemed sufficiently clear to allow selection of higher and lower quality items and scales to inform QEG discussions and the decision-making process. The results of the experiments mostly favoured the established formulations and formats, thus indicating the need to retain the 2013 main survey versions.

The consortium deliberately included 30 open-ended "other, please specify" dimensions in the field trial instruments in order to determine if any other dimensions and categories should be added to the questions for the main survey. After submission of the field trial data, the consortium asked each country/economy to examine the responses from their populations and to report back to the consortium those instances where a sizable proportion of total respondents gave a similar answer. The consortium collated these reports and provided QEG members with a summary of their content. Only five questions generated responses that were reported sufficiently widely to warrant consideration for inclusion.

Review of experiments

The following bulleted content describes how the experiments were embedded in the field trial and gives an account of the main insights gained from their presence:

- *Alternative frequency scales for "extent" questions:* Some of the existing questions from TALIS 2013 used an established set of response options ("not at all", "to some extent", "quite a bit", "a lot"), a format also used in PISA and, in part, taken from

earlier cycles of TALIS. The QEG for TALIS 2018 raised concerns with respect to the exactitude of the "quite a bit" option and challenged the appropriateness of the response options. As an alternative, the consortium proposed this set of response options: "not at all", "very little", "to some extent", "a lot". The experiment was implemented in the established (i.e. trend) self-efficacy question, with the original set comprising one form and the revised set the other form. Descriptive statistics were used to evaluate each alternative, while measurement invariance analyses along with cross-country/economy, cross-population and cross-cycle scale validation were used to evaluate the scale reliability and validity of the two alternatives. This work led to the established 2013 version being retained despite some differences in the measurement properties and the response frequencies.

- *Alternative wording for family-related aspects:* All instances of the word "family" were changed to the words "personal life" in the 2018 questionnaires. The change acknowledged that not all teachers have family duties and ties. The experiment, therefore, included "family" in one form of an item on barriers to professional development and "personal life" in the other form. This approach made it possible to check the equivalence of response proportions and other characteristics (e.g. non-response). Descriptive statistics were used to evaluate the item properties of the two scales (i.e. one with "family" and the other with "personal life"). Measurement invariance evaluation along with cross-country/economy, cross-population and cross-cycle scale validation were used to evaluate the reliability and validity of each scale. The established item formulation from 2013 was subsequently retained given evidence of some substantial between-country/economy changes in the measurement properties.
- *Substantial revisions of a question on teacher collaboration:* The aim of this experiment was to contrast the original (2013) and revised version of the question for statistical equivalence, with the expectation that one of the two versions would be retained, depending of course on the outcome of the evaluation. However, the members of the QEG noted a preference for retaining the revised version because they considered it had greater applicability to TALIS 2018. Descriptive statistics were used to evaluate the item properties of the two scales, while measurement invariance evaluation along with cross-country/economy, cross-population and cross-cycle scale validation were used to evaluate the reliability and validity of the two scales. As before, the 2013 formulations of the items were retained because of substantial changes in the measurement properties.
- *Context priming in question stems:* The intention behind these experiments was to investigate the impact of priming respondents by including context-related information in the question stem versus not including such information (i.e. a context-free stem). The question used for this purpose was a school climate question from TALIS 2013. The experiment used that version of the question as well as an alternative version that included a stem that read: "Thinking about the general climate in this school, …". Once again, descriptive statistics were used to evaluate the item properties of these two alternatives and measurement invariance evaluation along with cross-country/economy, cross-population and cross-cycle scale validation were used to assess scale reliability and validity. As before, the 2013 stem was retained because of substantial changes in the measurement properties.

- *Alternative version of the resource allocation/spending question:* Because the forced-choice version of the resource allocation question was dropped in accordance with feedback from the pilot study, the QEG decided to assess two alternatives of this question. The first was the ranking version used in the pilot. It asked respondents to pick the first, second and third most important priority out of a larger pool of priorities. The second – the rating version – asked respondents to rate the priority of all spending possibilities. Descriptive statistics were used to evaluate the two versions. The QEG rejected the one-choice-per-column variant (i.e. ranking) due to assumed and partially evidenced order effects, which meant they favoured retention of the earlier option.

Review of process and time data

The online delivery system collected process data for all of the countries/economies and respondents that participated in the online mode of data collection. Only two countries elected to collect data via paper questionnaires. The log of actions during the online administration, such as login events, navigation and responses, was saved anonymously, as were related absolute timestamps. Personal information about respondents, including IP addresses, was not saved at any time. In principle, analyses of these data profiled teachers or principals (e.g. average time to respond) as well as questions (e.g. the minimum, average and maximum time spent on questions). The analyses were done by population (e.g. ISCED level 2), country/economy, language and question, and also by whether a question was an international one or a national question added to the survey. Co-ordinated national options (CNOs) were deemed national questions.

Analyses also handled, in a standardised way, outliers that were the result of interruptions, which meant that time per question was trimmed to a certain maximum (mean plus three standard deviations). "Time to read" was extracted as the time a respondent took after reaching the page (one question per page/screen) to begin answering the first item. "Time to answer" was extracted as the time the respondent began answering until he or she navigated away from the page (mostly by clicking "Next"). Total time was computed as the sum of "time to read" and "time to answer". This sum was used as the *net* time the respondent took to complete the questionnaire, while "total time for questionnaire" was computed as the *gross* time the respondent needed to complete it. Total time thus included the time spent on the questionnaire's prologue and epilogue, on navigating, on reviewing/revising, and so on.

Before the field trial, the members of the QEG considered that 55 minutes to complete the core materials in each of the 3 versions of the teacher questionnaire would be a realistic and feasible target. Members also expected language expansion after translation would result in a higher or a lower response burden in several settings and could also potentially see the 60-minute target significantly exceeded. The QEG furthermore anticipated that a maximum of five minutes' response time would accommodate national additions (at the item and/or question level).

Key observations from the field trial analyses of data from almost all samples (i.e. countries/economies, languages, levels) included the following:

- The average gross response time for each teacher across countries/economies participating in the ISCED level 2 survey equalled almost exactly 1 hour, but remember that each teacher responded to only about 70% of the materials due to the use of the 3 survey forms (A, B, C). The target per person of 55 minutes of core

time plus 5 minutes to respond to national additions was somewhat met but only on average across the participating countries/economies.

- The average gross response time for principals of about 76 minutes was somewhat higher across the ISCED level 2 countries and economies.
- The average net time (across countries/economies and respondents) for the principal questionnaire was around 75 minutes for the English-speaking countries/economies and 85 minutes across all countries/economies, with the range of time spent extending from about 1 to 2 hours. Thus, the time targets expressed in the questionnaire's prologue (i.e. 45 to 60 minutes) were, on average, exceeded during the field trial.
- A high level of consistency was evident for both the net and gross times across the ISCED levels and the TALIS-PISA link within countries/economies. Thus, for example, average gross and average net times for ISCED levels 1 and 2 were largely consistent for both teachers and principals. The QEG members used the averages for the ISCED level 2 countries/economies as the benchmarks for their work.
- However, as occurred during TALIS 2013, the average net and gross times varied considerably across the TALIS 2018 countries and economies.
- A high level of correlation was evident in the average gross times taken to complete the teacher and principal questionnaires administered in the same language. The average per-question time for English-speaking versions and all languages correlated at 0.99. However, the totals for the English and the non-English versions were very different, with the averages for all languages consistently higher. This finding meant that the time target for the English version, as stipulated by the survey's terms of reference, would not be a meaningful or fair estimate for response burden across such a variety of countries/economies and contexts. The QEG members, therefore, used the empirical times across all languages in the ISCED level 2 survey for their deliberations.
- Stark differences were identified between the initial crude estimates of response time (e.g. those used at the second TGB meeting) and the actual empirical times. The QEG, therefore, used the empirical times for ISCED level 2.
- The time respondents took to read the questions versus the time they took to respond to them varied. Generally, questions with fewer data points and less information collected required more time to read (on average 60% of the time spent on the question) than time to respond (around 40% of the time spent on the question). Questions with more data points, mostly longer matrix-type questions, required relatively less time to read (about 25% to 30% of the time) than time to respond (around 70% to 75% of the time). The total time taken for a question correlated highly with the amount of information it collected. However, some of the outliers present in questions entailed a more complex and longer recall/response process (e.g. total time worked at school in last complete week; staff counts by category). When considering the amount of time respondents across all cases (e.g. ISCED levels) would need to answer the questions remaining after the field trial, the consortium estimated that 25% of the total time would be spent on reading and 75% of the time on responding.

- Many countries/economies exceeded the five-minute threshold for national items/questions. The consortium demanded respective reductions for the main survey from the countries/economies concerned. The TGB, having been informed of this situation, requested that NPMs receive support when selecting materials for the main survey to ensure compliance with the volume limits agreed to in the technical standards.
- Comparison of overlapping questions in Forms B and C showed that the position of these questions was identical in Sections "A. Background and Qualification" and "G. School Climate and Job Satisfaction". Different positions, however, applied to the questions in sections "D. Feedback" and "H. Teaching in Diverse Environments" (in each case, approximately 25 questions appeared further down Form B of the questionnaire than Form C). When the accumulated response times per question were compared, the findings showed that, in all cases, responding was faster when identical questions appeared later in the sequence (example items ranged from 12% to 23% faster responding). At the same time, zero-variation response patterns ("straight-lining") increased slightly for items presented later in the questionnaire.
- The presentation of the job satisfaction question in two different positions affected invariance and reduced model fit in a measurement invariance model. The job satisfaction scale was therefore administered at the end of the questionnaire, as was done in 2013.
- In regard to not-reached questions and items (i.e. those that a respondent did not answer because of previous drop-out) in the teacher questionnaire (with Form A used for the purpose of analysis), the proportions ranged from a minimum of 0.0% for 3 countries/economies to a maximum of 16.3% at the other extreme. On average, 4.7% (median 3.8%) of the teachers did not reach the end of the questionnaire, with the averages in 11 countries/economies ranging from 5% to 10%, and the averages in 5 countries/economies exceeding 10%. The averages for the remaining countries/economies ranged from 0% to 5%.
- For the principal questionnaire (and note that case numbers were low in some instances), the proportion of not-reached questions at the end of the questionnaire averaged 3.1% (median 0%), with the proportions ranging from 0% (in 26 countries/economies) to 20%. Three countries/economies had average rates of 5% to 10%, and 7 had rates larger than 10%.
- Both the QEG and the TAG agreed that the gradual increase in *not-reached* rates within and across countries/economies over the sequence of questions appeared, as in 2013, to follow a linear progression.

3.6.2. Revising and choosing content for the main survey

The QEG held its fourth and final in-person meeting in Paris in May 2017. The overall goal of the meeting was to jointly discuss and agree on the proposed content of the main survey questionnaires and related documents. The meeting adopted a conservative approach to the process of selecting main survey questionnaire content and it used three broad considerations to guide its deliberations. These were technical validity, conceptual value, and efficiency/length.

- *Technical validity:* All items had to have proven measurement quality, meaning that no new constructs, questions or items could be considered. If field trial data indicated a fundamental defect, the construct, question or item was dropped rather than revised. Minor edits relating to grammar, spelling, capitalisation and consistency were accepted. However, no substantive or semantic changes were considered unless sufficiently indicated by field trial data, for example, by responses to open-ended "Other, please specify" questions.[11]
- *Conceptual value:* The QEG considered the conceptual value of items in relation to the TALIS 2018 conceptual framework and the OECD's draft reporting plan. Members also took into consideration linkages to the TALIS Starting Strong Survey, the TALIS Video Study and PISA 2018, as well as possible contributions to the Sustainable Development Goals (SDGs) Target 4 and, as a priority consideration, to TALIS 2013.
- *Efficiency/length:* Analysis of the timing data from the field trial signified that the overall length of both questionnaires had to be reduced by at least one-third. The meeting sought, wherever possible, to reduce the number of items per question while ensuring the most efficient coverage of constructs in the instruments. Short questions (in terms of reading or response times) were preferred to longer ones, as were questions that served the needs of multiple themes. Where two or more questions covered similar constructs, all but one was dropped, with the decision based on the need and priority to report changes over time, criterion validity or similar rationale. In those instances where a construct was assessed from two different perspectives, the perspective with the better psychometric quality was the one retained.

In addition to removing almost all of the open-ended "please specify" dimensions, the meeting members deleted around 32 items from 15 questions in the principal questionnaire, and 65 items from 21 questions in the teacher questionnaire. In three instances, the QEG collapsed two or more dimensions into a single dimension.

Key modifications made to the structure or scope of questions were documented, annotated and communicated to the TGB, while minor modifications to spelling, grammar, punctuation and wording were made in accordance with the agreed approach and rules. Examples of deletions made on the basis of scientific rationale (poor functioning, low comparability) or other rationales (e.g. similar information or proxies available elsewhere) included the following: all situational judgement[12] items on cognitive activation, classroom management, clarity of instruction and teacher support (cross-cultural variation very high, bad model fit overall); job commitment/career plans (attrition proxy could be derived from teachers' age and number of years remaining in teaching); and a school team's degree of innovativeness (same scale administered to teachers and principals, teachers able to provide more accurate ratings).

Given increased ethical concerns about the collection and use of data, including process data, the consortium extended the questionnaire introductions to include language that informed respondents that process data, such as time spent on items, might be collected in an anonymous way and used for methodological and validation purposes.[13]

After eliminating questions based on this scientific rationale, the QEG considered three additional categories of possible deletions based on their understanding of priorities, on the analytical potential of questions and on ensuring that balance breadth and depth would still be maintained for each of the themes. Accordingly, the QEG flagged a sufficient

number of questions under two groupings: Category 1 (possible deletion, low/limited impact on analytical potential), and Category 2 (possible deletion, medium impact). Based on response-time estimations, the consortium concluded – and the TAG and OECD Secretariat agreed in principle – that all questions flagged as Category 1 and Category 2 had to be dropped to ensure maintenance of reasonable response time targets for both the teacher and principal questionnaires. The QEG also identified some additional questions as candidates for deletion should further reductions be required (Category 3). The final decisions on what to retain and what to delete were taken in close consultation with the OECD Secretariat and the TGB's chair and vice-chairs.

The consortium then provided NPMs with a detailed mapping of all revisions at the item and word levels, along with finalised, clean versions of the instruments, to facilitate updating of translations from the field trial questionnaires to the main survey questionnaires (see Chapter 4).

Because questions relating to qualification pathways and cohort and teacher mobility were offered as co-ordinated national options in the field trial, data harmonisation, sharing and comparison across these questions were at the discretion of the countries/economies and not the consortium. The consortium and QEG recommended that these questions be treated in the same way for the main survey. However, the consortium determined where the co-ordinated national options (CNOs) would be positioned in the questionnaires. If, for example, questions on teacher qualifications were used, these remained in the same sequence as for the field trial, that is, within the respective background section. Questions on teacher mobility were moved to a final section of their own, while any other national extensions were positioned, in compliance with the TALIS technical standards, at the end of the questionnaire. Eventually, about three out of every four countries/economies included the CNOs in their national version, with inclusion conditional on these participants' data needs and priorities.

Table 3.3 lists the total number of questions across the TALIS cycles. A number of questions are used here as a proxy for overall length in terms of pages, word count and response time. As is evident from the table, the total number of questions included in each cycle increased.

The last stage of selecting and approving the content of the questionnaire was resolved not only on the basis of psychometric/statistical analyses, data and scientific rationale but also on the basis of the TGB's views on an appropriate allocation of material (or, the best use of respondents' time) to each theme and its associated questions, items and indicators, as well as the need to derive data that would satisfy the survey's proposed reporting plan.

The consortium projected an average net response time for the principal questionnaire, with that time exclusive of CNOs, of about 52.9 minutes across all countries/economies (41.5 minutes for English) and an average net response time for the teacher questionnaire of about 51.4 minutes (40.6 for English). In addition to the net response time (reading and answering), the consortium estimated that an additional 5 to 10 minutes would be needed for logins, prologues, epilogues, reviews and navigation (with these elements jointly forming the gross response time).

Table 3.3. Overview of question count across TALIS 2008, 2013 and 2018 (field trial and main survey)

	2008 main survey	2013 main survey	2018 field trial	2018 main survey
Principal questionnaire	37 questions	39 questions No CNOs Increase: 2 from 2008	55 questions No CNOs Increase: 16 from 2013	45 questions No CNOs Increase: 6 from 2013
Teacher questionnaire	43 questions	46 questions 3 CNOs (social desirability, mobility) Increase (core): 3 from 2008	68 questions 5 CNOs (initial preparation, mobility) Increase (core): 22 from 2013	52 questions 6 CNOs (TQ-4+5 on initial preparation, TQ 24 on support for professional development, TQ 56 to 58 on mobility) Increase (core): 6 from 2013

These estimates meant that the gross average response time stipulated by the survey's terms of reference, that is, 45 minutes for the English version(s), would be exceeded. Given the consortium's concern about the overall increase in the number of questions, its members presented key findings from the process data analysis and the preliminary response time estimates to the TAG during the June 2017 meeting. In response, the TAG advised that it did not see a strong technical reason for not using the proposed questionnaire materials or for a specific cut-off time. However, the TAG did express concern that a longer questionnaire would likely yield such disadvantages as a hastier response style and poorer quality responses. The TAG members, therefore, suggested that process/time data be included in the data editing and the review of "straight-lining" (including defining item-level non-response) of the main survey data. Because of time constraints, priorities and overall limited resources, it was not possible to use the process data in this way or to analyse the sample process data (collected as part of the main survey) by the time this chapter was completed.

The consortium concluded that TALIS 2018 reached a limit, firstly with respect to what the current survey and questionnaire design could accommodate in terms of breadth and depth within and across the sizable number of themes, and second with respect to what it could reasonably expect from principals and teachers in terms of survey engagement and response burden. The consortium advised the TGB to expect, in comparison to TALIS 2013, the following: (1) some reduced co-operation and thus a higher level of questionnaire non-response; (2) some increase in the level of non-response for questions towards the end of the questionnaire; and (3) some reduction in response quality. While Aspects 2 and 3 had not been fully analysed at the time of writing, there was initially no evidence to indicate a noticeable effect on response rates across countries (Aspect 1) and cycles, as was reported to the TGB during its fifth meeting in Paris in February 2019.

3.6.3. Minimum questionnaire response and the corresponding definition of a "participating teacher"

TALIS 2013 considered a respondent to be a "participating teacher" if he or she answered at least one item in the questionnaire, a lenient rule adopted from student achievement studies in the field, including PISA. While the TALIS 2013 TAG initially advised to aim for a minimum of one answer in the background section of the questionnaire and at least

one answer from its substantive part (i.e. non-background), discussions with the TALIS Board of Participating Countries (BPC) resulted in the board's decision to retain the threshold at one answer and its agreement that this criterion would, therefore, suffice to define a "participating teacher" (Technical Standard 4.28 in TALIS 2013).

During discussions between the TALIS 2018 consortium and the TAG, it was suggested, via an internal technical memo, that the notion of "participating teacher" should be investigated again and that the impact of various rules should be assessed through the use of TALIS 2013 teacher data. The data set used was one where the records contributed to most, if not all, of the TALIS 2013 tables and models, and it was therefore seen as preferable to a set where useful information was scarce.

To achieve the analysis, the consortium compiled a list of some 46 variables and 3 scales comprised of 70 individual items in total (List 1) from the teacher background and initial preparation section of the TALIS 2013 teacher questionnaire (23 items), the professional development scale (23 items), the self-efficacy scale (12 items), the professional collaboration scale (4 items) and the job satisfaction scale (8 items). Meanwhile, the OECD Secretariat proposed a second list (List 2) consisting of 12 items from the teacher background and initial preparation section of the questionnaire (3 items) and from the professional development section of the questionnaire (9 items). List 1 spanned the entire teacher questionnaire and addressed key TALIS 2013 topics (which remained important in TALIS 2018). List 2 was optimised to address UN Sustainable Development Goal (SDG) 4.

The consortium then tested 3 different definitions of a "participating teacher": (1) where the teacher's responses covered at least 75% of the 46 variables and 3 scales on List 1; (2) where the responses covered at least 50% of the 46 variables and 3 scales on List 1; and (3) where the responses covered each of the 12 variables in List 2. A response to or no response to any other item or variable was not considered a factor in these definitions.

For each definition, the consortium assessed and classified each returned TALIS 2013 teacher questionnaire as "participating teacher" or "non-participating teacher". Teacher non-response adjustment factors were recomputed if needed. If the number of "participating teachers" fell under 50% of the selected teachers, the consortium flagged the school as "non-participating" and then recomputed the school non-response adjustment. Final estimation weights and replication weights were also recomputed.

To assess the impact of each definition, the consortium recomputed estimates and compared them with the results of the TALIS 2013 cycle for a number of tables. The variables covered during this process included: (1) age and gender distributions; (2) teachers' educational attainment; (3) hours spent working and spent teaching; (4) teachers' practices and job satisfaction; (5) subjects taught in current year; (6) professional development activities; and (8) professional development needs. The impact on participation rates and, therefore, on adjudication recommendations was also looked into.

In summary, and probably because of the generally high response rate in TALIS, none of the definitions had a severe impact on the estimates: the differences between the estimates published in 2013 and the alternative versions studied were for the most part negligible. Definition 2 (50% of items on List 1) was the most lenient and had the least impact on the estimates and on adjudication as hypothesised. Definition 1 (75% of List 1) and Definition 3 (all of List 2) had more impact than Definition 2. The impact also differed across countries/economies because both lists spanned the teacher questionnaire to

different extents. Definition 1 tended to have the most impact on teachers who became fatigued early on while answering the questionnaire. However, because of the shorter span of List 2 and because the items on it appeared mostly at the beginning of the teacher questionnaire, the impact of early drop-outs was not as clearly felt as it was under Definition 3.

All 3 definitions had little impact on those countries/economies where teacher and school participation rates were well above 85%. The impact was much more visible in countries/economies where participation was moderate (say, from 60% to 75%) or where respondents experienced survey fatigue relatively early while answering the questionnaires. Adjudication recommendations stayed identical except for two countries that would have seen their rating drop one category (from "good" to "fair" and from "fair" to "poor" respectively) due to loss of "responding teachers" and the ensuing loss of "participating schools".

The detailed results of this study were presented to the TAG in June 2017 at their meeting in Paris. The TAG recommended that TALIS 2018 Technical Standard 3.29 should be modified to reflect Definition 1 (after the corresponding teacher questionnaire items in TALIS 2018 had been identified)[14]. The TAG further recommended that data records which did not meet the standard on teacher participation should be: (1) excluded from the respective analyses; or (2) included, but with a note advising that the participating teacher standard had not been met.

During its third meeting in Lisbon in July 2017, the TGB decided not to adopt the definition but to apply the existing Technical Standard 3.29 instead (see Chapters 8, 9 and 10 for more details).

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Notes

[1] At this stage, it was determined that the concurrent uptake of the TALIS-PISA link option as part of both TALIS and the PISA teacher questionnaire would constitute a significant overburdening of teachers, especially in small countries where a large proportion of schools would be participating in both TALIS and PISA, and thus could mean some teachers receiving up to three different teacher questionnaires (core TALIS, TALIS-PISA link and PISA).

[2] The TALIS Board of Participating Countries (BPC) became the TALIS Governing Board (TGB) from 1 January 2016.

[3] The TAG also provided input through a series of virtual meetings (each lasting around two to three hours) conducted throughout the duration of the study: January 2016, March 2016, June 2016, November 2016 and March 2018. Written consultations about specific issues also took place during this time period.

[4] Dr Kaplan's contribution to the QEG was methodological in nature rather than related to the survey's core and substantial themes. Dr Kaplan also provided an important point of liaison with the PISA 2015 and PISA 2018 QEGs as required by the TALIS 2018 terms of reference.

[5] Dr Price provided essential links to the analytical work conducted as part of TALIS 2013, and which she contributed to at the time.

[6] Dr van de Vijver later contributed to the substantial development of the survey in connection with the topic of equity and diversity. This topic was changed into a full theme rather than a cross-cutting aspect prior to the field trial.

[7] Eventually, the TALIS 2018 main survey instruments did not cover "beliefs" about teaching, given sub-par measurement characteristics in the field trial (and originally in TALIS 2013). The theme title was subsequently shortened in the final conceptual framework.

[8] As agreed with the OECD Secretariat and TGB, QEG members received advance access to the draft international database in mid-2019 so that they could conduct their own analyses and publications, with that access conditional on the same embargo and data use policy that applied to the TGB.

[9] Pilot contributors were Alberta (Canada), Australia, Colombia, the Czech Republic, Dubai (United Arab Emirates), France, Kazakhstan, the Netherlands, Norway, Portugal and Sweden.

[10] Two late-joining countries/economies out of the total 48 countries/economies conducted a field trial at a later stage; the results did not contribute to the main field trial analyses.

[11] The European Commission requested the inclusion of an indicator on the proportion of students with an immigrant background (first or second generation) in the school (principal questionnaire) and classroom (teacher questionnaire). This late addition was problematic from a process perspective because the question had not been field-trialled. Given the European Commission's strong interest in conducting analyses of school and teacher data in light of the concentration of immigrant students, the OECD Secretariat and TALIS 2018 Consortium decided to defer the decision to the TGB. The TGB subsequently decided, during its third meeting in Lisbon, to include this question in the main survey.

[12] A variety of approaches were used to analyse these items in co-operation with Dr Leslie Rutkowski and in consultation with the TAG as well as additional experts convened by the OECD Secretariat for a webinar. Most importantly, insufficient measurement properties (in item response theory and factor analytical frameworks) and the absence of a consensus on appropriate or preferred

situational reaction led to the QEG dropping the items. The TAG recommended that future TALIS cycles explore different scale scoring methods, such as "wisdom of the crowd" or expert ratings.

[13] For the main survey, the consortium collected process data (i.e. timestamped events reflecting user actions, browser and screen size details, but no IP addresses) from a sample of respondents only. The intention was to use the data to assess the overall quality and validity of the data, for example, with respect to proportions of respondents with exceptionally low or high response times.

[14] The consortium and QEG determined the following list of 20 key questions from the field trial that could reasonably describe a teacher, that had high policy relevance and that were assumed to be relatively stable across cycles: gender (TQ-01), age (TQ-02), highest educational attainment (TQ-04), qualification elements and preparedness (TQ-08), employment status tenure (TQ-11), employment status full-time equivalent (TQ-12), work experience (TQ-13), special needs teaching status (TQ-16), subjects taught (TQ-17), time distribution – total hours (TQ-18), time distribution – teaching hours (TQ-19), professional development types/formats (TQ-27), professional development topics (TQ-28), professional development needs (TQ-32), engagement in collaborative activities (scale, TQ-40), general self-efficacy (scale, TQ-41), satisfaction with classroom autonomy (scale, TQ-52), core teaching practices in target class (scale, TQ-54), satisfaction with the profession and school (scale, TQ-65), and self-efficacy in multicultural environments (scale, TQ-70).

Chapter 4. Preparation of national survey instruments

This chapter summarises the outcomes and procedures for national adaptation verification and international translation verification, and includes information about the layout verification process of the Teaching and Learning International Survey (TALIS) instruments. The international adaptation, translation and layout verification of all specified instruments in the identified target languages was conducted before the field trial and main data collection of TALIS 2018.

All participating countries/economies produced national survey instruments efficiently and of high quality. Quality control during production of the national instruments helped ensure the collection of high-quality data that can be compared internationally across countries/economies and over time. National adaptation forms supported adaptations of the international source versions in the main survey for all target populations chosen by the participating countries and economies. The materials for each country/economy and survey language were carefully cross-checked against the various source instruments, that is, the international (English, French) instruments, the versions for the different target populations and the versions used in the previous TALIS cycle (TALIS 2013).

The development of the various target questionnaires produced from the international source questionnaire, ranging from one to four different target populations (if and when applicable), was generally successful with respect to ensuring accuracy and consistency not only within the national materials for each country/economy but also across the national survey instruments used by each participating country/economy.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

4.1. Overview of adaptation and translation verification

The TALIS 2018 survey instruments were reviewed during several stages of their preparation. Instruments included questionnaires (online and paper data collection) and cover letters (online data collection). The reviews focused on approving national modifications to all instruments (in a given target language) and this chapter describes the procedures related to that work, which encompassed three major activities:

- translation and adaptation of the international source versions of the TALIS instruments into the national languages
- international verification of the national translations and adaptations
- international layout verification of the final national instruments.

Everybody involved in preparing the instruments had to meet the procedural requirements for translation and translation verification (including the submission and review procedures) outlined in the TALIS 2018 Technical Standards 4.1–4.27. The *TALIS 2018 Survey Operations Procedures Unit 3*, provided to all TALIS 2018 national project managers (NPMs), contained detailed instructions on instrument preparation.

The survey instruments, which included an international version in English and a version translated into French (the official languages of the OECD), were released to the national study teams during three key phases. The first phase consisted of a pilot study, during which experts reviewed the survey instruments. Each national study centre could use either the English or French source version of the instruments (on the assumption that the teachers and principals responding to them could understand English or French) or perform a full translation into the local language(s). Because the piloted national TALIS questionnaires were used solely to collect qualitative data and feedback rather than quantitative, internationally comparable data, national adaptations and translations were not examined by external verifiers.

The second and third key phases were the field trial and the main survey respectively. During these phases, the national questionnaires underwent stringent independent adaptation, translation and layout verification processes. The national study centres began this work by adapting the international source version of the teacher and principal questionnaires (available in English and French) to fit their respective national or subnational contexts. This work included structural and non-structural adaptations of questions and, to a very limited extent, national additions of items, categories and questions. Each national study centre used national adaptation forms to document their adaptations to their national survey instruments. The TALIS 2018 international study centre (ISC) was responsible for approving all documented adaptations.

In preparation for the field trial and the main survey, decentralised translation took place. This meant that each country was responsible for adapting and translating its own national instruments from one of the two source versions (English or French). The translation process required translation and translation review at the national level. For the main survey, the ISC provided countries/economies with Word documents containing translated questions from the field trial that could be used in unchanged form for the main survey.

During the translation verification process, overseen by the IEA Amsterdam, independent language specialists at cApStAn Linguistic Quality Control (an agency specialising in validating translations of international survey instruments) compared the translated instruments side by side with the international versions. Upon completion of the

verification, the IEA Amsterdam returned the instruments, each of which contained verifier feedback accompanied by a severity code (established by the IEA), to the TALIS 2018 NPMs and asked them to review the verifiers' comments and improve the translations or adaptations in line with the IEA's guidelines for translation. From there, the NPMs submitted the instruments to the ISC for verification of the layout, after which the NPMs finalised their respective sets of instruments for data collection.

4.2. Instruments requiring adaptation and translation

The following materials needed to be adapted and translated by each country/economy based on the mode of administration (online and/or paper):

- one principal questionnaire template, requiring a variety of mandatory adjustments for the different International Standard Classification of Education (ISCED) levels/TALIS-PISA link
- one teacher questionnaire template, requiring a variety of mandatory adjustments for the different ISCED levels/TALIS-PISA link
- one principal cover letter template for online administration, requiring a variety of mandatory adjustments for the different ISCED levels/TALIS-PISA link
- one teacher cover letter template for online administration, requiring a variety of adjustments for the different ISCED levels/TALIS-PISA link.

The *TALIS 2018 School Co-ordinator Manual*[1] also needed to be adapted and translated into the language(s) used by the school co-ordinators. Although the manual was not subject to international translation or layout verification procedures, national translations of and adaptations to the manual had to adhere to TALIS procedures. The IEA's independent international quality observers (IQOs) reviewed the national version(s) of the *School Co-ordinator Manual* and included their comments in their translation verification report (for details, see Chapter 7).

4.3. Identifying the target language

Most countries and economies taking part in TALIS 2018 administered the survey in one predominant language, typically the language used throughout their entire education system or at least understood by all respondents. Of the 48 participating countries/economies, 9 administered the survey in more than 1 language (with the number ranging from 2 to 5 languages). The ISC advised these countries/economies to involve professionals familiar with more than one of these languages to review the translations and to ensure equivalency across versions.

Participating countries/economies translated the principal and teacher questionnaires into the languages listed in Table 4.1. The countries/economies that conducted online data collection translated cover letters to be distributed to participants. The cover letters contained information about the study, the web address for accessing the online questionnaire and individualised user login information.

In general, each set of instruments underwent two rounds of translation verification – once for the field trial and once for the main survey. However, two of the languages administered during the main survey were not administered during the field trial. Norway initially intended using only Bokmål but during the field trial decided to administer the instruments in Nynorsk as well. This late decision, along with tight timelines, the fact that Bokmål was

the only language used in the regions participating in the field trial and the similarities between Bokmål and Nynorsk, led to the national centre and the ISC agreeing that the instruments in Nynorsk should undergo translation verification only during the main survey. In Finland, the only language used during the field trial was Finnish, even though the national centre had also prepared a Swedish translation. This translation was based on the Swedish translation that Finland borrowed from Sweden. Due to the small number of schools in Finland that would administer the instruments in Swedish, Finland elected not to use the Swedish version during the field trial so as to prevent under-representation during the main survey.

Several countries/economies used the English version of the instruments, notably England (United Kingdom), Malta and the United States. Only two countries used the French version – Belgium and France. These countries/economies all made national adaptations to the instruments and submitted them for adaptation verification, language verification and layout verification.

Table 4.1. Languages used in TALIS 2018

Participating country/economy	Main survey language(s)
Alberta (Canada)	English
Australia	English
Austria	German
Belgium	French
Flemish Community (Belgium)	Flemish (Dutch)
Brazil	Portuguese
Bulgaria	Bulgarian
Chile	Spanish
Ciudad Autónoma de Buenos Aires (Argentina)	Spanish
Columbia	Spanish
Croatia	Croatian
Cyprus[1,2]	Greek and English
Czech Republic	Czech
Denmark	Danish
England (United Kingdom)	English
Estonia	Estonian
Finland[3]	Finnish and Swedish
France	French
Georgia	Georgian, Azeri and Russian
Hungary	Hungarian
Iceland	Icelandic
Israel	Hebrew and Arabic
Italy	Italian
Japan	Japanese
Kazakhstan	Kazakh and Russian
Korea	Korean
Latvia	Latvian
Lithuania	Lithuanian
Malta	English
Mexico	Spanish
Netherlands	Dutch
New Zealand	English and Maori
Norway[4]	Bokmål and Nynorsk
Portugal	Portuguese

Participating country/economy	Main survey language(s)
Romania	Romanian
Russian Federation	Russian
Saudi Arabia	Arabic
Shanghai (China)	Mandarin
Singapore	English
Slovak Republic	Slovak
Slovenia	Slovenian
South Africa	English
Spain	Spanish (Castilian), Catalan, Galician, Valencian and Basque
Sweden	Swedish
Chinese Taipei	Traditional Chinese
Turkey	Turkish
United Arab Emirates	Arabic and English
United States	English
Viet Nam	Vietnamese

1. Note by Turkey: The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".
2. Note by all the European Union Member States of the OECD and the European Union: The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.
3. For Finland, only Finnish was administered during the field trial.
4. For Norway, only Bokmål was administered during the field trial.

4.4. Adaptations

Adaptations were kept to a minimum but some were mandatory to ensure that the principals and teachers in each country/economy received questions equivalent to those administered to principals and teachers in all other countries/economies. Revisions included structural and non-structural changes, as well as mandatory and elective adaptations.

- *Structural adaptations:* The term "structural adaptation" referred to any adaptation that altered the structure of the international source questionnaires by removing, adding or splitting categories, by removing, adding or splitting national dimensions, by removing or adding questions or by changing the width and range definition for a question.
- *Non-structural adaptations:* Non-structural adaptations referred to adaptations that did not change the structure of the questionnaires, that is, neither added nor subtracted questions, dimensions or categories to or from the instruments. The adaptations typically involved adapting terms and phrases to fit the cultural context of each country/economy. The adaptation of the term or phrase was more than a pure translation because the international term or phrase was replaced by the national term or phrase.
- *Mandatory adaptations:* The international questionnaires contained terms or phrases that needed to be adapted at the national level. These adaptations were non-structural because they did not alter the structure of the instrument but adapted it to fit a local context. To facilitate the mandatory adaptation process, the international

versions of the questionnaires included brackets and yellow highlighting to indicate the places where mandatory adaptations were needed.

- Square brackets. These required NPMs to add some nationally-specific information such as that relating to procedures on how to return questionnaires and specification of deadlines, for example, "[national return procedures and date]".
- Angle brackets. These required NPMs to replace the words in the brackets with the country/economy-appropriate term or terms. Some of these words related to the target populations (respondents). For example, <ISCED Level x> needed to be replaced with the appropriate educational level set out in the International Standard Classification of Education 2011 mapping (UNESCO-UIS, 2012[1]), such as "lower secondary education". Additional advice and instruction in the *TALIS 2018 Survey Operations Procedures Unit 3* also helped NPMs identify appropriate adaptations.

- *Elective adaptations:* Countries/economies could apply additional non-structural adaptations, such as replacing (where necessary) terms or phrases with terms or phrases relevant to their respective contexts and cultures. Examples included names of specific institutions and ways of addressing people. Elective adaptations also included the following:
  - Valid ranges (if necessary), removal of non-applicable questions or dimensions, and addition of categories (if necessary).[2]
  - National questions. National study centres were permitted to add these questions at the very end of each questionnaire. These national questions could be ones developed by the participating countries/economies themselves or be items originally discarded from the international instrument but still deemed appropriate for implementation (e.g. questions on teacher mobility). The ISC stipulated, as a general rule, that these additional questions should add no more than five minutes of response time to a questionnaire's total response time.

During the adaptation process, participating countries/economies decided not to administer certain items. Table 4.2 and Table 4.3 provide an overview of the questions, dimensions and categories that countries/economies decided to exclude from the TALIS 2018 administration before preparation of the national survey instruments.

Table 4.2. Excluded TALIS 2018 principal questionnaire questions (before translation verification)

Participating country/ economy	PQ-08	PQ-10	PQ-11	PQ-15	PQ-17	PQ-19	PQ-20	PQ-24	PQ-25	PQ-29	PQ-33	PQ-39	PQ-42
Bulgaria	H										H	B, C	
Ciudad Autónoma de Buenos Aires (Argentina)							G–H	D	C, F				
Croatia				ISCED2: A, D, E ISCED3: A–C				C	C, F				
Cyprus[1]		CAT 5											

Participating country/ economy	PQ-08	PQ-10	PQ-11	PQ-15	PQ-17	PQ-19	PQ-20	PQ-24	PQ-25	PQ-29	PQ-33	PQ-39	PQ-42
Denmark				ISCED3: A		F–H			C				
France						D							
Italy							G, J						X
Japan						F							
Korea				E									
Malta				E									
Spain										C, M			
Sweden	D		A–D							C			
United States					D								

1. See Notes 1 and 2 under Table 4.1.
Note: In the table, an "X" means that the respective country/economy excluded the question. For questions with multiple dimensions, the listed letters refer to those dimensions of the respective question that were not administered in the country/economy. For example, Bulgaria excluded dimension H of PQ-08. "CAT" denotes that a question category was excluded. Where necessary, the information presented in the table distinguishes between the different TALIS 2018 target populations (i.e. ISCED level 1, ISCED level 2, ISCED level 3 and TALIS-PISA link). Unless stated otherwise, all information refers to the ISCED level 2 instruments.

Table 4.3. Excluded TALIS 2018 teacher questionnaire questions (before translation verification)

Participating country/ economy	TQ-14	TQ-15	TQ-20	TQ-24	TQ-29	TQ-35	TQ-36	TQ-50	TQ-55
Belgium				A–H					
Flemish Community (Belgium)				A–H					
Bulgaria	X		H				X		A–I
Ciudad Autónoma de Buenos Aires (Argentina)				A–H	D				
Croatia					C				
Israel		F							
Italy								X	
Japan		ISCED1: G ISCED2: F		A–H					
Netherlands		ISCED1: A–G, J–K							
Shanghai (China)		F							
United States				A–H		G			

Note: In the table, an "X" means that the respective country/economy excluded the question. For questions with multiple dimensions, the listed letters refer to those dimensions of the respective question that were not administered in the country/economy. For example, Croatia excluded dimension C of TQ-29. Where necessary, the information presented in the table distinguishes between the different TALIS 2018 target populations (i.e. ISCED level 1, ISCED level 2, ISCED level 3 and TALIS-PISA link). Unless stated otherwise, all information refers to the ISCED level 2 instruments.

4.5. National adaptation forms

All changes, selections and adaptations to the TALIS instruments were done with the goal of creating an international database containing comparable data from all participating countries/economies. NPMs noted all revisions to the instruments for the main survey in an Excel document called a national adaptation form (NAF). NPMs received adequate training in using the form and were required by the ISC to fill out a form for each language and target population in which they intended to administer the instruments. Georgia, for example, filled in a set of three NAFs because it administered TALIS in Azeri, Georgian and Russian. The NAF ultimately contained the complete translation, adaptation and verification history of each set of national instruments for every applicable target population and it was, therefore, an integral part of the adaptation and translation processes before and after international translation verification and, finally, layout review.

During preparation of the national instruments, the ISC asked the NPMs to submit the adaptation forms at five key times (project "milestones"):

- *Step I, NAF approval:* The ISC reviewed the proposed adaptations entered on the NAFs. Terms and items used in TALIS 2013 had to be translated identically to allow for trend analysis. The ISC released the TALIS 2013 main survey instruments as a reference. The ISC also gave all participating TALIS 2018 countries/economies the International Standard Classification of Education 2011 mapping (UNESCO-UIS, 2012[1]) and asked them to use this for referencing the ISCED levels.
- *Step II, translation verification:* External language experts (from cApStAn) reviewed the translated (updated) ISCED level 2 core instruments, referring to the NAFs when relevant and commenting on any implemented adaptations. The experts also verified translations of the cover letters and the NAFs for the other international options (ISCED level 1, ISCED level 3 and the TALIS-PISA link).
- *Step III, layout verification:* During this stage, the ISC compared the layout of the national instruments with the international source versions in English or French and noted any deviations from the international versions in the national instruments.
- *Step IV, online data collection (ODC) verification:* The ISC prepared online questionnaires for each participating country/economy in the respective language(s). The online questionnaires included all adaptations to match the national instrument structure. National study centres then used the online delivery system to review the final online instruments.
- *Step V, codebook verification:* The ISC created a national codebook for each country/economy. Countries/economies were asked to check the structure of the national codebook by entering one record for each questionnaire type.

4.6. Hierarchy of international options during instrument preparation

TALIS 2018 offered countries/economies the opportunity to survey not only the international target population, that is, the teachers and principals in schools providing lower secondary education (ISCED level 2) but also the populations of teachers and principals at ISCED level 1 and ISCED level 3 and those involved in the TALIS-PISA link. Countries/economies that chose to survey teacher and principal respondents from more than one of the international options needed to ensure that the different survey instruments

were consistent across the core and optional target populations. Deviations across target populations were only permissible if the country/economy could justify them and if the ISC approved those justifications.

As a further means of quality control, the ISC asked countries/economies to produce the ISCED level 2 core version of the instruments in the predominant survey language and then to use this version as the main blueprint for the international options and/or additional language(s). This key process was ingrained in the survey operations to ensure that all national materials were of high quality and consistent across the different instruments used within one country/economy. The procedure applied to all steps of the national instrument production that are outlined in this chapter.

The ISCED levels 1 and 3 instruments were not subject to a full translation verification. Instead, revisions were recorded in the NAF, and verifiers then checked these changes. A thorough consistency check during layout verification ensured only those adaptations to the ISCED levels 1 and 3 instruments that the ISC had agreed to were implemented and that the rest of the instruments matched the ISCED level 2 core instruments.

Preparation of the principal and teacher questionnaires for the TALIS-PISA link followed the same procedure used for preparing the ISCED levels 1 and 3 questionnaires. However, because the countries/economies administering the TALIS-PISA link had to replace the ISCED-level information in those questionnaires with the notation "15-year-olds", they had to produce an extra set of questionnaires, even if they were also administering the survey at an ISCED level where 15-year-olds were part of the population.

All participating countries/economies implemented the survey at the ISCED level 2 core, 15 implemented it at ISCED level 1, and 11 implemented it at ISCED level 3. Nine participating countries/economies also took part in the TALIS-PISA link option (see Table 4.4).

Table 4.4. List of the teacher and principal target populations in TALIS 2018 by country

Participating country/ economy	ISCED level 1	ISCED level 2 (core)	ISCED level 3	TALIS-PISA link
Alberta (Canada)		X	X	
Australia	X	X		X
Austria		X		
Belgium		X		
Flemish Community (Belgium)	X	X		
Brazil		X	X	
Bulgaria		X		
Chile		X		
Ciudad Autónoma de Buenos Aires (Argentina)	X	X		X
Colombia		X		X
Croatia		X	X	
Cyprus[1]		X		
Czech Republic		X		X
Denmark	X	X	X	X
England (United Kingdom)	X	X		
Estonia		X		
Finland		X		
France	X	X		
Georgia		X		X

Participating country/ economy	ISCED level 1	ISCED level 2 (core)	ISCED level 3	TALIS-PISA link
Hungary		X		
Iceland		X		
Israel		X		
Italy		X		
Japan	X	X		
Kazakhstan		X		
Korea	X	X		
Latvia		X		
Lithuania		X		
Malta		X		X
Mexico		X		
Netherlands	X	X		
New Zealand		X		
Norway		X		
Portugal		X	X	
Romania		X		
Russian Federation		X		
Saudi Arabia		X		
Shanghai (China)		X		
Singapore		X		
Slovak Republic		X		
Slovenia		X	X	
South Africa		X		
Spain	X	X		
Sweden	X	X	X	
Chinese Taipei	X	X	X	
Turkey	X	X	X	X
United Arab Emirates	X	X	X	
United States		X		
Viet Nam	X	X	X	X

1. See Notes 1 and 2 under Table 4.1.

4.7. Engaging translators

The ISC advised NPMs to engage a minimum of two translators for each language in which their respective countries/economies intended administering the survey. Translators needed to have the scheduled language as their mother tongue, possess excellent knowledge of English and be familiar with survey instruments.

The first of these translators, who was expected to be not only a language specialist but also someone with a sound understanding of the country's/economy's cultural context, translated the international English (or French) text of the instruments and manuals into the national language. The second translator, known as the reviewer, was expected to possess experience in the national educational context and to be familiar with the subject of the study. This individual reviewed and commented on how appropriate the initial translation was in terms of fitting the national educational context. This person also checked the translation's accuracy and readability. The country's/economy's NPM subsequently reviewed the translation and the reviewer's comments and made changes where he or she deemed appropriate in the final document. This method meant that three independent people compared the national versions against the original international source versions in English or French.

The ISC reminded NPMs planning to divide up the translation work or to produce translations in more than one language of the importance of ensuring consistency within and across instruments. The ISC also encouraged the countries/economies that intended producing the survey instruments in more than one language to engage professionals familiar with all the languages as special reviewers so as to establish equivalence across translations.

4.8. Producing translations

For English-speaking or French-speaking countries/economies, the instrument preparation process involved adapting language, terminology and classifications to local requirements. Countries/economies administering the survey in a language or languages other than English or French had to translate and adapt all survey materials into the local language(s). When producing their national survey instruments, all but 2 of the 48 participating countries/economies used the English source version. The exceptions were Belgium and France. They used the French source version.

The TALIS 2018 instruments contained some questions/items used in TALIS 2013 and these provided a basis for comparing data collected by the countries/economies that participated in both TALIS surveys. The TALIS 2018 countries/economies that had participated in TALIS 2013 were obligated to use the translations from the earlier cycle in order to ensure consistency and therefore possible comparability of data across the two surveys. The ISC asked the national study centres to adhere to this objective when updating the field trial instruments for the TALIS 2018 main survey. The ISC also made sure that the NPMs had access to the approved TALIS 2013 main survey instruments for reference. If, when comparing the TALIS 2013 translations to the TALIS 2018 field trial translations, NPMs viewed a translation from TALIS 2013 as not appropriate or had any other concerns regarding the translation, the ISC asked the NPMs to address these issues and concerns by contacting the ISC.

Although the instruments used for the TALIS 2018 main data collection were based on field-tested instruments, they also contained several new items that were either not tested in the field trial or were significantly modified after it. In addition, the ISC implemented trend verification (across the international options) for both the field trial and the main survey. During the main survey, a separate procedure was applied to the trend items in the questionnaires that were used by those countries/economies that also took part in TALIS 2013. This procedure was designed to detect any discrepancies between the two sets of items so as to ensure consistency and make it possible to reliably measure changes in responses to those items over time. The international source instruments were also comprehensively edited for the 2018 cycle, which resulted in the development of sophisticated methods and procedures to preserve the trend measurement. Any revisions and additions to the text and/or rewording of or omissions from it that affected the meaning of questions and/or options would also have influenced ability to preserve trend measurement.

The *TALIS 2018 Survey Operations Procedures Unit 3, Instrument Preparation (Main Survey)* specified the need for translations not only to follow the rules of the target language and the country's/economy's national/school context but also to have the same meaning as the source text. The ISC produced a glossary document containing definitions and explanations of the most critical terms to help translators prepare sets of instruments that captured the meaning and intent of the international instruments while safeguarding against

inaccuracies or word-for-word translations that were not appropriate within the national language and context.

The translator's role was to prepare a full translation of the core questionnaires and cover letters so that these would provide the blueprints for the other international options. Translators introduced the mandatory adaptations for the international options and, where applicable, documented them in the NAFs. The translated texts needed to ensure understanding and natural flow to the extent that anyone reading the texts could not tell if they had originated in English or French. Guidance on language use during translation, as outlined in the *TALIS 2018 Survey Operations Procedures Unit 3, Instrument Preparation (Main Survey)*, comprised the following:

- The translated text should have the same register (language level and degree of formality) as the source text.
- The translated text should have correct grammar and usage (e.g. subject/verb agreement, prepositions, verb tenses, etc.).
- The translated text should not add text to or omit text from the source version unless the ISC agreed to this.
- The translated text should employ equivalent qualifiers and modifiers appropriate for the target language.
- The translated text should have the equivalent social, political or historical terminology appropriate for the target language and used at this level of education.
- Idiomatic expressions should be translated appropriately, not necessarily word for word.
- Spelling, punctuation and capitalisation in the target text should be appropriate for the target language and the country/economy or cultural context.

When the individuals in the national study centres responsible for the translation work completed their work, reviewers read the materials to ensure that the translations were appropriate for teacher and principal respondents, were consistent with the field trial version of the instruments and met the requirements of TALIS 2018. After the reviewers had commented on the consistency and quality of the translations, the translators were expected to integrate the changes into the instruments. If a translator and a reviewer disagreed on the most appropriate translation, the NPM acted as an arbitrator and had the right to make the final decision.

4.9. International translation verification

International translation verification was an important part of the TALIS 2018 technical standards (specifically, Standards 4.18–4.27). The IEA Amsterdam co-ordinated the translation verification process and engaged the services of native-speaking linguistic verifiers through cApStAn Linguistic Quality Control, based in Brussels, Belgium. These verifiers, experienced in balancing the cultural and national "appropriateness" of the target version with "faithfulness" to the source version, provided expert feedback on country/economy translations and adaptations. The ISC then asked the NPMs to carefully review all verifier comments and suggestions and to implement those that improved the questionnaire materials according to the IEA's guidelines for translation, while also ensuring that the translations retained the original meaning of the phrases. Although an

NPM always had the right to make final decisions regarding document content, he or she had to describe and explain any major differences of opinions between national study centre personnel and verifiers.

The ISCED level 2 core instruments and cover letters underwent full translation verification. The ISC asked the NPMs to use the verified core instruments as the base from which to develop the optional instruments and to make only approved adaptations to the latter. Therefore, for the international options (ISCED level 1, ISCED level 3 and the TALIS-PISA link), the additional entries in the NAFs were the only content to undergo international translation verification. The IEA Amsterdam provided verifiers with the same materials that the NPMs used when producing national translations.

During the main survey, translation verifiers received the international (English or French) questionnaires in PDF format, which gave them an accurate preview of the intended format. The translated questionnaires (for all ISCED levels and the TALIS-PISA link) and cover letters (online data collection) were received in Word format, while the relevant NAFs were received as Excel files. Verifiers used the "track changes" feature of Word to insert their comments and changes directly into the national documents. Verifiers also documented and recorded (in the form of comments) any deviations from the international source version in the NAF and used the IEA severity code system to indicate the severity of the identified error or issue.

Each verifier comment contained one of the following severity codes:

- **Code 1:** Major change or error. Examples included the incorrect order of choices in a multiple-choice item, omission of an item, incorrect translation resulting in the answer being indicated by the item, an incorrect translation that changed the meaning or difficulty of the text/item, and the incorrect order of items.
- **Code 1?:** Not certain. The verifiers used a *Code 1?* when they were unsure of how to correct a possible error or which intervention category to apply.
- **Code 2:** Minor change or error. Examples included spelling errors that did not affect comprehension.
- **Code 3:** Suggestion for alternatives. The translation might be adequate, but the verifier suggested different wording.
- **Code 4:** Acceptable change. Examples included national conventions for capitalisation and date format.

4.10. Feedback from NPMs on international translation and translation verification

The ISC developed a survey activities questionnaire (SAQ) that it administered after the field trial and again after collection of the main survey data. The questionnaire, designed to elicit feedback from NPMs on their experiences administering TALIS 2018, included questions on the translation and international translation verification processes. Responses to the SAQ administered after the main data collection period indicated that the NPMs found the international translation verification process benefited preparation of the main survey.

All NPMs of the participating countries/economies answered the SAQ. Their answers showed that the majority of the participants (29 of the 48) experienced no difficulties translating the source questionnaires into national language(s) or adapting them to local contexts. Most of the NMPs reported that after reviewing the feedback from the

international translation verifiers, they made several modifications to their instruments; 41 of the 48 said they corrected errors identified by the verifiers.

4.11. Layout verification: Paper and online data collection

As a final step during production of the national instruments and after completion of the translation verification process, the ISC verified the layout of the paper versions and created the online versions of the instruments. The ISC carefully checked the national versions of the instruments against the international English or French versions and the documentation in the corresponding NAFs. The aim of the layout verification was to ensure that the national versions of the TALIS instruments looked, as much as possible, like the international source versions and that the paper and online versions were, therefore, to the greatest extent possible, equivalent.

The process used to verify the layout of the paper version was similar to the NAF approval process. NPMs submitted all ISCED level 2 (core population), ISCED level 1, ISCED level 3 and TALIS-PISA link instruments and, if applicable, the cover letters, to the ISC for approval. The ISC then compared the ISCED levels 1 and 3 questionnaires, including the teacher and principal questionnaires for the TALIS-PISA link, against the approved ISCED level 2 questionnaires, which served as the new master versions.

ISC staff checked each questionnaire for font size, font changes, adjustment of cells, response options, blank pages, word emphases, tracked changes, page breaks and comments. If ISC staff found deviations from the documentation in the NAF, they adjusted the paper versions and asked the relevant NPM to verify the correction of the mistake.

After paper layout approval, the ISC simultaneously implemented the instruments for all ISCED levels and options in the IEA Online Survey System (OSS) and then checked each online version of an instrument against its approved paper version. This practice helped ensure that the instruments within one country/economy were the same, regardless of whether they were administered on paper or on line. Visual checks were run using the same standards and procedures as for verification of the paper layout. After finalising the online files, the ISC asked each NPM to thoroughly check the files and report any mismatching to the ISC.

Up to two rounds of checking and verification were needed for most of the language versions of the instruments before they received final approval from the NPM.

The process involved in verifying the different international options was time-consuming and many countries/economies were operating under a tight schedule. For these reasons, the ISC invited those countries/economies that had elected to administer one or more of the international options to work simultaneously on finalising the paper layout for these options. The majority of NPMs (40 of the 48) said they found the instructions for layout verification provided by the ISC helpful for preparing their national survey instruments. In a few cases, NPMs detected some minor inconsistencies regarding spelling, punctuation or layout mismatches after layout approval and prior to online system activation or printing. The ISC changed these inconsistencies and informed the relevant NPM of the updated version(s).

References

UNESCO-UIS (2012), *International Standard Classification of Education (ISCED) 2011*, UNESCO Institute for Statistics, Montreal, http://uis.unesco.org/sites/default/files/documents/international-standard-classification-of-education-isced-2011-en.pdf. [1]

Notes

[1] The *TALIS School Co-ordinator Manual* (internal document) contained detailed information about the role and responsibilities of the school co-ordinator. The ISC provided two templates of the manual in English to the NPMs, one template for online survey administration and the other for the paper-based survey administration. The templates were to be translated and adapted by the NPM and then distributed to the country's/economy's school co-ordinators.

[2] TALIS 2018 set the standard that all participating countries/economies should implement 100% of the agreed questions and items during the main survey data collection. However, systems were offered the possibility of derogating specific questions and items if they considered they were not suitable for their national context. Systems had to prepare a detailed explanation for each item they wished to derogate and the request had to be approved by the OECD Secretariat and by the bureau of the TALIS Governing Board. Only 2 of the 48 participating countries/economies requested a derogation of items. Both of these requests were approved.

Chapter 5. Sample design

The international target population for the Teaching and Learning International Survey (TALIS) 2018 consisted of schools providing ISCED level 2 education (deemed the core survey of TALIS) as defined by the International Standard Classification of Education 2011, as well as their principals and their teachers. Participating countries and economies could also opt to survey primary (ISCED level 1) and upper secondary (ISCED level 3) teachers. This chapter covers the sample design prepared for the TALIS 2018 countries and economies. It also reviews the sampling strategies and the nominal sample sizes. TALIS 2018 participants who also took part in the OECD Programme for International Student Assessment (PISA) 2018 had the option of implementing TALIS in the schools that participated in PISA 2018. This international option is called the TALIS-PISA link.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

5.1. Overview

This chapter covers the sample design prepared for the countries/economies participating in TALIS. It also reviews the sampling strategy and the sample size. The chapter focuses solely on the standard international (the "core" survey) sampling plan. Strategies for estimation of population characteristics and of their sampling error are detailed in Chapter 9, while Annex E provides characteristics of each national sampling plan.

The *TALIS 2018 Sampling Manual* (internal document) provides a more comprehensive description of the survey design and its recommended implementation. The salient points of the survey design appear in the section of this chapter on the participating countries' and economies' core survey (ISCED level 2)[1] samples.

Participating countries/economies could opt to survey ISCED level 1 and ISCED level 3 teachers. Australia, the Flemish Community of Belgium, Ciudad Autónoma de Buenos Aires (henceforth "CABA", Argentina), Denmark, England (United Kingdom), France, Japan, Korea, the Netherlands, Spain, Sweden, Chinese Taipei, Turkey, the United Arab Emirates and Viet Nam chose to survey ISCED level 1 teachers. Alberta (Canada), Brazil, Croatia, Denmark, Portugal, Slovenia, Sweden, Chinese Taipei, Turkey, the United Arab Emirates and Viet Nam chose to survey ISCED level 3. Participating countries/economies were also offered an international option, which was to administer the TALIS teacher questionnaire to a sample of PISA teachers in a sample of schools selected for PISA 2018. This linking of TALIS data and PISA student achievement data at the school level is known as the TALIS-PISA link. CABA (Argentina), Colombia, the Czech Republic, Denmark, Georgia, Malta, Turkey and Viet Nam elected to participate in this school-level option.

5.2. International sampling plan

The international sampling plan prepared for each of the TALIS 2018 teacher populations was a stratified two-stage probability sampling design. This design meant that teachers (second-stage units or secondary sampling units, abbreviated SSU) were randomly selected from the list of in-scope teachers for each of the randomly selected schools (first-stage or primary sampling units, abbreviated as PSUs).

The populations of interest comprised schools providing ISCED level 2 education, as well as their principals and their teachers. TALIS adheres, for sampling purposes, to the OECD international education statistics definition of a classroom teacher: "A classroom teacher is defined as a person whose professional activity involves the planning, organising and conducting of group activities whereby students' knowledge, skills and attitudes develop as stipulated by educational programmes" (OECD, 2004, p. p. 47[1]).

5.3. Target population and survey population: International requirements and national implementations

The TALIS programme of surveys (the ISCED level 2 core survey and the options for ISCED levels 1 and 3 and the TALIS-PISA link) aims to cover all teachers of a given ISCED level in a participating country/economy. Because the programme's identification of policy issues encompasses the classroom, the teacher, the school and school management, all subjects being taught in a school are within TALIS's scope. As such, the programme's sampling coverage extends to all teachers of an ISCED level and to the principals of the schools in which these teachers are working.

Teachers at a given ISCED level are those who, as part of their regular duties in a target school, provide instruction in programmes at that ISCED level. The TALIS populations of interest also include teachers teaching a mixture of subjects at different levels in a sampled school. This consideration applies no matter how much or how little teaching these teachers are engaged in.

TALIS's *international target population* restricts the survey to those teachers who teach in "regular" schools and to the principals of those schools. Teachers teaching adults are not part of the international target population and are therefore deemed "out of scope"; teachers working with children with special needs are "in-scope" if they teach in regular schools. However, when a school consists exclusively of these teachers, the school itself is said to be out of scope. Teacher aides, pedagogical support staff (e.g. guidance counsellors, librarians) and health and social support staff (e.g. doctors, nurses, psychiatrists, psychologists, occupational therapists and social workers) are not considered teachers and therefore cannot be part of TALIS.

Ideally, all the members of a target population should be admissible to sampling and data collection, and this is the option that TALIS chose. As a consequence, the international survey population (those who can be surveyed) is identical to the international target population (those who should be surveyed).

For national reasons, participating countries/economies can choose to restrict the coverage of their national implementation of TALIS to parts of the country/economy. For example, a province or state experiencing civil unrest or an area that has recently been struck by a natural disaster can be removed from the national target population to create a *national survey population*. The TALIS sampling team asked participants to restrict these exclusions to the greatest extent possible, for the reason given in the *TALIS 2018 Sampling Manual*: *"So as to maintain comparability and unbiasedness, exclusions should be kept to the strict minimum and be justifiable. With only broad guidelines to help them, countries that participated in the previous cycles of TALIS successfully managed to keep the proportion of excluded teachers to less than 5%. A 5% threshold was thus adopted for this [third] round of TALIS as an upper limit for the exclusion of teachers from the survey population" (p. 11).*

TALIS recognises that attempting to survey teachers in very small schools, that is, schools with no more than three teachers at the ISCED level of interest, and those teaching in schools located in geographically remote areas, can be costly, time-consuming and statistically inefficient. Participating countries/economies can, therefore, excuse those teachers from the TALIS data collection, thus creating a national survey population different from the national target population. TALIS 2018 required the national project manager (NPM) for each country/economy to document the reasons for exclusion, as well as the size, location and clientele of each excluded school.

Ultimately, the TALIS 2018 samples of schools and teachers were selected from the national survey population. Table 5.1 illustrates how the international and national survey populations relate to one another. Note that Chapter 6 of this report covers the sampling of teachers in the participating schools.

Annex D presents the national definitions of the TALIS 2018 target and survey populations for each of the ISCED levels. NPMs provided this information on TALIS sampling forms, templates of which can be found in Annex C.

Table 5.1. TALIS 2018 target and survey populations

<table>
<tr><th colspan="4">ISCED level X Universe</th></tr>
<tr><td>TALIS 2018 out of scope</td><td colspan="3">TALIS 2018 international target population
=
TALIS 2018 international survey population
=
All schools where at least one ISCED level X class is found</td></tr>
<tr><td rowspan="4">• Schools exclusively for adult education
• Schools exclusively for students with special needs
• Substitute or emergency teachers
• Teachers exclusively for adult education in regular schools</td><td colspan="3">NATIONAL target population</td></tr>
<tr><td>NATIONAL exclusions</td><td colspan="2">NATIONAL survey population</td></tr>
<tr><td>• Remote, small schools
• Entire province, state, or subpopulation</td><td>Not sampled</td><td>In sample</td></tr>
<tr><td>Not more than 5% of teachers</td><td colspan="2">At least 95% of teachers</td></tr>
</table>

During TALIS 2018, some teachers within a selected in-scope school were excluded from the survey. They included:

- teachers who were also acting as principals: no teacher data collected, but principal data collected (labelled as NEXCL5 in Chapter 9)
- substitute, emergency or occasional teachers: out of scope
- teachers on long-term leave: out of scope
- teachers teaching exclusively adults: out of scope
- teachers in Cyprus,[2,3] Iceland, Malta and the United Arab Emirates who took part in the TALIS 2018 field trial so that they would not have to answer another TALIS questionnaire (labelled as NEXCL6 in Chapter 9).

NPMs received detailed guidelines on how to apply these exclusion categories. Guidelines could be found in the *TALIS 2018 Survey Operations Procedures Unit 1: Sampling Schools* (internal document) or were provided during correspondence between Statistics Canada, the international study centre and the interested participating countries/economies. In addition, the *TALIS 2018 School Co-ordinator Manual* (internal document) provided school co-ordinators with information on how to recognise different types of exclusion and how to apply the correct codes.

NPMs were reminded that they were not to exclude teachers teaching at more than one school. Instead, they were to record the number of schools in which these teachers were working (see "weight adjustment for teacher multiplicity" in Chapter 9).

5.4. Sample size requirements[4]

To allow for reliable estimation and modelling while also allowing for some degree of non-response, TALIS 2018 set the minimum sample size at 20 teachers within each participating school and required countries/economies to draw a minimum sample of 200 schools from the national population of in-scope schools. The nominal sample was, therefore, a minimum of 4 000 teachers.

Teachers from the same school tend to share opinions and behave in similar ways more so than teachers from different schools, cities or provinces in a given country/economy. This tendency for two teachers from the same school to be "more alike" than two teachers from different schools is called the "clustering effect" and it is measured, in single-stage designs, by the intra-cluster correlation. In essence, the stronger the intra-cluster correlation, the lower the number of sampled teachers needed from a school because one responding teacher becomes a good predictor of the other teachers in that same school. In other words, in a sample of 20 teachers from the same school, there are, in a sense, fewer than 20 original data points. This outcome is a manifestation of the clustering effect or design effect, and the larger the cluster, the larger the loss.

Those engaged in the preparation work for TALIS 2013 used an intra-cluster correlation value of 0.3 as a working hypothesis, on the supposition that teachers are as homogeneous as their students, this supposition accorded with the design of TALIS 2008. The team that worked on the design of TALIS 2018 adopted the TALIS 2013 design, in conformity with the Terms of Reference. The loss in sample size due to clustering, when added to the losses due to non-response, reduced the nominal sample of 4 000 teachers to an effective sample of approximately 400 as depicted in Table 5.2. Thus, the nominal sample of 4 000 teachers obtained by the complex sampling design was equivalent to a simple random sample of 433 teachers.

Table 5.2. Establishing the sample size for TALIS 2018

Schools	a	200
Teachers per school	b	20
Total number of teachers	**c = a × b**	**4 000**
School response rate	d	75%
Teacher response within school	e	75%
Overall response rate	**f = d × e**	**56%**
Net number of responding teachers	**g = c × f**	**2 250**
Intra-cluster correlation	h	0.30
Design effect (deff)	deff = 1 +{(e ×b)-1}×h	5.2
Effective sample	**= g / deff**	**433**

The precision that is expected from the sample of 20 teachers in 200 schools is equivalent to that of a simple random sample of 433 teachers selected from the (often unavailable) national list of teachers. The expected margin of error for a simple random sample of this size is $\pm (1.96) \times (1/\sqrt{433}) = \pm 9.4\%$. Evidence from TALIS 2008 and TALIS 2013 shows that, in most countries, clustering was not as great as anticipated. Hence, the achieved precision in most countries and for most statistics was better than the expected 9.4%. However, the requirements for the nominal sample for 2018 remained at the original level to allow for easier tabulations at subnational levels and for more robust secondary analyses.

Participating countries/economies could choose to augment their national sample by selecting more schools. Alternatively, they could select more teachers to increase the within-school sample and thereby counterbalance the effect of selecting too many schools with too few teachers.

The sampling team reduced the sample size requirement for some participating countries/economies because of the smaller number of schools available for sampling (see Annex E, which presents the characteristics of the national samples). In the few cases where the average number of teachers in the schools was lower than the number given in the international plan, the sampling team asked for the number of schools sampled to be increased to maintain a minimum total number of participating teachers.

5.5. National sampling strategies

Participating countries/economies could suggest variations to or adaptations of the international sampling plan to better suit their national needs or conditions. All changes to the international sampling plan had to be reviewed and approved by the sampling team.

5.5.1. Sampling frames

The sampling team at Statistics Canada asked participating countries/economies to give them a current and complete list of schools providing education at the ISCED level of interest. This list constituted the school sampling frame for TALIS and was expected to correspond to the survey population as defined and described on the sampling forms.

The sampling frame had to contain certain key fields: a national school identifier, a measure of size (preferably the number of teachers at the ISCED level of interest) and values for those variables that would be used for stratification. Whenever possible, the frame also needed to include the type of funding (private or public) and the type of education stream (academic or vocational).

Additional sampling frames were required for the sampling of teachers, namely, the list of admissible teachers at the ISCED level of interest in each selected school.

5.5.2. Stratification

The international sampling plan did not require stratification of the schools or of the teachers within the selected schools. The sampling team invited participating countries/economies that chose to implement some form of stratification (in order to answer national requirements) to discuss their strategy with them.

Stratification could be done explicitly (whereby a fixed portion of the total sample is allocated to the stratum) or implicitly (the variable is used to sort the sampling frame before sample selection, thus giving, on average, a proportional representation of the implicit strata in the sample).

In instances where explicit stratification was used, the participating country/economy and the sampling team together determined the sample allocation scheme.

In most cases, stratification resulted in a combination of some or all of the details relating to geography, source of financing, type of educational programme and school size. Annex E (Tables 5.7 to 5.9) provides these details for each participating country/economy and each ISCED level in which they participated.

5.5.3. Sample selection

The method used to select the school samples was systematic random sampling with probability proportional to size (PPS) within explicit strata specified in the national sampling plans. When implicit stratification was used, schools in explicit strata were sorted

by implicit strata and measure of size (MOS) prior to sampling. Sampling frames were always sorted by MOS prior to sampling, whether or not stratification was applied. Sorting by MOS was done in a serpentine manner, which meant alternating increasing order and decreasing order so that adjacent schools would be of similar sizes even across strata. This approach is useful when creating replication zones for estimation of sampling error (see the section in Chapter 9 on creating replicates for balanced repeated replication).

The mechanics of systematic random sampling with PPS can be described as follows. Let M be the total MOS in an explicit stratum, let m_i be the MOS for school i in the explicit stratum and M_i be the cumulative sum of the school sizes up to and including school i, and let n be the number of schools to be sampled from that explicit stratum. A sampling step k is then computed as quotient $M \div n$, and a starting point d is drawn at such that $1 \leq d < k+1$. The sample is selected by walking steps of fixed length k along the (ordered) sampling frame. As evident in Table 5.3 below, the point at which the step lands points to the school to be added to the sample.

Whenever possible, the sample selection programme selected two replacement schools for each sampled school: the school just above and the school just below the selected school on the sampling frame sorted by MOS. The replacement schools had to come from the same explicit stratum as the sampled school. The sampling team advised the use of this strategy to help maintain the sample size and minimise the non-response biases that can occur when schools with characteristics similar to those of the non-responding schools are used. Schools selected for the original sample could not be selected as a replacement school.

To simplify and speed up the sampling process, the sampling team selected all samples of schools.

At the end of school selection, the sampling team sent each participating country/economy a copy of its school sampling frame, in which the selected schools were identified (marked "S" for the original sample and marked "R1" and "R2" for the replacement schools) and then given a standardised TALIS school identification number.

Table 5.3 illustrates how an ordinary spreadsheet can be used to implement systematic random sampling with PPS. In this illustration, explicit stratum "A" consists of 12 schools with a total MOS of 209 teachers. The sample needed from this stratum is $n = 3$ schools; the sampling step k $(209 \div 3) = 69.7$. Suppose that the random start is $d = 49$. The j^{th} school selected is then such that $M_{j-1} < d + (j\text{-}1) \times k \leq M_j$, with $M_0 = 0$ and $j = 1, 2, 3$. Here, for the first selection, $j = 1$ and the pointer is $49 + (1\text{-}1) \times 69.7 = 49$. If $j = 2$, the pointer is at $49 + (2\text{-}1) \times 69.7 = 118.7$ (rounded to 118), and finally the pointer is at $118.7 + 69.7 = 188.4$ (rounded to 188). If available, replacement schools (the schools immediately before and after a selected school) are assigned automatically; note that School 12 has no second replacement.

The International Association for the Evaluation of Educational Achievement (IEA) Hamburg provided each participating country/economy with the IEA Windows Within-School Sampling Software (WinW3S) to help them create the sampling frames and sample selection of teachers and to ensure compliance with the sample design and with furnishing complete documentation.

Annex E presents the size of the sample of schools and of teachers for each participating country/economy.

Table 5.3. Illustration of systematic random sampling with PPS

National school ID	Explicit stratum	Implicit stratum	MOS m_i	Cumulative MOS M_i	Sampling step	Pointer	Selections and replacements
1	A	1	10	10			
2	A	1	12	22			
3	A	1	15	37			R1
4	A	1	17	54	1	49	S
5	A	2	20	74			R2
6	A	2	18	92			
7	A	2	16	108			R1
8	A	2	16	124	2	118	S
9	A	3	15	139			R2
10	A	3	17	156			
11	A	3	26	182			R1
12	A	3	27	M = 209	3	188	S

5.5.4. Sampling for the field trial

Between January and March 2017 and before the main data collection, each participating country/economy conducted a field trial (FT). For that purpose, a sample of 20 schools (plus their one replacement)[5] was selected at the time of sample selection for the main survey (MS). The simultaneous selection of the school samples for the FT and the MS allowed some control of sample overlap and helped reduce response burden on participating schools. When the number of schools in an explicit stratum was such that overlap of FT and MS samples was unavoidable, the teachers who had taken part in the FT could be excused from participation in the MS (see Chapter 9).

5.6. ISCED levels 2, 1 and 3 samples, by participating country and economy

The following three tables give an overview of the sampling plan for each participating country/economy.

Table 5.4 covers the countries/economies that participated in ISCED level 2, Table 5.5 those countries/economies that participated in ISCED level 1 and Table 5.6 those countries/economies that participated in ISCED level 3.

Table 5.4. Overview of the ISCED level 2 samples

Participating country/economy	Explicit stratification	Number of ISCED level 2 schools	Number of ISCED level 2 teachers	School sample size	Teacher sample expected size
Alberta (Canada)*	Five types of school	1 019	138 297	200	4 000
Australia*	Eight states x three sectors	2 536	125 251	305	6 100
Austria*	Three types of school	1 495	35 054	279	5 580
Belgium*	French Community, four types of funding, and Flemish Community	1 161	247 362	320	6 400
French Community (Belgium)*	French Community, four types of funding	440	115 725	120	2 400

Participating country/economy	Explicit stratification	Number of ISCED level 2 schools	Number of ISCED level 2 teachers	School sample size	Teacher sample expected size
Flemish Community (Belgium)*	Flemish Community	721	131 637	200	4 000
Brazil	Three types of institution	53 308	850 117	200	4 000
Bulgaria	Two types of school	1 722	22 588	200	4 000
Chile	Two types of institution	5 324	50 178	200	4 000
Ciudad Autónoma de Buenos Aires (Argentina)*	Two sectors x three SES indexes	488	84 762	150	3 000
Colombia*	Two types of school x two locations	12 672	2 796 704	200	4 000
Croatia*	Six regions	849	297 224	200	4 000
Cyprus[1,2]	n/a	99	4 400	99	1 980
Czech Republic	Two types of school	2 616	39 441	220	4 400
Denmark*	n/a	1 470	224 804	200	4 000
England (United Kingdom)*	Two types of funding x two school sizes x four locations	4 258	1 754 633	200	4 000
Estonia	Two locations x two types of school	405	8 660	200	4 000
Finland*	Five regions x two locations	714	170 799	150	3 000
France	Three types of school x three degrees of urbanisation	6 828	209 069	200	4 000
Georgia	Two locations x two types of funding	2 250	42 502	200	4 000
Hungary	Seven regions x four types of community	2 759	37 812	200	4 000
Iceland*	n/a	142	4 057	142	2 840
Israel*	Three languages x three types of instruction	2 470	13 658	220	4 400
Italy	Three territorial divisions x two types of school	5 720	153 981	200	4 000
Japan	Three types of school x four locations	10 426	264 356	200	4 000
Kazakhstan	Sixteen regions x two locations x two types of funding	6 386	206 668	333	6 660
Korea	Seventeen regions	3 059	68 341	200	4 000
Latvia*	Three types of school x four locations	692	87 799	150	3 000
Lithuania*	Four locations	926	83 741	200	4 000
Malta	n/a	61	3 255	61	1 220
Mexico	Two types of funding x two types of school x two regions	16 722	328 554	200	4 000

Participating country/economy	Explicit stratification	Number of ISCED level 2 schools	Number of ISCED level 2 teachers	School sample size	Teacher sample expected size
Netherlands*	n/a	548	729 191	200	4 000
New Zealand*	Five types of school x two sizes (teacher) x three decile groups	1 695	83 803	234	4 680
Norway	Four municipality sizes	1 064	23 079	200	4 000
Portugal	Five regions x two types of funding	1 257	36 613	200	4 000
Romania*	Two regions	4 688	753 077	200	4 000
Russian Federation	Fourteen regions	40 539	706 193	230	4 600
Saudi Arabia	Two types of gender x 13 regions	6 266	99 766	200	4 000
Shanghai (China)	Two locations x two types of funding	650	41 365	200	4 000
Singapore	Two types of funding	193	12 085	169	3 380
Slovak Republic	Two types of school x two types of location	1 581	24 821	200	4 000
Slovenia	n/a	448	9 048	150	3 000
South Africa	Nine provinces x two sectors	9 312	200 192	200	4 000
Spain	Eighteen autonomous communities x two types of school for Comunidad de Madrid	6 909	200 092	399	7 980
Sweden*	Two school levels x two school types	1 708	309 277	200	4 000
Chinese Taipei*	Two school levels x two types of funding x three townships x two types of school	932	59 871	203	4 060
Turkey	Two types of school (state and private) x 12 regions for state	16 228	310 932	200	4 000
United Arab Emirates	Three regions x four school levels	563	17 191	563	11 260
United States*	Two types of funding x three grade structures	63 226	12 061 144	220	4 400
Viet Nam	Two school levels x three zones x two types of funding	10 821	303 018	200	4 000

n/a : not applicable.
* Measure of size (MOS) is not number of teachers.
1. Note by Turkey: The information in this document with reference to “Cyprus” relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the “Cyprus issue”.
2. Note by all the European Union Member States of the OECD and the European Union: The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

Table 5.5. Overview of the ISCED level 1 samples

Participating country/economy	Explicit stratification	Number of ISCED level 1 schools	Number of ISCED level 1 teachers	School sample size	Teacher sample expected size
Australia	n/a	2 234	423 017	200	4 000
Flemish Community (Belgium)*	Two school types x three townships	2 655	14 362	201	4 020
Ciudad Autónoma de Buenos Aires (Argentina)*	6 states, two territories x three sectors	6 510	137 886	299	5 980
Denmark*	Two types of funding x two sizes x four geographic regions	18 144	3 901 692	200	4 000
England (United Kingdom)*	Three type of schools x three degrees of urbanisation	32 926	4 006 439	200	4 000
France*	Four school locations	20 333	385 923	200	4 000
Japan	Seventeen geographical regions	5 611	116 066	200	4 000
Korea	n/a	6 337	110 869	251	5 020
Netherlands	Eighteen autonomous communities x two school levels for Cantabria and La Rioja communities	13 275	286 462	444	8 880
Spain	Two school levels x two school types	4 261	667 183	200	4 000
Sweden*	Two school types (state and private) x 12 regions for state	24 755	289 681	200	4 000
Chinese Taipei	Two school levels	1 694	462 225	200	4 000
Turkey	Three regions x four school levels	588	21 646	588	11 760
United Arab Emirates	Three zones x six regions x two types of funding	15 143	394 935	201	4 020
Viet Nam	Two school levels x three SES indexes	878	243 034	200	4 000

n/a : not applicable.
* Measure of size (MOS) is not number of teachers.

Table 5.6. Overview of the ISCED level 3 samples

Participating country/economy	Explicit stratification	Number of ISCED level 1 schools	Number of ISCED level 1 teachers	School sample size	Teacher sample expected size
Alberta (Canada)*	Five school authorities	606	160 199	199	3 980
Brazil	Two school levels x three types of funding	28 011	640 522	200	4 000
Croatia*	Six regions	379	160 569	150	3 000
Denmark*	Seven types of school	397	262 133	150	3 000
Portugal	Two school levels x three types of funding x five regions	854	36 619	200	4 000
Slovenia*	n/a	150	3 000	150	3 000
Sweden*	Two types of funding	1 278	319 289	200	4 000
Chinese Taipei*	Two school levels x two types of funding x three townships x two types of school	503	43 902	151	3 020
Turkey	Two school types (state and private) x 12 regions per state	9 520	325 692	459	9 180
United Arab Emirates	Three regions x four school levels	437	12 975	437	8 740
Viet Nam	Two school levels x three zones x six regions x two types of funding	2 928	167 599	200	4 000

n/a : not applicable.
* Measure of size (MOS) is not number of teachers.

5.6.1. "TALIS-PISA link" samples, by participating country/economy

Table 5.7 gives an overview of the sampling plan for each country/economy that participated in the TALIS-PISA link option. The country/economy reports in Appendix E provides more details.

Table 5.7. Overview of the TALIS-PISA link samples

Participating country/economy	Number of TALIS-PISA link schools	Number of TALIS-PISA link teachers	School sample size	Teacher sample expected size
Australia*	804	116 723.97	150	3 000
Ciudad Autónoma de Buenos Aires (Argentina)*	104	9 931.0002	104	2 080
Colombia*	265	26 409	162	3 240
Czech Republic*	351	10 017	190	3 800
Denmark*	396	18 026	150	3 000
Georgia*	352	11 193	150	3 000
Malta*	63	4 006.0001	63	1 260
Turkey*	211	29 355	150	3 000
Viet Nam*	178	53 355	150	3 000

* Measure of size (MOS) is not number of teachers.

Reference

OECD (2015), "ISCED 2011 Level 2: Lower secondary education", in *ISCED 2011 Operational Manual: Guidelines for Classifying National Education Programmes and Related Qualifications*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264228368-6-en. [2]

OECD (2004), *OECD Handbook for Internationally Comparative Education Statistics: Concepts, Standards, Definitions, and Classifications*, OECD Publishing, Paris, https://doi.org/10.1787/9789264279889-en. [1]

Notes

[1] As defined by the International Standard Classification of Education 2011 (OECD, 2015[2]),

[2] Note by Turkey: The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".

[3] Note by all the European Union Member States of the OECD and the European Union: The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

[4] Requirements for ISCED level 1 and ISCED level 3 were identical to those imposed for ISCED level 2; the nominal sample size for the TALIS-PISA link was set at 150 schools, which is the PISA requirement.

[5] Only one replacement school was selected for the field trial to minimise the overlap with the sample for the main survey. Schools for the field trial of the TALIS-PISA link component were selected by convenience.

Chapter 6. Field operations procedures

This chapter summarises the procedures and outcomes of the TALIS 2018 field operations. It focuses on the areas of work within national centres, which included contacting schools, performing the within-school sampling, and monitoring the collection of data for the International Standard Classification of Education (ISCED) level 2 core and eventual additional international options of the TALIS 2018 main survey.

The chapter also references the materials and software that the international study centre (ISC) gave all national study centres.[1]

The overall administration of TALIS 2018 in all participating countries/economies was very successful. No mayor obstacles were encountered and the field-operation procedures, as defined and communicated by the ISC, were met.[2]

Although the procedures described in this chapter focus on the administration of the ISCED level 2 core survey, they also apply to the international ISCED level 1, ISCED level 3 and the TALIS-PISA link options. The ISC asked all participating countries/economies to follow the standards and procedures and made it clear that deviations from these would only be allowed in certain cases and if discussed and agreed with the TALIS Consortium and the OECD.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

6.1. Technical standards, manuals and software

During all phases of the survey, the national study centres adhered to the standardised procedures prepared by the international study centre (ISC) and its consortium partners. These procedures were outlined in the following documents, which the ISC released to the national study centres before the field trial and then updated for the main survey (except for the technical standards). To note, apart from the technical standards, these are all internal documents:

- *TALIS 2018 Technical Standards (see Annex B)*: The ISC released the final version prior to the main survey (MS) after the TALIS Governing Board (TGB) approved the standards during its third meeting in June 2017. The technical standards covered ten main topics,[3] ranging from survey ethics, confidentiality and survey operations to quality observation and data management.
- *TALIS 2018 National Project Managers' Manual*: The purpose of this manual was to provide national project managers (NPMs) with an overview of TALIS, detail the tasks NPMs and national study centres were to carry out, and give information about key milestones and deliveries. The ISC provided detailed information about national instrument production and survey operations in separate guideline documents.
- *Survey Operations Procedures Unit 1: Sampling Schools*: Statistics Canada prepared this manual, which defined the target population of teachers for all of the ISCED levels and the TALIS-PISA link. The manual also described how to prepare and implement a national sampling plan, how to prepare the school sampling frame and how to select the school sample. The manual's annexes provided thorough instruction on how to handle the samples for the different international options.
- *Survey Operations Procedures Unit 2: Working with Schools*: As indicated by its title, this manual addressed guidelines for obtaining and increasing co-operation of schools, with the emphasis placed on public relations strategies. It also described how to adapt the *School Co-ordinator Manual* to the national context and explained details of instrument shipping and quality-control measures.
- *School Co-ordinator Manual*: This manual was intended for school co-ordinators (SCs). Each SC was the main contact person for the national study centre in each school. The person fulfilling the role of SC was often a teacher or a principal of the school participating in TALIS. The ISC released one template of the *School Co-ordinator Manual* for participating countries/economies doing paper-only administration and one template for those administering the survey solely on line or in a mixed mode (paper and online administration). The manual described, in detail, the steps for listing and tracking teachers and for organising the survey administration on site. NPMs were responsible for translating the manual into their survey administration language(s) and for adding national information where necessary. Responsibility for translations and adaptations rested solely with the NPMs. The ISC asked international quality observers (IQOs) to make sure the NPMs used the correct template (see Chapter 7 for more details on quality assurance).
- *Survey Operations Procedures Unit 3: Instrument Preparation*: This manual provided the national study centres with instructions on how to produce internationally comparable national versions of the released international survey

instruments. It gave detailed descriptions of the different verification steps (adaptation, translation, layout) included in the process.

- *Survey Operations Procedures Unit 4: Data Collection and Quality Control*: This manual informed national study centres on how to prepare for and support data collection in schools. The information included detailed explanations on the listing and within-school sampling of teachers, on assigning and administrating the instruments, and on tracking and monitoring the quality of the data collection.
- *Survey Operations Procedures Unit 5: Data Capture Procedures*: The ISC used this document to describe how to work with the IEA Data Management Expert (DME) software, which was used to capture and verify data received on paper.
- *National Quality Observer Manual*: Prepared by the IEA Amsterdam, this manual showed NPMs how to conduct a national quality control programme. These procedures related closely to those used by international observers. However, NPMs were free to adapt the manual and procedures according to their needs.
- *International Quality Observer Manual*: The IEA Amsterdam prepared this document and delivered it directly to the international quality observers, all of whom were contracted by the IEA. The manual outlined the tasks the observers needed to complete in order to check the quality of the survey operation procedures within the participating countries/economies. The observers had to visit the national study centres and schools in order to interview not only the NPMs and national teams but also the school co-ordinators. Observers documented the results of their visits in an online survey called the "school visit record".
- *Note on the Investigation of Non-response Bias*: Prepared by Statistics Canada, this document explained how to investigate the extent of agreement between the characteristics of the sample (at the school and teacher level) and independently available population statistics. Whether participating countries/economies had to carry out this analysis depended on the participation rate. The consortium asked study centres to provide this additional information only in those instances where the data collection had yielded less than the minimally required 75% rate for school participation *after* replacement but had still encompassed at least 50% of the original sample of schools.

In addition to providing the manuals and documents described, the ISC gave NPMs three main software packages to assist with data collection:

- *The IEA Windows Within-School Sampling Software (WinW3S)*: This software package helped the national data managers prepare the survey listing forms, qualify and randomly sample teachers in selected schools, and produce tracking forms for the sampled individuals. The software stored all tracking data in a single database so that this information could later be used to verify the integrity of the sampling procedures, to verify the completeness of the response data and (eventually) to compute sampling weights and participation rates.
- *The IEA Data Management Expert (DME) software*: The DME software enabled national study centre staff to capture the data through keyboard data entry and to perform a range of validity checks on the entered data. The DME databases included codebooks for each of the questionnaires, thus providing all the information necessary for producing data files for each instrument that adhered to the standard international format (see Chapter 8 for more details).

A third software package, the *IEA Online Survey System (OSS)*, helped the ISC prepare the questionnaires for online administration. During this process, the ISC asked the participating countries/economies to review the prepared online questionnaires via the Internet. The web-based monitor component of the OSS allowed national centres to audit participation in real-time and to follow up those schools that returned incomplete questionnaires or did not return questionnaires.

During meetings with the NPMs, the ISC described and explained the field operation procedures outlined in the manuals and guidelines and provided guidance on how to use the software packages. Representatives of the national study centres also had to participate in hands-on training sessions to practise the correct handling of the software and some procedures. If any queries or concerns regarding procedures, guidelines or software emerged during implementation, the ISC was available to support the national centres and help them find appropriate solutions.

6.2. Administering the TALIS core and additional international options

TALIS 2018 mandated all participating countries/economies to administer the ISCED level 2 core survey of teachers and their principals. In addition, countries/economies could participate in one or more of the international options (Table 1.1 in Chapter 1) an overview of the distribution of options across the participating countries/economies, while Chapter 4 outlines the development of the national survey instruments for the different options). If countries/economies opted to administer TALIS at an additional ISCED level or to administer the TALIS-PISA link, the ISC instructed them to prioritise the ISCED level 2 core survey. This mandate applied to national instrument production as well as to data collection and data processing.[4]

For those countries/economies that decided to administer one or more of the international options, this work, which had to be conducted alongside production of the national ISCED level 2 instrument, presented an extra layer of complexity. The ISC, therefore, stressed the importance of each of these countries/economies following an agreed individualised survey preparation schedule. These schedules made it possible to monitor progress, plan for staff resources and ensure a smooth workflow between the national study centres and the ISC.

Unlike countries/economies belonging to the Northern Hemisphere, some countries/economies in the Southern Hemisphere had only about six to eight weeks to get all survey instruments and materials ready in time for the start of survey administration, which had to occur in the interval from the middle to the end of September/beginning of October 2017. Some countries/economies extended their data collection into January 2018 as an exception.

Table 6.1 gives an overview of the official data collection windows and the time period dedicated to instrument preparation for both hemispheres.

Table 6.1. Instrument preparation time

School schedule	Preparation time for instruments	Official main survey data collection window
Southern Hemisphere	15 August to 30 September 2017	1 September to 15 December 2017
Northern Hemisphere	15 August to 28 February 2018	1 March to 31 May 2018

Due to the tight timelines for the Southern Hemisphere countries/economies, the ISC delivered the *School Co-ordinator Manual* earlier than scheduled to those national study centres that requested it. The ISC also released instruments and some manuals and forms earlier than originally scheduled, that is, on 1 August 2017 rather than on 15 August. In addition, the ISC treated Australia, Brazil, Chile, Ciudad Autónoma de Buenos Aires (Argentina), Colombia, Korea, New Zealand and Singapore as high-priority and scheduled exclusive time during August and September 2017 for verifying their survey instruments.

Data collection for Northern Hemisphere countries was mainly from March to May 2018 (with some participants starting early in January and February and some extending into July 2018). In the Northern Hemisphere, schedules and procedures for Denmark, Turkey and Viet Nam were particularly complex because these countries decided to administer all of the international options. That decision resulted in 16 instruments across the options: 4 teacher questionnaires, 4 principal questionnaires, 4 teacher cover letters and 4 principal cover letters.

Spain administered the survey in 5 different languages, which resulted in 20 instruments (teacher questionnaire, principal questionnaire, teacher cover letter and principal cover letter for each language). Spain also decided, in early 2017, to join the ISCED level 1 option, which meant it had to conduct a late field trial (FT) in September/October 2017. Because administration of the Spanish FT coincided with preparation for the Spanish MS, this work was particularly challenging for all parties involved. France, meanwhile, had to administer a second FT in October/November 2017 in order to trial a set of politically sensitive questions that it had not been able to administer during the original FT in the spring of 2017.

Saudi Arabia and South Africa had very demanding schedules as well. South Africa decided to join TALIS in September 2017 and therefore had to conduct its FT in March 2018 and administer its MS in August-October 2018 in line with a Southern Hemisphere schedule. Saudi Arabia administered its FT in March 2018, followed shortly after by administration of its MS in May 2018.

Then there were participating countries/economies for which instrument preparation was relatively straightforward and timelines were comfortable. These countries/economies, (e.g. Estonia, Hungary, the Russian Federation) opted to administer only the ISCED level 2 core survey and in one national language only.

6.3. Contacting schools and within-school sampling procedures

Statistics Canada sent each NPM a selected school sample based on the sampling frame the NPM had already submitted (see Chapter 5 for more details on school sampling). In order to achieve the highest possible participation rates at the school level, Statistics Canada sampled two replacement schools (assuming such schools were available) in addition to each originally sampled school.

Once NPMs received their sample, the national study centres began contacting the designated schools. National study centres usually adhered to the technical standards and only contacted their first replacement school if one of the originally sampled schools declined participation. If this replacement school also refused participation, NPMs approached their second replacement school.

Two participating countries (the Netherlands and the United States) applied another process so as to achieve the required participation rates, namely contacting all schools at the same time. If the original school and the replacement school both agreed to participate in the survey, the replacement school was marked as a national school. However, because this procedure represented a deviation from Technical Standard 5.5, national schools were not included during computation of the participation rates, conducted as part of the data adjudication process. Further mention of the adjudication procedure appears in the discussion in Chapter 10 on data adjudication.

National study centres that administered the survey in 1 or more of the international options generally had to handle, in parallel, up to 750 schools (including the 200 for the core survey).[5] These centres, therefore, had to plan their resources carefully to meet the requirements of the multiple tasks associated with this complex survey design.

Most of the participating countries/economies asked each school to nominate a school co-ordinator to be responsible for carrying out all TALIS-related tasks within the school. In many cases, the school co-ordinators were principals or another school management team member. Nearly 50% of the national study centres said that a member of the management team other than the principal took on this responsibility. Nearly 40% of the study centres noted that teachers filled the role of school co-ordinators. Only one national study centre hired an external agency and only one centre hired external staff (e.g. retired principals or experienced assessment co-ordinators) to complete the tasks.

Close co-operation between school co-ordinators and national study centres was crucial during all steps of teacher listing, teacher sampling and survey administration. To facilitate smooth communication, several countries/economies established hotlines, special email accounts, or websites and online platforms.

6.3.1. Identification number, teacher listing forms and teacher tracking forms

Information about teachers was gathered through the teacher listing form (TLF) and teacher tracking form (TTF; see Annex F for more information on these two forms). National study centres used the IEA WinW3S software to produce the forms. WinW3S created hierarchical four-digit identification numbers that uniquely identified the sampled schools within each participating country/economy. This number was also the identification code assigned to the person answering the principal questionnaire. Teacher identification codes were derived from the school codes by adding two additional digits at the end of the school identifier, a process that created a hierarchical link between schools and teachers.

In accordance with the instructions in the *School Co-ordinator Manual*, school co-ordinators listed each eligible teacher and his or her name, followed by a sequential number, exemption information, year of birth, gender and main subject domain. Nearly one-third of the NPMs reported that data protection/confidentiality laws and rules prevented them from providing teachers' names. These participating countries/economies, therefore, used only numbers or codes.

Schools could choose up to a maximum of five main subject domains: language, human sciences, mathematics and science, other, and not specified. Classifying teachers into the

domains was sometimes a demanding task, requiring close co-operation between the school co-ordinators and their respective national study centres. Although the TALIS core survey targeted ISCED level 2 teachers, not every teacher teaching at this level was within scope. Out-of-scope teachers included teachers entirely devoted to adult education; substitute, emergency or occasional teachers; teachers on long-term leave; teacher aides; pedagogical support staff; and health and social support staff. Teachers who were also the school principal, as well as teachers who took part in the FT, were exempted from participation but they still had to be included on the TLF (for more details on school sampling, see Chapter 5).

The national study centres entered information from the TFLs into WinW3S and then drew the random within-school teacher sample of 20 teachers per school.[6] After completion of the within-school sampling, WinW3S created TTFs that listed all sampled teachers. The national study centres sent the TTFs to schools so that school co-ordinators knew which teachers should receive the instruments.

The TTFs were also used to monitor the participation status of the sampled teachers and therefore included teacher names, teacher ID, year of birth, gender, main subject domain and teacher questionnaire mode (online or paper). Each TTF furthermore contained a column that allowed the national study centres to document the teacher questionnaire return status for paper administration and a column in which the centres could enter data availability information from the online data collection. Because the form provided school co-ordinators with a roster of selected teachers, they could also use the form to identify which teachers within schools they needed to follow up via email or telephone.

The national study centres sent copies of the TTFs, each of which included teacher IDs but not teacher names, to the ISC together with the survey data. Because the names on the TTFs could be cut off, all names were kept confidential. Annex F contains a blank TFL and TTF.

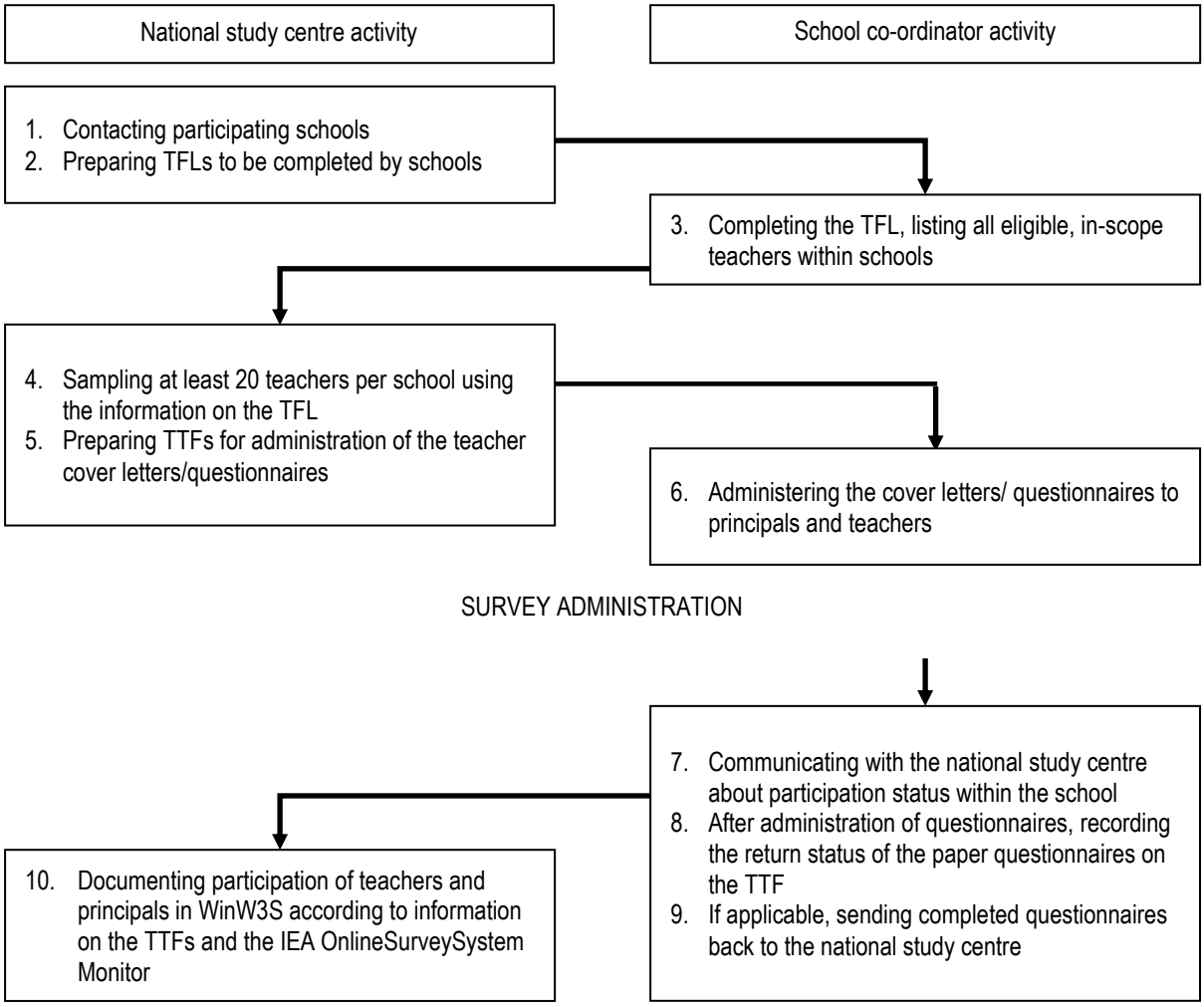
6.3.2. Assigning materials to teachers and school principals

The ISC asked each school principal to complete one principal questionnaire. The school co-ordinator assigned a teacher questionnaire to each teacher listed on the TTFs (see Chapter 5 for more details on school sampling).

The national study centre then sent each school co-ordinator a package containing all cover letters for online administration or paper administration as well as the TTFs and any other relevant briefing materials. To address confidentiality concerns, several countries/economies chose to provide teachers with pre-paid envelopes that they could send directly to their respective national study centre rather than to the school co-ordinator.

Figure 6.1 outlines the different responsibilities of each national study centre and school co-ordinator with regard to the correct assignment of questionnaires to teachers.

Figure 6.1. Responsibilities of national study centres and the school co-ordinator during survey administration



6.4. Administering the questionnaires and conducting national quality observations

The ISC asked each participating country/economy to select its own timeframe for survey administration, but within the internationally prescribed time period at the end of the school year. For Southern Hemisphere countries/economies, the internationally prescribed time for the MS was between 1 October and 15 December 2017. However, some countries/economies started in September, while others extended their data collection into January 2018. For the Northern Hemisphere countries/economies, the prescribed time was between 1 March 2018 and 31 May 2018, but some countries/economies started in January and February, while others extended into July 2018 as an exception. National study centres had to discuss any deviations from these periods with the ISC and gain the ISC's approval for them. The only deviations exempt from this process were those for South Africa, which operated under a shifted survey schedule.

Table 6.2 documents the data collection windows as they were originally planned, as well as changes to them. The table also highlights the dates that fell outside the internationally

prescribed time periods. Some national study centres had to exceed the data collection window in order to achieve the necessary participation rates. They did this by starting the data collection earlier or by finishing it later than originally specified. The data collection windows, therefore, ranged from 13 days to 5 months.

While 15 countries/economies asked for start or end dates that were not in the prescribed periods, most of these dates were still within the same school year. The only participating countries/economies in which data collection shifted to a new school year were Australia and Denmark (see Chapter 10 for details).

Table 6.2. Originally planned and actual data collection windows for ISCED levels 1, 2 and 3[1]

Country/economy	Planned start of data collection window	Planned end of data collection window	Actual start of data collection window	Actual end of data collection window
Alberta (Canada)	01-03-18	24-05-18		**22-06-18**
Australia	09-10-17	22-12-17		**28-02-18**
Austria	09-04-18	09-05-18		14-05-18
Belgium	01-03-18	31-05-18		
Flemish Community (Belgium)	01-03-18	31-05-18		
Brazil	09-10-17	04-11-17		30-11-17
Bulgaria	04-03-18	04-05-18		
Chile	02-10-17	15-11-17	23-10-17	
Ciudad Autónoma de Buenos Aires (Argentina)	02-10-17	20-10-17		21-11-17
Colombia	12-10-17	06-12-17		**19-01-18**
Croatia	19-03-18	14-05-18		
Cyprus[2,3]	05-03-18	05-05-18	01-03-18	
Czech Republic	26-03-18	30-04-18		
Denmark	01-03-18	16-05-18		**06-07-18**
England (United Kingdom)	01-03-18	31-05-18		
Estonia	01-03-18	30-04-18		11-05-18
Finland	12-03-18	08-04-18		
France	**26-02-18**	18-05-18		
Georgia	04-03-18	30-04-18		
Hungary	01-03-18	13-04-18		
Iceland	01-03-18	31-05-18		**16-06-18**
Israel	01-02-18	31-03-18		
Italy	01-03-18	31-03-18		
Japan	**15-02-18**	15-03-18		
Kazakhstan	01-03-18	30-04-18	**26-02-18**	
Korea	01-11-17	15-11-17		01-12-17
Latvia	01-03-18	30-04-18		31-05-18
Lithuania	**12-02-18**	09-03-18		
Malta	15-03-18	30-04-18		
Mexico	09-04-18	25-04-18		
Netherlands	**15-01-18**	31-05-18		
New Zealand	16-10-17	15-12-17		**31-01-18**
Norway	01-03-18	04-05-18		23-05-18
Portugal	02-04-18	31-05-18	20-03-18	
Romania	01-03-18	31-03-18		

Country/economy	Planned start of data collection window	Planned end of data collection window	Actual start of data collection window	Actual end of data collection window
Russian Federation	20-03-18	28-05-18		**11-06-18**
Saudi Arabia	01-03-18	10-05-18		
Shanghai (China)	01-03-18	20-04-18	16-04-18	
Singapore	**14-09-17**	17-11-17		
Slovak Republic	30-04-18	18-05-18		
Slovenia	15-03-18	18-04-18	07-03-18	
South Africa	01-08-18	10-10-18		
Spain	01-03-18	20-04-18		31-05-18
Sweden	01-03-18	30-04-18		18-05-18
Chinese Taipei	01-04-18	31-05-18	15-04-18	
Turkey	01-03-18	31-03-18	15-03-18	
United Arab Emirates	15-05-18	31-05-18	**01-02-18**	15-04-18
United States	01-03-18	31-05-18		
Viet Nam	01-03-18	31-05-18		

1. The TALIS-PISA link was administered together with all the other ISCED levels in TALIS and in parallel or shortly after the PISA main survey in the Northern Hemisphere countries/economies. The Southern Hemisphere countries/economies (Australia and Ciudad Autónoma de Buenos Aires [Argentina]) administered PISA and therefore the TALIS-PISA link on a shifted schedule between September and November 2018.
2. Note by Turkey: The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".
3. Note by all the European Union Member States of the OECD and the European Union: The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

Bolded dates highlight dates that fell outside the internationally prescribed periods.

The end of the school year was purposely selected for administering the survey to guarantee comparability of collected data. During this period, principals and teachers were free to fill in the questionnaires whenever they chose. The overall target was 100% within-school participation. A school was considered to be a participating school if at least 50% of the sampled teachers returned their completed questionnaires.

To maintain high survey standards, the ISC expected the national study centres to run a national quality control programme. The ISC provided a manual template for national quality observers (NQOs); however, NPMs could elect to arrange their own programme. NQOs could perform their national quality observations partly on the phone and partly during school visits, but the ISC also required each NQO to personally visit at least ten schools.

Some participating countries/economies chose national study centre staff to carry out the NQO programme, whereas others appointed external personnel, such as researchers interested in large-scale assessments, representatives of government agencies involved in education and retired principals. After the TALIS MS had been administered, NPMs reported the outcomes of the national quality control work in the survey activities questionnaire. Chapter 7 provides a discussion of these outcomes. The IEA Amsterdam was responsible for organising the international quality observation work; their role in this regard is also outlined in Chapter 7.

6.5. Monitoring the online questionnaires

Monitoring the administration of the survey was a demanding task for the school co-ordinators, especially if data protection laws prevented them from using the online monitor of the OSS or if teachers could send completed paper questionnaires directly to their national study centre. In these instances, school co-ordinators relied on national study centres to inform them of the need to follow up pending questionnaires.

National study centres monitored completion of the online questionnaires (see Chapter 8 for more details),and NPMs communicated completion status to school co-ordinators. Countries/economies were free to manage this procedure according to their needs. Most national study centres preferred regular email and/or telephone exchanges between the school co-ordinators and themselves. Other centres either contacted respondents directly using email or instant messaging, set up banners on websites, prepared reminder leaflets for teachers and schools, asked union members to call schools or created national TALIS websites where school co-ordinators could log on individually to access all necessary information. Some national study centres granted school co-ordinators access to the monitor so that they could organise the follow-up procedures themselves.

The monitoring work also included a participation-rate estimation tool that kept data managers up to date on their current participation rate according to the already returned paper questionnaires or submitted online questionnaires.

After the survey had been administered, each national study centre exported the questionnaire data availability status from the OSS. National study centre personnel then imported this participation information, as well as the participation information from the DME with respect to administration of the paper questionnaire, into WinW3S, a practice that enabled the national study centres to verify the participation status of each sampled respondent. The ISC told each national centre that it was mandatory for them to verify participation before they submitted data to the consortium, a process that all TALIS countries/economies completed successfully.

6.6. Material receipt and preparing for data entry

The major tasks for NPMs immediately after administration of the TALIS MS included retrieving and collating the materials from schools and verifying their integrity. On receiving survey materials from the schools, NPMs:

- checked that they had received complete and appropriate cover letters/questionnaires for every teacher listed on the TTF
- verified that all identification numbers on all cover letters/questionnaires were accurate and legible
- checked that the participation status recorded on the TTFs matched the availability of questionnaires, the information on the paper questionnaires and the information in the online monitor
- followed up those schools that did not return all the survey materials or for which forms were missing, incomplete or otherwise inconsistent.

National study centres recorded all necessary information about schools, principals and teachers, as well as the return status of the questionnaires, in WinW3S. NPMs then organised the paper questionnaires and corresponding forms for data entry (see Chapter 8).

Notes

[1] The international study centre (ISC) had prepared software packages for sampling, online data collection, data entry and data processing to fit the needs of TALIS. The ISC requested that all participating countries/economies use solely the IEA software to perform the survey; no exceptions were allowed.

[2] With the survey activities questionnaire (SAQ), administered after the field trial and again after the main survey data had been collected, the ISC collected NPMs' feedback on their experiences administering TALIS 2018. The outcomes of the field trial activities questionnaire were considered in terms of improvements to the main survey's procedures and the software in use. The outcome of the main survey questionnaire was incorporated into this chapter.

[3] The ten topics included: survey ethics and planning; communication; sampling design, weighting and adjudication; instrument adaptation, translation and verification; school co-operation and within-school sampling; data collection and participation monitoring; observing the quality of data collection; data capture of paper instruments, verification, submission and management; confidentiality, security and preparation of the international database; data analysis and reporting.

[4] If a participating country/economy administering one or more of the options was struggling with low participation rates during the survey, the national study centre knew it had to first focus on the core survey.

[5] Exceptions occurred for small countries, where the sample size was reduced due to local circumstances.

[6] National study centres were given the opportunity to sample more than the recommended 20 eligible teachers per school, if desired.

Chapter 7. Quality assurance procedures for the TALIS data collection

This chapter describes the quality control programme developed and implemented for administration of the Teaching and Learning International Survey (TALIS) 2018. Assuring the quality of the data collection was a three-part process, comprising: (1) an international quality control programme overseen by the IEA Amsterdam and designed to document the procedures for survey preparation and administration during the main data collection; (2) a national quality control programme carried out by national study centres; and (3) a follow-up online survey activities questionnaire that asked national project managers to comment on the implementation of the TALIS main survey procedures in their respective countries.

Quality control in the survey administration was extremely important for ensuring valid comparisons of teacher and principal survey results across countries/economies. It helped document not only the quality of survey administration and adherence to technical standards and to standardised survey administration guidelines and procedures in each participating country/economy but also issues that could influence the quality and comparability of the data.

Because the information collected by the international quality observers serves as evidence for further analysis and improvements and reveals any critical and significant process-related issues, the school visit record and the survey activities questionnaire provided data on key components of the survey process and of national project managers' experiences in conducting TALIS 2018. The international quality observers gained the impression from their observations that most countries/economies closely followed survey procedures.

Available evidence suggests that teacher respondents generally had few problems with the survey. Any issues or concerns regarding survey administration procedures and problem-solving were shared between the national study centres and the TALIS International Consortium. The quality of the implementation of the TALIS 2018 data collection procedures was well documented, mostly by quality observers at the international level. Data reflected stable and consistent data collection processes across participants. In addition, the importance of effective communication in facilitating international project work and supporting project completion was, once again, highlighted, setting the stage for attainable success during future TALIS cycles.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

7.1. Quality control in survey administration

During TALIS 2018, considerable effort went into developing standardised materials and procedures that ensured the data collected in each country/economy were internationally comparable to the greatest extent possible. More specifically, this standardisation process ensured that survey materials were administered to participants under comparable survey conditions for comparable analysis, across all countries/economies and languages and for each mode of administration (i.e. online and/or paper data collection). Quality control was implemented at different levels and stages during instrument production, administration, and data entry and processing in order to document the extent to which each country/economy implemented the standard operating procedures.

This chapter describes the outcomes of the quality control activities conducted during the main data collection. Quality control consisted of three major parts:

- The IEA Amsterdam designed and managed a standardised, international quality control programme of school and national centre visits carried out by international quality observers (IQOs). International quality control was implemented for the main survey only.
- The data from the quality control activities for TALIS were augmented by the responses of national project managers (NPMs) to a survey activities questionnaire (SAQ) administered online and conducted after administration of the main survey. The questionnaire elicited information about the NPMs' experiences in preparing for and conducting the TALIS 2018 data collection and the extent to which everyone involved followed procedures and guidelines. It also provided NPMs with an opportunity to provide feedback about all aspects of survey administration. Information pertaining to the national quality control programmes was also reported in the SAQ and is presented later in this chapter.
- The TALIS International Consortium required the NPMs to implement national data collection quality observations (i.e. a national quality control programme made up of school visits) during both the field trial and the main survey. The design of the national quality observation programme was nevertheless at the discretion of each participant. As a member of the consortium, the IEA Amsterdam provided a national quality observer manual template that countries/economies could adapt to suit their national contexts and use as a basis for training their national quality observers (NQOs).

During TALIS 2018, countries/economies could administer three international options in addition to the core ISCED level 2 population, namely ISCED level 1, ISCED level 3 and the TALIS-PISA link. The sampled populations (and instruments) applicable to participants featured in the design of the quality control programme and were proportionally included in the schools selected for international quality observations in each country/economy. The TALIS 2018 Consortium advised NPMs to adopt a similar approach with respect to national quality control.

7.2. International quality control programme

As part of the OECD TALIS 2018 quality assurance process, the IEA Amsterdam established a standardised international quality control programme to document data collection activities in the participating countries/economies.

A crucial element of the programme was the appointment of an international quality observer (IQO) in each participating country/economy who could conduct international quality control externally to the national study centre. The IEA Amsterdam asked each NPM to nominate two candidates for the TALIS 2018 IQO position who were familiar with survey-based research, school environments and/or the day-to-day operations of schools. The nominees could not be staff members in the national study centre or relatives or friends of the people working in the centre. The IQOs also had to possess ICT skills and be fluent in both English and the surveyed language(s) spoken in their countries/economies.

For each country/economy, the IEA Amsterdam selected and appointed one of the two candidates to serve as IQO. The only exception to this practice was Belgium. Because Belgium has two separate education systems for its Flemish and French communities, two IQOs were necessary. To guarantee IQO independence, the IEA Amsterdam contracted all IQOs and required them to report directly to them. IQOs were permitted to recruit and share their duties with assistants in order to cover the range of school locations and environments and ensure compliance with the survey timeframe.

Prior to administration of the main survey, the appointed IQOs from the TALIS countries and economies attended and participated in a one-and-a-half-day training seminar on their role and responsibilities. The face-to-face training sessions, conducted by the IEA office in Amsterdam, took place from 31 August to 1 September 2017 for Southern Hemisphere countries/economies and from 15 to 16 January 2018 for Northern Hemisphere countries/economies (two IQOs received training remotely).

During the training seminars, the IEA Amsterdam introduced the IQOs to the TALIS design and operating procedures and guided them through each step of the programme so they could confidently fulfil their roles. The IQOs received the following materials:

- the *TALIS 2018 main survey manual for international quality observers* (internal document), outlining the IQO's role and responsibilities
- the international *TALIS School Co-ordinator Manual*(s) (one per administration mode – internal documents)
- the TALIS 2018 translation verification report template, international survey instruments and translation verification files/documentation
- confidential login details for the IEA Online Survey System (IEA OSS) that gave access to the electronic versions of the national instruments used for online data collection
- the TALIS 2018 school visit record template, which provided a standardised, structured format for interviewing the school co-ordinator (SC) on the administration of the survey
- confidential login details for the IEA OSS to enter data recorded in the school visit record for every school visited for international quality control purposes
- confidentiality agreement (template) to be signed by IQO assistants
- guidance file on the documentation requirements
- NPM interview outline and question template
- a USB stick containing all TALIS materials (manuals, templates, informational documents and forms) that would be used during data collection.

IQOs were also required to collect the following documents from the national centre in their country/economy:

- national versions of the *TALIS 2018 School Co-ordinator Manual* (one for each surveyed population, administration mode and language)
- national survey instruments
- a teacher listing form and a teacher tracking form for each school selected for international quality observation.

IQOs had three main responsibilities with respect to the international quality control programme. Their first task involved visiting the national study centre to interview the country's/economy's NPM, collect national TALIS materials and select 20 schools to be visited. Since a structured interview with the NPM would ensure a better understanding of how the international procedures had been adapted to suit national contexts, the IEA Amsterdam provided IQOs with an NPM interview outline and question template.

Second, IQOs were expected to complete a translation verification report (one report per language of administration; a maximum of two languages). Each participating country/economy had to translate and/or adapt the TALIS materials to the national situation and submit all versions of their instruments[1] (in all common languages) to the IEA Amsterdam for independent international translation verification. The IEA Amsterdam asked IQOs to review the national instruments and comment on the use of specialist advice from the verifier regarding national translations of the international source instruments into the official language(s) of instruction. They also had to assess and document consistency across the national instruments used to survey the core target population and any optional populations, and to compare the national version of the *School Co-ordinator Manual* with the international templates in order to verify alignment (proper adaptation) and determine if the TALIS 2018 guidelines produced by the international study centre (ISC) had been followed.

The third duty, irrespective of the options (ISCED level 1, ISCED level 2, ISCED level 3 and the TALIS-PISA link), required IQOs to visit a total of 20 sampled schools to interview the school co-ordinators (SCs) about TALIS activities leading up to and including the distribution of materials, and to record their observations and interview responses in the school visit record for each of the schools. The interview times ranged from approximately 30 minutes to no more than 60 minutes. IQOs were instructed to allow extra time for questions that required a more careful explanation.

During their fieldwork, IQOs were required to report their progress to the IEA Amsterdam and to advise of any issues that had arisen. As a result of their duties, IQOs had to send two sets of deliverables to the IEA Amsterdam at different stages of the programme. The deliverables included the following materials and documents:

- a copy of the completed NPM interview outline and question template
- a copy of the translation verification report per language of administration
- a checklist documenting the materials collected from the NPM
- a list of all visited schools
- copies of all 20 completed school visit records
- teacher listing forms and teacher tracking forms for every visited school

- a copy of the national version(s) of the *School Co-ordinator Manual*
- copies of the TALIS study instruments per surveyed population and language of administration
- confidentiality agreements signed by the IQO assistants (if applicable).

7.3. School visit design

In co-operation with the NPM, the IQO in each country/economy selected 20 of the sampled TALIS 2018 schools. For countries and economies that chose one or more of the optional survey population(s), the number of school visits was distributed according to the plan indicated in Table 7.1. If, for example, a country/economy administered two extra international options in addition to core ISCED level 2, its IQO had to visit seven schools for that ISCED level, seven schools for one of the international options (at the IQO's discretion) and six schools for the other international option (again at the IQO's discretion). This plan was designed to yield sufficient evidence of the quality of the data collection sessions across the surveyed populations.

The IEA Amsterdam received documentation of the international quality control visits to schools from all participating countries and economies. IQOs successfully conducted 968 school visits in 49 countries/economies,[2] with the exception of Australia, the Netherlands, South Africa and Sweden. Dutch schools teaching at ISCED level 1 took industrial action during the country's survey administration window, meaning the observer could only conduct 19 of the 20 scheduled school visits. In Sweden, the observer interviewed the required number of SCs (i.e. 20) but had to interview 2 of them by telephone rather than in person. Similar measures were implemented in Australia, where the IQO conducted 14 school visits/face-to-face interviews for the ISCED levels 1 and 2 surveys, but 6 telephone interviews for the TALIS-PISA link option. The IQO in South Africa conducted only 18 school visits due to unforeseen personal circumstances and practical constraints.

The IEA Amsterdam instructed IQOs to select multiple replacement schools in addition to the 20 initially selected schools, in case problems occurred (e.g. declines in survey participation and difficulties arranging school visits) that prevented them from visiting their originally selected schools. Before beginning their field work, IQOs had to ask the IEA Amsterdam to approve their respective lists of selected schools and replacement schools. In general, observers managed to resort to their pre-selected replacement schools when issues arose with regard to any of the 20 initially selected schools.

Monitoring of the survey administration in the TALIS-PISA link schools received special attention. The majority of countries/economies conducted the TALIS 2018 project during the PISA data collection in the second quarter of 2018. The exceptions were Australia and Ciudad Autónoma de Buenos Aires (Argentina), where administration of the TALIS-PISA link questionnaires took place in the third quarter of 2018. Both IQOs conducted the remainder of their visits accordingly.

Table 7.1. Planned distribution of school visits across international options

Participating country/economy	Surveyed populations(s)	Number of planned school visits			
		ISCED level 1	ISCED level 2	ISCED level 3	TALIS-PISA link
Austria, Bulgaria, Chile, Cyprus,[1,2] Estonia, Finland, French Community (Belgium), Hungary, Iceland, Israel, Italy, Kazakhstan, Latvia, Lithuania, Mexico, New Zealand, Norway, Romania, Russian Federation, Saudi Arabia, Shanghai (China), Singapore, Slovak Republic, South Africa, Spain, United States	ISCED level 2		20		
Flemish Community (Belgium), England (United Kingdom), France, Japan, Korea, Netherlands	ISCED level 1 and ISCED level 2	10	10		
Alberta (Canada), Brazil, Croatia, Portugal, Slovenia	ISCED level 2 and ISCED level 3		10	10	
Sweden, Chinese Taipei, United Arab Emirates	ISCED level 1, ISCED level 2 and ISCED level 3	6 or 7	7	6 or 7	
Colombia, Czech Republic, Georgia, Malta	ISCED level 2 and TALIS-PISA link		10		10
Australia, Ciudad Autónoma de Buenos Aires (Argentina)	ISCED level 1, ISCED level 2 and TALIS-PISA link	6 or 7	7		6 or 7
Denmark, Turkey, Viet Nam	ISCED level 1, ISCED level 2, ISCED level 3 and TALIS-PISA link	5	5	5	5

1. Note by Turkey: The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".
2. Note by all the European Union Member States of the OECD and the European Union: The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

During their school co-ordinator in-situ interviews, IQOs asked the SCs if the teacher population being surveyed at the school comprised ISCED level 1, ISCED level 2, ISCED level 3 or TALIS-PISA link teachers. Table 7.2 compares the expected distribution of school visits across the surveyed populations against the realised distribution, as reported by the IQOs. The data show that the realised distribution of school visits deviated slightly from the planned distribution.

Table 7.2. Comparison of the planned and realised school visit design

School visits	ISCED level 1 (%)	ISCED level 2 (%)	ISCED level 3 (%)	TALIS-PISA link (%)	Total (%)
Planned	10.7–11.2	74.8	6.9–7.3	6.8–7.0	100.0
Realised	12.2	72.0	8.6	6.9	99.7

The results of the IQOs' school visits across the different surveyed target populations given in the following sections are presented together, not separately by TALIS participant.

7.4. Interviews with the SCs

The TALIS principal and teacher questionnaires were administered in 49 countries/economies during the main data collection. The IEA Amsterdam asked the IQOs to use the school visit record to record their observations of the survey administration.

Data collected for the school visit record came from a structured interview with the SC. The purpose of this activity was to solicit an evaluation of the administration of TALIS from the SCs, to collect recommendations for improvement, to obtain additional background information, and to elicit information on survey and post-survey-related activities. The IQOs conducted interviews with the SCs according to the guidelines included in Sections A, B, C, D and E of the school visit record:

A. *SC information*, that is, information about the SC and his or her involvement in the survey.

B. *Initial preparations before survey distribution*, for example, assisting the NPM to complete the *teacher listing forms*, determining the administration dates with the NPM and ensuring that the survey instruments were kept in a secure place.

C. *Survey administration activities, including issues of confidentiality and security*, for example, distributing the respective cover letters (online data collection) and/or the principal questionnaires and teacher questionnaires (paper data collection) for survey administration.

D. *General impressions*, that is, evaluation of procedures conducted by the SC.

E. *IQO review*, that is, summary of the IQO's overall impressions.

To provide an overview of the main data collection process co-ordinated by the SCs, the following subsections are based on the information collected in the school visit records. The subsections accord with the five-part structure of the school visit record.

7.4.1. SC information

In all countries and economies, approximately 96% of SCs were members of the school staff. Almost half of the co-ordinators were heads of subject or year level and/or another member of the school management team (42%); about 23% of them were principals and approximately 19% were teachers. In Chile, for example, co-ordinators were external to the schools and had other jobs related to the field of education. Across the participating countries/economies and target populations, the percentage of SCs responsible for one TALIS school only was 96%.

A large majority of SCs stated that the attitudes of other school staff towards TALIS 2018 were slightly more neutral (about 52%) than positive (fewer than 48%), while less than 1%

of the SCs reported negative attitudes. The negative or indifferent attitudes of the staff members were commonly characterised as a result of the survey period overlapping with busy periods in the school year and school staff's limited knowledge about TALIS.

As documented by the IQOs, 31% of the SCs reported that someone other than the SC encouraged teachers to join the survey. These people used special instructions, motivational talks and/or incentives as encouragement. School principals, for example, tended to encourage participation by delivering motivational or instructional talks. When this occurred, it was usually during staff meetings or at a group session emphasising the importance of the survey and of sound survey distribution procedures.

The SCs described teacher participants as broadly co-operative, with between roughly 40% and 55% of them considering teachers "moderately co-operative or extremely co-operative" (Table 7.3). Less than 0.4% of the co-ordinators considered teachers "hardly co-operative at all". In general, according to roughly three-quarters (76.3%) of the co-ordinators, teacher respondents felt comfortable answering the survey questions; approximately 15% of co-ordinators did not know whether teachers felt comfortable.

Table 7.3. IQO-reported interview responses of the SCs to questions about teacher co-operation and comfort when participating in TALIS

Questions	Extremely co-operative (%)	Moderately co-operative (%)	Somewhat co-operative (%)	Not co-operative (%)
To what extent would you describe the teachers as co-operative?	55.1	39.8	4.7	0.4
		Yes (%)	No (%)	Do not know (%)
Did teachers feel comfortable answering the survey questions?		76.3	8.3	15.4

IQOs reported that SCs administered their survey in accordance with the international procedures. Just over half of the SCs (50.9%) from across the participating countries and economies adhered to particular data protection rules at the national level in addition to TALIS 2018 standardised procedures.

7.4.2. Initial preparations

Section B of the school visit record asked SCs to report on the training and other preparatory work they did prior to survey administration in order to ready themselves for their role in TALIS. Table 7.4 summarises the SCs' answers to these questions.

Approximately 92% of the SCs interviewed reported receiving a leaflet about TALIS 2018 from their NPM and roughly half of them attended a training session designed specifically for them (Table 7.4). Several countries/economies had not organised any training sessions but many of their SCs found their national *School Co-ordinator Manual* self-explanatory. When IQOs asked SCs if they had any difficulty understanding the survey procedures, about 95% of them answered "no". Roughly 37% of them indicated they had previous experience serving as the SC for an international and/or national survey.

Table 7.4. IQO-reported interview responses of the SCs to questions about their experiences, training and initial survey preparation

Questions	Yes (%)	No (%)	Not answered (%)
Did the SC receive a leaflet from the NPM explaining the purpose of TALIS?	91.6	8.4	x
Has the SC previously served as a school co-ordinator for any other survey and/or assessment (national and/or international)?	36.5	63.2	0.3
Has the SC attended a training session designed for the TALIS 2018 main survey school co-ordinators?	43.4	56.5	0.1
Did the SC have any difficulty understanding the survey procedures?			
Purpose of the survey	5.1	94.9	x
Survey administration (including administration, participation and security/confidentiality arrangements)	5.3	94.7	x
Survey return procedures (online and paper)	6.4	93.6	x
Did the SC experience any difficulties completing the teacher tracking form or teacher listing form?	6.8	91.2	2.0
Did the SC experience any inconsistent communication with the NPM, resulting in delays or unexpected changes?	2.5	97.4	0.1
Did you use the Teacher Tracking Form and Teacher Listing Form?	97.7	2.0	0.2
Is there anyone listed on the Teacher Listing Form who is NOT a teacher? NOTE: School staff who do NOT qualify as teachers are out-of-scope for the purposes of TALIS, and include substitute, emergency or occasional teachers.	5.0	95.0	x

x: not applicable.
Note: Percentages were derived from school co-ordinator responses during 976 interviews in total.

In terms of following pre-survey procedures, most countries used the teacher listing form and the teacher tracking form, as evidenced by the majority of SCs stating that they used the forms (approximately 98%). Generally, most SCs did not experience difficulties completing the teacher listing form and teacher tracking form (roughly 91%). The SCs prepared the teacher listing forms as part of the within-school sampling process, as described in the *School Co-ordinator Manual*, which provided detailed information about who to include on the form.

About 7% of the SCs stated they experienced some difficulty completing the teacher tracking and teacher listing forms. In some cases, SCs struggled to list eligible teacher respondents due to teachers working at more than one level of education (international options) and/or because they did not have access to some of the information requested on the forms (subjects and names). The IQO data revealed those listed on the teacher listing form qualified as a teacher in almost all cases (about 95%). In some cases, the lists included substitute teachers and teachers who were on long-term leave.

The IEA Amsterdam asked IQOs to collect the teacher listing and tracking forms from the NPMs for every school selected for international quality control in their respective country/economy and to cross-check the information recorded in the forms against the forms prepared by the SCs. The majority of SCs (around 96%) confirmed that the IQOs possessed a complete list of all the teachers employed at each particular school who were teaching the surveyed population (i.e. ISCED level 1, ISCED level 2, ISCED level 3 and the TALIS-PISA link). Discrepancies usually corresponded to staff turnover, teacher absences and maternity leave.

Most SCs (approximately 95%) felt that their respective *School Co-ordinator Manual* worked well, with fewer than 6% reporting the need for improvements to the document. Some TALIS 2018 countries/economies, for example, Austria and England (United Kingdom), did not produce a manual for SCs but opted to give them letters or other forms of information, or, in the case of Italy, to run webinars. Some countries/economies added supplementary material to the manual, such as short videos and screenshots.

Some SCs thought that more information on the survey itself could have been provided in addition to the procedural information and that the document was overlong and could, therefore, be shortened. Overall, NPMs were, as reported by the IQOs, highly consistent in their communication with the SCs, resulting in few delays or unexpected changes. Approximately 3% of the SCs who answered this question experienced minor communication issues.

7.4.3. Survey administration activities

The IEA Amsterdam instructed the IQOs to refer to the teacher tracking form and teacher listing form specific to each school when visiting it. Tables 7.5, 7.6 and 7.7 capture some of these key tasks and demonstrate that, among the SCs interviewed, 89.4% to 92.9% said that they explained not only the purpose of the survey to teacher respondents but also the estimated time needed to complete the survey, along with information on confidentiality arrangements and survey return procedures.

Table 7.5. IQO-reported interview responses of the SCs about explaining TALIS to participants

Question	Yes (%)	Somewhat (%)	No (%)
Did the SC explain the following aspects to the participants?			
Purpose of the survey	92.9	4.3	2.8
Estimated time to complete	89.5	3.7	6.8
Confidentiality arrangements	91.8	3.4	4.8
Survey return procedures	89.4	3.1	7.5

Note: Percentages derived from school co-ordinator responses during 976 interviews in total.

Table 7.6. IQO-reported interview responses of the SCs about distribution procedures

Questions	Yes (%)	No (%)	Not answered (%)
Did the SC distribute the cover letters (online data collection) and/or questionnaires (paper data collection) to participants in a confidential manner?	97.4	2.6	x
Did the SC distribute the cover letters (online data collection) and/or questionnaires (paper data collection) in accordance with the teacher tracking form?	97.2	2.7	0.1

x : not applicable.
Note: Percentages derived from school co-ordinator responses during 976 interviews in total.

Table 7.7. IQO-reported interview responses of the SCs about distribution time

Question	Same day (%)	Two-five days (%)	More than one week (%)	Not answered (%)
How soon after receipt of the questionnaires (paper data collection) and/or cover letters (online data collection) were the materials distributed to the participants?				
Principal questionnaire	37.9	41.3	20.5	0.3
Teacher questionnaire	21.0	54.1	24.5	0.4

Note: Percentages derived from school co-ordinator responses during 976 interviews in total.

With regard to distribution of the survey instruments, approximately 97% of the SCs stated that they disseminated the materials in a confidential manner. Both the principal questionnaires and the teacher questionnaires (paper data collection) and/or cover letters (online data collection) were typically distributed to participants on the same day or within two to five days after the co-ordinators' receipt of the instruments.

Similarly, 97.2% of the SCs stated that they distributed the cover letters (online data collection) and/or questionnaires (paper data collection) in accordance with the teacher tracking form. The teacher tracking forms and teacher listing forms were often kept in secure storage, such as the SC's or the principal's office. Administering the survey online was the default mode of data collection; about 88% of the SCs who provided a response reported that their school administered all the questionnaires online. Bulgaria, Japan, and Mexico conducted exclusively paper data collection.

The ethics and integrity of the survey relied on IQOs and SCs recognising and respecting boundaries on information sharing. The manner in which data were collected during TALIS 2018 ensured the anonymity of teachers and principals in the reporting of results. It also ensured that any information encountered that may have identified the teachers or principals participating in the survey remained confidential.

When SCs were asked about confidentiality provisions, around 89% of them said they were the only people to have access to the teacher tracking form and teacher listing form (Table 7.8). Fewer than 4% of the SCs stated that someone other than themselves had access to the completed questionnaires (paper data collection), which implies that confidentiality was primarily upheld across the sampled schools.

Table 7.8. IQO-reported interview responses of the SCs to questions about security and anonymity

Question	Yes (%)	No (%)	Not answered (%)
Did anyone else but the SC have access to the teacher tracking form and teacher listing form?	11.5	88.5	0.0
Did anyone other than the SC have access to the completed questionnaires (only applicable for paper data collection)?	3.3	68.4	28.3
Did any teachers refuse to participate in the survey?	7.7	92.2	0.1

Note: Percentages derived from school co-ordinator responses during 976 interviews in total.

As documented in the school visit records, SCs reported that fewer than 8% of sampled teachers refused to participate in TALIS. The reasons why non-respondents refused to participate included lack of time, upcoming retirement, illness, and teachers' unions or associations advising against participation.

7.4.4. General impressions

Table 7.9 presents the SCs' answers to questions about their general observations of the TALIS 2018 implementation.

Table 7.9. IQO-reported interview responses of the SCs to questions about their general impressions of the survey administration

Question	Yes (%)	No (%)	Not answered (%)
Did participants approach the SC to discuss any of the following?			
Purpose of the survey	12.7	87.2	0.1
Survey return procedures	7.7	92.0	0.3
Clarification of any items	15.2	84.5	0.3
An error they spotted	1.9	97.7	0.3
Other questions about the survey	10.0	89.7	0.3
Any questions they could not answer	5.0	94.6	0.4
	Very well, no problems (%)	Satisfactory, few problems (%)	Unsatisfactory, many problems (%)
Overall, how did the SC describe the survey distribution process?	89.8	9.7	0.5

Note: Percentages derived from school co-ordinator responses during 976 interviews in total.

IQOs asked SCs to indicate whether any of the TALIS participants approached them to discuss or ask questions about the survey. Approximately 13% of the SCs said participants asked them about the purpose of the survey, around 15% said participants asked them to clarify survey items and about 8% said participants questioned them about the survey return procedures. Around 2% of SCs said participants asked them about an error they had spotted and 10% of the SCs reported dealing with other questions about the survey (e.g. queries about confidentiality or requests for help to access the online questionnaire).

The majority of SCs felt the survey distribution process had gone very well, overall, and without any problems. Of those interviewed, about 10% reported experiencing some problems but still deemed the process satisfactory. Suggestions for improvement included additional time to complete the survey and more detailed instructions on completing the teacher tracking form.

7.4.5. IQO review

The IQOs formed the impression that the overall implementation of TALIS was positive. In their opinion, roughly 87% of the SCs definitely applied the TALIS procedures seriously and professionally. Several IQOs commended SCs for their thorough preparatory work executed ahead of the survey, effort to meet the deadlines outlined by the NPMs and professionalism in assuring the success of survey operations at the school level.

The SC and IQO feedback implies that teacher respondents remained supportive of TALIS and understood the importance of the project despite concerns some of them had about the length of the survey and not having, in their opinion, sufficient time to complete it.

7.5. Translation verification report(s)

IQOs recorded feedback from the translation verification process and their review of the verified national instruments and *School Co-ordinator Manual*(s) in the translation verification report. The IQOs completed one translation verification report per surveyed language (maximum of two national languages). The reports provided a starting point for determining whether any translation problems made the item(s) internationally non-comparable. Translation verification was implemented to help ensure the international comparability of the survey instruments.

7.6. Extra quality control questions

As an innovative endeavour, the TALIS 2018 Consortium developed three extra questions designed to test the feasibility of adding quality control questions to the teacher questionnaire delivered online. The questions were administered to 25 660 teachers representing a 10% subsample of the teachers participating in TALIS 2018. Of the three questions developed, two functioned as expected. Since the overall response rate for these 2 questions was above 95%, the questions could be used for further cycles. The third question was affected by a misunderstanding and would require further revision for future administration.

7.7. Survey activities questionnaire

The survey activities questionnaire covered all aspects of survey administration. The ISC prepared this questionnaire online and delivered it to NPMs for Southern Hemisphere participants in February 2018, after they had completed data collection. NPMs for Northern Hemisphere participants received their credentials and information on the survey activities questionnaire in April 2018. The questionnaire, which consisted of 9 content sections and 156 questions, asked the national study centres to provide information about all survey-related activities and the extent to which procedures and guidelines had been followed. The questionnaire also gave NPMs an opportunity to provide valuable feedback about all aspects of survey administration, including survey procedures and manuals, guidelines, support materials and software. All TALIS participants completed the questionnaire between March and December 2018. The following subsections present the results of this survey.

7.7.1. Within-school sampling

The national centres in all countries used the Windows Within-School Sampling Software (WinW3S) provided by the ISC.

Nine national centres used prepopulated teacher listing forms. The centres included information from ministries or school authorities in the lists before they sent them to schools, which meant that SCs only had to update the information. Some national centres (19%) used methods other than the paper/electronic forms created by WinW3S to list and track teachers. These methods varied from online forms to special software provided to

schools or already existing in schools. During TALIS 2013, 21% of national centres used other methods; during TALIS 2008, 62% did so.

With regard to data protection and confidentiality laws, 13 countries/economies reported restrictions on using teacher names on the listing and tracking forms and the national questionnaires. In these instances, the countries/economies used numbers or codes on the forms.

7.7.2. Contacting schools

In 29 of the participating countries/economies, NPMs were typically the people who made the first contact with sampled schools, although in 20 countries/economies, the NPMs and other members of the national study centre did this task together. In 14 countries/economies, the ministry of education made first contact, sometimes in conjunction with the national centre.

Although the overall participation rates for TALIS 2018 were high, more than 50% of the national centres reported difficulty convincing schools to participate. The most commonly reported reason cited by national centres was a general work overload, at times combined with the problematic timing of the survey at the end of the school year. Some national centres found explaining the purpose of the survey especially difficult because schools did not see the value it might bring. National centres also noted general survey fatigue. Strategies to overcome school reluctance to participate included multiple follow-up attempts and seeking the support of teacher unions or regional, state or national education authorities. Ten of the participating countries/economies requested an extension to the survey deadline beyond the international finalised date for data collection in order to improve the overall response rate. Participation rates show that most of the national centres were able to overcome these difficulties and convince schools to take part in the survey.

The persons nominated to fill the role of a school co-ordinator were generally easy to identify and no problems resulted in appointing them. Only 12% of the national centres reported difficulty finding a suitable person for the task.

For most of the participating countries/economies (90%), adapting the *School Co-ordinator Manual* (internal document) to their national context and needs was a straightforward and easy task. Only 10% reported some difficulties, such as adapting cultural specifics or using the correct terms for translation.

Because the co-ordinators played a key role within the survey, 52% of NPMs provided them with additional formal training, while 48% used different communication channels, such as phone calls and written instructions. National study centres also used emails to explain single tasks at the appropriate times throughout the survey process and videos to communicate with and inform school co-ordinators.

The ISC provided the national study centres with a software tool (IEA Participation Rate Estimator) to help them keep track of the participation rates during data collection. NPMs sent outcomes of the estimator to the ISC mostly on a weekly to bi-weekly basis, enabling the ISC to closely monitor participation rates in all participating countries/economies and to contact national centres if rates seemed too low or did not evolve quickly enough. In some cases, the ISC advised national centres to try to improve participation rates by applying certain strategies, such as focusing on contacting schools that were near to passing the 50% participation threshold.

7.7.3. Listing teachers

Due to the complexity of the listing procedure, 42% of national centres reported one or more difficulties during the listing process: 21% said that they experienced difficulty explaining either the definition of the teacher population or the assignment of exemption codes to the teachers. Other challenges included correctly assigning the main subject domains (25% of national centres experienced this difficulty) and explaining to school co-ordinators why they needed to administer only the correct (specified) questionnaire to designated teacher respondents (a difficulty for 14% of the centres). However, centres managed to resolve nearly all of these issues before survey administration began.

7.7.4. Preparing questionnaires

Preparation of the questionnaires involved several steps outlined in the *Survey Operations Procedures Unit 3: Instrument Preparation*. National centres first prepared all national adaptations and sent them to the ISC. The ISC thoroughly reviewed the adaptations to the instruments, provided the national centres with feedback on the acceptability of adaptations and described the changes that centres needed to make in order to have their adaptations approved. As soon as national centres obtained final approval for adaptations from the ISC and finalised their translations, they submitted their national materials for international translation verification. International translation verifiers, whose work was co-ordinated by the IEA Amsterdam, then verified the translated ISCED level 2 instruments. For ISCED levels 1 and 3, including the TALIS-PISA link, translation verification encompassed only differences between these instruments and the ISCED level 2 instruments and national adaptations specific to those instruments.

After completing the translation verification process, NPMs revised and finalised the paper instruments, and considered the verifiers' suggestions as they did so. The ISC verified the layout of all submitted instruments and gave their final approval for launching the printing process at national centres or, if online data collection had been selected, for preparing the online instruments (for more details about this process, see Chapter 4).

Mindful that translation and adaptation of survey instruments is a difficult exercise in any cross-national study, the ISC supported the process by bringing a structured approach to instrument preparation that included individualised translation verification schedules, additional support materials (e.g. national adaptation forms) and documentation guidelines. Overall, 83% of the national centres said that documentation of the non-structural national adaptations (i.e. adaptations of terms or words that did not affect the structure of the questionnaires) was a straightforward task. Only 17% of national centres characterised the task as "somewhat difficult", mainly because they saw the process as time-consuming. The SAQ's comments on the structural adaptations (i.e. adaptations that changed the structure of the questionnaires by, for example, adding dimensions or categories) presented a similar picture: 81% of the national centres, all of which had to document structural adaptations, reported no difficulties with the task, while 19% described it as "somewhat difficult".

In regard to translations, approximately 60% of the centres considered the process as not being difficult at all, while the remainder described it as "somewhat difficult". The majority of reported difficulties related to certain translated terms and concepts that were difficult to apply within the national context or to align in meaning across different survey languages. All TALIS national centres considered the translation and adaptation guidelines useful for facilitating completion of the task.

7.7.5. Preparing the online questionnaires

After completion of the adaptation and translation verification processes for the paper instruments, the ISC prepared online questionnaires for all participating countries, with the exception of the three participants that chose to administer the paper-only version of TALIS.

7.7.6. Online administration

The online data collection helped to reduce the time taken to conduct data entry and data processing once all the data had been collected. Forty percent of the participating countries and economies using online data collection reported no problems.

Most of the problems that were encountered emerged from application errors (e.g. typing URLs in the search engine) or lost login details. Some participants reported difficulty accessing the questionnaires because of a slow Internet connection or because of specific browsers. In some cases, technical difficulties with the OSS (server maintenance, local firewall settings and interface problems) were reported. One-quarter of participants said technical problems with the OSS prevented respondents from completing the questionnaires. Usually, these were single cases, where respondents reported being thrown out of the system without an explanation or being unable to access the OSS. ISC staff worked closely with the national study centres to provide technical support and resolve problems.

To monitor the online data collection process and participation progress on a daily basis, the ISC provided a software tool called the Online Survey System Monitor. This tool proved very helpful and the participating countries/economies used it several times a week. Forty participants used the software on a daily basis, while four participants used it approximately once a week. Forty-one participants characterised the system monitor listing as useful.

7.7.7. Paper administration

While most data were collected online, 11 TALIS 2018 participants administered paper instruments in schools. Three of these countries/economies administered only paper instruments; eight used a mixed-mode approach, that is, paper and online instruments. Nine participants completed data collection in paper mode within the regular administration window; two countries faced challenges during administration and requested an extension of the planned survey window so they could meet the necessary minimum participation-rate requirements at the school and teacher level.

7.7.8. Manual data entry and submission

All TALIS 2018 participants received training in performing manual data entry according to the rules and standards outlined in the *TALIS 2018 Survey Operations Procedures Unit 5: Data Capture Procedures (Main Survey)* and the *TALIS 2018 Technical Standards* (internal documents) and in using the IEA's Data Management Expert (DME) software. Most of the participating countries/economies submitted their data and documentation by 31 May 2018. Only six participants provided the required information in June and two in July. As an important quality control measure, countries/economies were required to perform double entry of a sampled set of teacher and principal questionnaires to ensure high-quality data entry.

7.7.9. National quality observation programme

NPMs were instructed to implement national quality control during administration of the TALIS 2018 field trial and main data collection survey instruments; the design of the quality control programme remained at the discretion of each country/economy. National quality observations are an important means not only of collecting information about survey administration and implementation at schools but also of helping to ensure the quality and comparability of the data collected in each country/economy.

The ISC asked NPMs to use the relevant section of the survey activities questionnaire to summarise and report salient findings from the national quality observations. However, the NPMs were not required to submit data collected by the national quality observers (NQOs) to the ISC. Each participating country/economy was responsible for designing its own quality assurance programme, appointing NQOs and ensuring that they met required standards relating to data collection and survey administration. The IEA Amsterdam developed an NQO manual template containing detailed instructions that would not only help NPMs conduct national quality control but also serve as the basis for training the NQOs. The TALIS 2018 NQO manual could be adapted to fit the needs of the country/economy with respect to how it would collect its data, such as accommodating international options or covering features important for the national centres (e.g. communication at the national level or online resources for the school co-ordinators). NQOs were mainly appointed from among national study centre staff but they also included graduate students, university staff, external people or retired school principals and teachers.

As reported in the SAQ, 34 of the 49 countries/economies implemented a national quality control programme for the main survey. National study centres in ten countries/economies did not conduct a quality control programme at the national level but opted to use other ways of observing survey operations and activities. These approaches included maintaining ongoing telephone contact with schools to receive real-time feedback and asking SCs to complete online questionnaires. The United States decided that rather than having NQOs conduct school visits, it would administer a school co-ordinator debriefing form in schools in order to gather information about the survey administration.

Altogether, 32 countries used the manual template supplied by the IEA Amsterdam, with only 8 countries applying significant adaptations, such as editing, adding and/or omitting questions. These adaptations were mainly due to the country context. For instance, Italy excluded some questions that were not applicable to the Italian context, while Colombia added questions to gain more information about the national processes and the teachers' reactions to the survey. NQOs visited approximately 18 schools per country/economy and 30 of them told their NPM that the SCs distributed the teacher questionnaires/cover letters in exact accordance with the teacher tracking form.

Problems observed by some quality observers at the national level, as reported by NPMs, varied. They included TALIS 2018 running parallel to other surveys, the amount of time it took a respondent to complete the questionnaire, teachers having difficulty understanding the aim of the questions, the content of some questions not being applicable in the national/school context, technical issues with online survey administration (e.g. problems accessing the online questionnaires, slow Internet connections), difficulty contacting the schools and co-ordinators to schedule an interview time, and planning visits too close to the end of the data collection window.

Notes

[1] Countries administering additional international options (ISCED level 1, ISCED level 3 and the TALIS-PISA link) were also required to submit the national versions of these instruments.

[2] The distinct educational systems in Belgium were taken into account, leading to the recruitment of one IQO for the Flemish community and one IQO for the French community.

Chapter 8. Creating and checking the international database

This chapter offers an overview of the approach and strategy used to create the TALIS 2018 international database (IDB). It describes the data-entry and verification tasks carried out by the national study centres and the exchange of data and documentation between these centres and the international study centre at the IEA. It also describes the integration of data from the paper and online administration modes and the data editing and database creation procedures implemented there, including the detection and resolution of inconsistencies in the data. The final section of the chapter details the interim data produced and the steps that all involved centres took to confirm the IDB's accuracy, integrity and validity.

8.1. Overview

Creating the TALIS 2018 international database (IDB) and ensuring its integrity required close co-ordination and co-operation among the international study centre (ISC), Statistics Canada, the national project managers (NPMs) and the OECD Secretariat.

The primary goals of this work were to ensure that:

- all national adaptations to questionnaires were reflected appropriately in the codebooks and corresponding documentation
- all national information eventually conformed to the international data structure and coding scheme
- any errors, such as logical inconsistencies or implausible values given by respondents or those occurring during data entry, were minimised as much as possible.

The quality control measures applied throughout the process were identical, to the greatest extent feasible, for all four target populations: the ISCED level 2 core, ISCED level 1, ISCED level 3 and the TALIS-PISA link.

The IEA Hamburg supplied the national centres with the IEA Data Management Expert (DME) software and the *TALIS 2018 Main Survey Operations Procedures, Unit 5* (internal document), which describes the process and rules associated with manual data entry, via the DME software, of the teacher and principal questionnaires. It also provides information about the data structure.

The IEA Hamburg also held a three-day data management training session in Rome, Italy, in October 2016 that covered software use, procedures for national adaptations, and rules and procedures for data entry. The seminar was specifically targeted at the national team member(s) responsible for data management and liaising with the IEA Hamburg. In addition, after administration of the TALIS 2018 field trial in 2017, the TALIS national project managers (NPMs) received information about the outcomes of the field trial and resulting software improvements at the third NPM meeting in Lisbon, Portugal, in July 2017.

This chapter describes the additional steps taken to build the IDB and assure the quality and accuracy of the TALIS 2018 data.

8.2. Online data collection and verification

The default mode of data collection during TALIS 2018 was online questionnaires. However, paper questionnaires were still important. Of the 48 participating countries/economies, 37 used the online mode exclusively and 3 used only the paper mode. The remaining eight countries/economies applied a mixed-mode design, in which they used the paper mode in addition to the online mode (or vice-versa) for particular ISCED levels, for either teachers or principals, for selected schools only or for particular school principals or teachers. National centres had to ensure that individual respondents who refused to participate in the online mode or did not have access to the Internet received a paper questionnaire, thereby minimising non-response as a result of a forced administration mode.

The data from the two different collection modes were later merged into a single set per ISCED level and country/economy. Potential sources of error originating from the use of

the two parallel modes had to be controlled for and reduced as much as possible to ensure uniform and comparable conditions across modes and across countries. The design established several general principles to achieve this:

- questionnaires in both modes were self-administered and comparable in terms of layout and appearance
- the same sample design and procedures were used to identify respondents
- the same methods were used to contact respondents and to validate their participation
- both modes of data collection occurred over the same period of time.

Notable differences between the two collection modes included approaches to skipping questions (manually on paper, automatic on line) and the possibility of validating responses in real time in the online mode.

The electronic versions of the TALIS questionnaires could be completed only on line. No other options, such as sending/receiving PDF documents by email or printing out the online questionnaires and mailing them to the national centres, were permissible. Because the online data collection for TALIS was designed to ensure a standardised educational survey and to accommodate specific operations, successful administration of the electronic questionnaires relied on all participating countries/economies adhering to the technical standard that required them to use the software provided by the TALIS Consortium.

To properly sequence preparation tasks and processes and to ensure comparability of data, the paper versions of the two questionnaire types (i.e. principal and teacher) had to be finalised in terms of translation and layout, even if it was likely that all or almost all of the data would be collected on line. After these final paper versions of the questionnaires had been converted for the online mode, their structure, text and layout were subject to final verification.

In addition to these requirements, the design ensured that online respondents needed only an Internet connection and a standard Internet browser. No additional software, particular operating system or particular make or version of browsers were required.

The navigational concept for the online questionnaire had to be as similar as possible to that of the paper questionnaires. Respondents could use “next” and “previous” buttons to navigate to an adjacent page, actions akin to flipping physical pages. In addition, a hyperlinked “table of contents” mirrored the experience of opening a specific page or question of a paper questionnaire. While most respondents followed the sequence of questions directly, these features allowed respondents to skip or omit questions just as if they were answering a self-administered paper questionnaire.

To further ensure the similarity of the two sets of questionnaires, responses to the online questionnaires were not mandatory, evaluated or enforced in detail (e.g. hard validations or a strict sequence). Instead, some questions used soft validation, such as respondents being asked to give several percentage numbers that would supposedly add up to 100%. For these questions, the sum was constantly updated according to the respondent’s entries and was highlighted in red as long as it differed from 100%. Even if a response remained red, respondents could proceed to the next question.

Certain differences in the representation of the two modes remained, however. To reduce response burden and complexity, the online survey automatically skipped questions not applicable to the respondent, in contrast to the paper questionnaire, which instructed

respondents to proceed to the next applicable question. Rather than presenting multiple questions per page, the online questionnaire proceeded question by question.

While vertical scrolling was required for a few questions, particularly the longer questions with multiple "yes/no" or Likert-type items, horizontal scrolling was not. Also, because respondents could easily use visual cues to estimate the length and burden of the paper questionnaires, the online questionnaires attempted to offer this feature through progress counters and a "table of contents" that listed each question and its response status. Multiple-choice questions were implemented with standard HTML radio buttons. Once respondents reached the end of the online questionnaires, they were presented with a summary of the questions they had not answered.

National centres were provided with a tool to monitor online participation. A restricted version of this tool was also available for school co-ordinators, if requested. While NPMs could see summary information (e.g. first login, last login, total of logins, progress of answers) and raw data for all principals and teachers, school co-ordinators could only view the type of summary information for their school that would prompt them to initiate appropriate follow-up activities. They could not access actual responses.

8.3. Data entry and verification of paper questionnaires at national centres

Each national centre was responsible for transcribing the information from the principal and teacher questionnaires into computer data files. National centres entered responses from the paper questionnaires into data files created from an internationally predefined codebook. This contained information about the names, lengths, labels, valid ranges (for continuous measures or counts) or valid values (for nominal or ordinal questions) and missing codes for each variable in each of the two questionnaire types. Before data entry commenced, national data managers (NDMs) were required to verify the nationally adapted codebook structure that reflected all ISC-approved adaptations (e.g. a nationally added response category) made to the national questionnaire versions. These adapted codebooks then served as templates for creating the corresponding data set.

In general, the ISC instructed national centres to discard any questionnaire that was unused or returned completely empty and to enter any questionnaire that contained at least one valid response. To ensure consistency across participating countries, the basic rule for data entry in DME required national staff to enter data "as is", without any interpretation, correction, truncation, imputation or cleaning. Any inconsistencies that remained after this data-entry stage were dealt with at the time of data cleaning (see below).

The rules for data entry meant that:

- Responses to categorical questions were generally coded as "1" if the first option (checkbox) was used, "2" if the second option was marked, and so on.
- Responses to "check-all-that-apply" questions were coded as either "1" (marked) or "9" (omitted or invalid).
- Responses to numerical or scale questions (e.g. school enrolment) were entered "as is", that is, without any correction or truncation, even if the value was outside the originally expected range (e.g. if a teacher reported that he or she spent 80 hours a week teaching students in school). If countries needed to enter values that exceeded the defined variable width, they entered these few values on an Excel sheet and submitted it to the ISC, which then included these values during its data processing work.

- Likewise, responses to filter questions and filter-dependent questions were entered exactly as filled in by the respondent, even if the information provided was logically inconsistent.
- If responses were not given at all, not given in the expected format, ambiguous or conflicting in any other way (e.g. selection of two options in a multiple-choice question), the corresponding variable was coded as "omitted or invalid".
- During data capture, TALIS did not use a separate code to identify "not administered" questions, such as those that were misprinted. In these rare cases, the "omitted or invalid" code was used.

Data entered with DME were automatically validated. First, the entered respondent ID had to be validated with a five-digit code – the checksum, generated by the IEA Windows Within-School Sampling Software (WinW3S). A mistype in either the ID or the checksum resulted in an error message that prompted the data-entry person to check the entered values. The data verification module of DME also enabled identification of a range of problems, such as inconsistencies in identification codes and out-of-range or otherwise invalid codes. These potential problems had to be resolved or confirmed before data entry could resume.

To check the reliability of the data entry within the participating countries/economies, their national centres had to have at least 100 completed principal questionnaires and 5% of the total number of completed teacher questionnaires (or at least a minimum of 100 teacher questionnaires) entered twice by different staff members as early as possible during the data-capture period. This procedure allowed NDMs and the ISC to identify possible systematic or incidental misunderstandings or mishandlings of data-entry rules and to initiate appropriate remedial actions, for example, retraining national centre staff. The acceptable level of disagreement between the originally entered and double-entered data was established at 1% or less; any value above this level required a complete re-entry of data. This restriction guaranteed that the margin of error observed for processed data remained well below the required threshold.

Before sending the data to the ISC for further processing, national centres carried out mandatory verification steps on all entered data and undertook corrections as necessary. The corresponding routines were included in the DME software, and the data files were systematically checked for duplicate identification codes and data outside the expected valid range or values defined as valid. NDMs reviewed the corresponding reports, resolved any inconsistencies and, where possible, corrected problems by looking at the original survey questionnaires. NDMs also verified that all returned non-empty questionnaires were, in fact, entered and that the availability of data corresponded to the participation indicator variables and entries on the tracking forms.

While the questionnaire data were being entered, the NDM at each national centre used the information from the teacher tracking forms to verify the completeness of the materials. He or she then entered the participation information (e.g. whether the teacher concerned had left the school permanently between the time of sampling and the time of administration) in the WinW3S software.

In addition to submitting the data files described above, national centres provided the ISC with detailed data documentation, including hard copies or electronic scans of all original teacher tracking forms and a report containing information on data-capture activities collected via the online survey activities questionnaire. The ISC already had access, as part

of the layout verification process, to electronic copies of the national versions of all questionnaires and the final national adaptation forms (NAFs).

8.4. Data checking, editing and quality control at the IEA Hamburg

Once the national centres submitted their data to the ISC, data processing commenced. The objective of this process was to ensure that the data adhered to international formats, that information from principals and teachers could be linked across different survey files and that the data accurately and consistently reflected the information collected within each participating country/economy. The ISC went to great lengths to ensure that the data received from participating countries/economies were internationally comparable and of high quality. The foundation for quality assurance had been laid down before the data were submitted to the ISC through the provision of manuals, training and software designed to standardise a range of operational and data-related tasks, and through verification of the content and layout of the NAFs, paper questionnaires, online questionnaires and codebooks.

- The WinW3S software performed the within-school sampling operations, strictly adhering to the sampling rules defined by TALIS (see Chapter 5 for more details on school sampling). The software created all necessary listing and tracking forms and stored school-specific and teacher-specific information, such as gender and participation status. The software also generated login credentials that consisted of the unique ID and the corresponding checksum (the five-digit validation code) that were used for both survey administration modes. For the purpose of paper administration, WinW3S created questionnaire labels that included the generated login credentials. It also included a participation rate estimator that kept NDMs up to date on their current participation rate according to the already returned paper questionnaires or submitted online questionnaires. The ISC asked NDMs to begin uploading their weekly participation rate reports as soon as data collection began.
- The DME software enabled entry of all questionnaire data in a standard, internationally defined format. Data entered with the DME software were automatically validated. This process included validation of login credentials and a range of other issues, such as the uniqueness of the ID or out-of-range or otherwise invalid codes. Whenever the software flagged such issues, it also prompted the individuals entering the data to resolve or to confirm the inconsistencies before resuming data entry. In addition, special variables called “check variables” were used during data entry to avoid any individual entering values for the wrong question. The ISC asked national study centres to use the DME software for data entry. However, if the centres’ countries/economies wanted to use different tools to enter their data, the DME gave them the option of importing these data and verifying them with the same range of checks used by those participating countries/economies entering the data directly via the DME software. The software also included a range of data-verification checks that NDMs had to perform during data capture and after data entry.

A complex study such as TALIS 2018 required a correspondingly complex data cleaning design. Accordingly, the ISC developed processing tools in Structured Query Language (SQL) and, where necessary, in Statistical Package for the Social Sciences (SPSS). The ISC took the following steps to ensure that programmes ran in the correct sequence, that no special requirements were overlooked and that the cleaning process was implemented independently of the persons in charge.

- Before the data-cleaning programmes were applied to real data, all of them were thoroughly tested using simulated data sets containing all expected problems or inconsistencies.
- To document versions and updates, all incoming data and documents were registered in a specific material receipt database. The date of arrival and any specific issues meriting attention were recorded.
- All national adaptations and all detected deviations from the international data structure were recorded in a "national adaptation database" and verified against the national adaptation form (NAF), the national instruments, the codebooks and the contents of the data. The reports from this process are available for data analysts in the *TALIS 2018 and TALIS Starting Strong Survey 2018 User Guide* (OECD, forthcoming[1]).
- Cleaning was organised according to rules strictly and consistently applied to all national data sets, making deviations in the cleaning sequence impossible.
- All systematic or manual corrections made to data files were implemented and recorded in specific cleaning reports that the TALIS Consortium and the NPMs then reviewed and approved.
- On completion of the data cleaning for a participating country/economy, all cleaning checks were repeated from the beginning to detect any problems that might have been inadvertently introduced during the cleaning process itself.

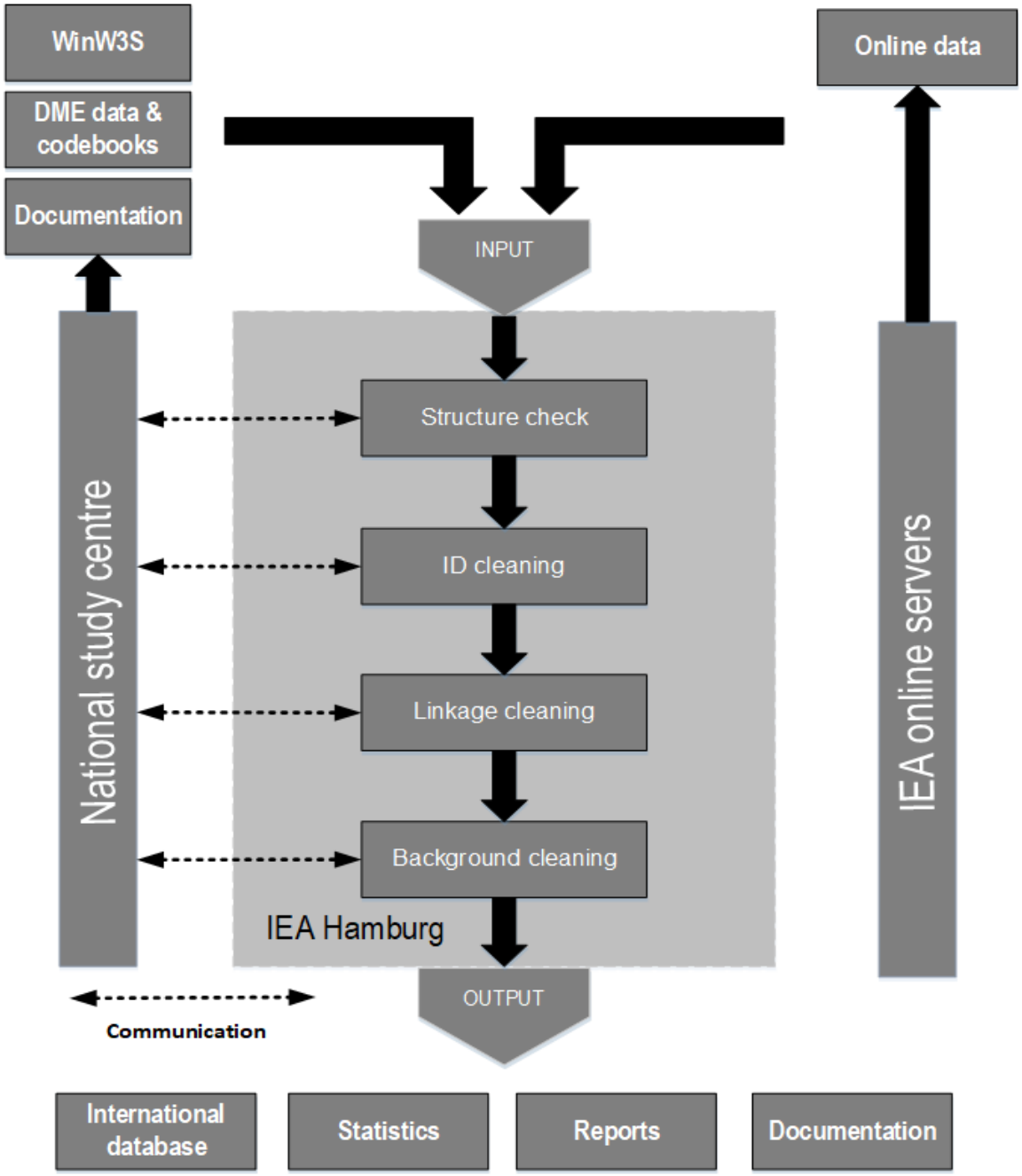
Figure 8.1 provides a schematic overview of this iterative process conducted in co-operation with the national centres. The following subsections of this chapter give a more detailed description of the sequential data-cleaning steps displayed in Figure 8.1.

8.4.1. Import, documentation and structure check

Data cleaning began with an analysis of the submitted data-file structures and a review of data documentation on the teacher tracking forms. Most participating countries/economies submitted all required documentation along with their data, which greatly facilitated the data checking. The ISC contacted the participating countries/economies that returned incomplete data or documentation to obtain that missing material. As soon as all required materials were received, further data processing began.

All available codebooks and data were imported from the source files and combined in the SQL database. This content included the respondents' answers collected on line, the respondents' data entered into the DME, and all sampling and tracking information generated by and collected with WinW3S. During this step, the data originating from the paper questionnaires and the online questionnaires were combined and checked for structural agreement, with all sample and tracking information also taken into consideration. In all cases, the data from both administration modes were structurally equivalent and used the same valid and missing codes. The early combination of these data in the import stage ensured that data resulting from both administration modes were fed through the same data processing steps and checks described in the remainder of this chapter. Also, because the international structure of the files did not differ, data from all ISCED levels were processed with the same checks in the same database.

Figure 8.1. Iterative data-cleaning process



The structure check implemented at the ISC looked for differences between the international and the national file structures. As described above, some participating countries/economies made structural adaptations to the questionnaires, the extent and nature of which differed greatly across the countries/economies. Whereas some participating countries/economies administered the questionnaires without any change, except for translations and necessary cultural adaptations, others inserted or removed questions or options within existing international variables or added entirely new national variables.

Given the associated risk of deviating from the international data structure, NPMs wishing to make such changes had to follow certain strict rules to allow unequivocal integration of nationally adapted variables for international comparison. Where necessary, the ISC modified the data according to the international design to ensure that the resulting data were internationally comparable. For instance, the ISC recoded (mapped) additional national options in multiple-choice questions in a way that ensured they adhered to the international code scheme. National variables were created to hold the original values for later use in the national reports.

NPMs and NDMs received detailed reports on structural deviations together with documentation on how the ISC resolved them. In a few cases, data were not available for certain variables because the corresponding question was not administered nationally; see, in this regard, the *TALIS 2018 and TALIS Starting Strong Survey 2018 User Guide* (OECD, forthcoming[1]). In a few instances, data had to be removed from the IDB because the information was not internationally comparable due to errors in translations that were spotted only after the data had been collected.

8.4.2. Identification variable and linkage cleaning

To uniquely identify, track and document each participant and each corresponding questionnaire in a survey, each record in a data file needs to have an identification number specific to it. The existence of records with duplicate identification (ID) numbers in a file implies an error. Because, in TALIS, the uniqueness of IDs was already guaranteed through use of the DME software and the IEA Online Survey System (OSS), duplicate IDs could only occur in two situations: first, if the respondent administered the questionnaire on line and also completed a paper questionnaire; and, second, if a country/economy administered more than one language and the respondent completed the online questionnaire in two languages. If two records shared the same ID number and contained exactly the same data, one of the records was deleted and the other was left in the database. If the records contained different data (apart from the ID numbers) and it was impossible to identify which record contained the "authentic" data, NPMs were consulted to resolve the matter.

In TALIS, data collected at the school level were recorded in the principal file. It was crucial that the records from these files could then be linked to the multiple teacher-level records for that school. The linkage was implemented through a hierarchical ID numbering system and was also cross-checked against the tracking forms.

Further ID cleaning focused on consistent tracking of information between the data used for listing, sampling and tracking in WinW3S and the actual responses in the questionnaires. Whenever necessary, the variables pertaining to teachers' gender, year of birth, exclusion status and participation status were verified and checked against the original paper version of the teacher tracking form.

The ISC sought close co-operation with the national centres in order to resolve ID or linkage inconsistencies. For this purpose, NPMs and NDMs received standardised reports containing each identified inconsistency. Once the ISC had finalised the ID, linkage, participation and exclusion information, it transferred these data to Statistics Canada, which used this information to calculate participation rates, exclusion rates and, finally, sampling weights.

8.4.3. Resolving inconsistencies in questionnaire data

After matching the national and international data structures as specified in the international codebooks and after resolving all ID and linkage issues, the ISC applied a series of standard cleaning rules to the data. The process, conducted through the SQL programmes developed at the ISC, identified and, in many cases, automatically corrected inconsistencies in the data. The IEA Hamburg prepared detailed documentation of all cleaning checks, procedures and actions applied to the data. It then sent these to the national centres and explained them during the fourth NPM meeting in October 2018.

Filter questions, which appeared in certain positions in the TALIS 2018 questionnaires, were used to direct respondents to a particular question or section of the questionnaire. Filter questions and their dependent questions were treated automatically in most cases. If the filter question contained a value and the respondent skipped the dependent questions for a valid reason, the dependent variables were coded as "logically not applicable". If a response to a filter question was equivalent to "no", meaning that the dependent questions were not applicable to that respondent, and yet that person answered the dependent questions in an ambiguous pattern, the dependent variables were set to "logically not applicable" regardless of the value originally recorded in the dependent variable. Questions 12 and 13 in the teacher questionnaire were exceptions to this general rule.

Split-variable checks were applied to "yes/no" questions for which the responses needed to be coded into several variables. For example, Question 15 in the teacher questionnaire (i.e. TQ-15) listed a number of subjects and asked teachers to indicate whether they taught them (by marking the "yes" box) or not (by marking the "no" box) for each subject. Occasionally, teachers marked just the "yes" boxes but left the "no" boxes unchecked, resulting in omitted values in the data file. In those instances where a combination of "yes" and "omitted or invalid" responses was found for a given question in the data, it was assumed that the unmarked boxes actually meant "no" and that the corresponding values were therefore imputed.

Split-variable checks were also applied to "check-all-that-apply" questions for which the responses needed to be coded into several variables. For example, Question 20 in the principal questionnaire (i.e. PQ-20) asked who, within the school, had significant responsibility for a given task. Principals could mark as many checkboxes as appropriate corresponding to different members of the school as well as to other relevant people. In line with the split-variable checks applied to "yes/no" questions, the check boxes coded as "omitted or invalid" were recoded as "not checked" for those cases where some checkboxes were left omitted, yet others were marked "checked" and "not checked". If all of the checkboxes within a question were marked as "not checked", the whole question was recoded to "omitted or invalid".

The TALIS 2018 questionnaires included several questions that consisted of a list of numeric variables. These questions asked respondents to enter either a percentage (e.g. "percentage of class time" in TQ-39) or a number (e.g. "years of work experience" in TQ-11). In cases where some of the questions on the list were left omitted while others were answered with a value, the omitted values were recoded to zero ("0").

The individual responses to percentage questions were summed. These values were set to "omitted or invalid" if they fell outside the 90 to 110 range (PQ-11 and PQ-21), or the 45 to 110 range (TQ-39), or if any of them were larger than 100.

Variables with implausible numerical values were also set to "omitted or invalid". For example, TQ-38 asked respondents to give the average number of students in the target class. Values exceeding 100 were set to "omitted or invalid".

Finally, inconsistencies between the listing information in the teacher tracking forms and the actual responses of the teachers regarding their age and gender were resolved in a manner that gave precedence to the teacher-supplied information.

The number of inconsistent or implausible responses in the data files varied from one country/economy to another, but no national data were completely free of inconsistent responses. Each problem was recorded in a database and identified by a unique problem number. The entry also included a description of the problem and of the automatic action taken by the software programme or the manual action taken by ISC staff. Staff referred issues that could not be corrected using systematic rules to the relevant NPM so that he or she could check the original data collection instruments and tracking forms and trace the source of the inconsistency. Whenever possible, staff at the ISC suggested a solution and asked the NPMs either to accept it or to propose an alternative. Data files were then updated to reflect the agreed-upon solutions. Both systematic corrections and those apparent on a case-by-case basis were applied directly in SQL programme syntax and carried out automatically for each cleaning run.

If an NPM could not solve a problem by inspecting the instruments and forms or could not suggest a satisfying solution or explanation, the TALIS Consortium defined the final cleaning rules. The ISC and the OECD Secretariat together agreed to any systematic content edits and documented them for use by the NPM.

8.4.4. Final action for logically inconsistent filter/dependent responses

If the associated filter question for each of the following questions (with the exception of TQ-12/13) was answered in the negative ("no"), the dependent variables were set to "logically not applicable" regardless of the originally recorded value in the dependent variable: PQ-15 (Part A vs. B, PQ-18/19, PQ-23/24 and 25, PQ-31/32 and 33, PQ-31a/PQ-32, PQ-34/35 and 36, PQ-37/38, TQ-4/5 and 6, TQ-12/13, TQ-19/20, TQ-22/23 to 26, TQ-25/26, TQ-29/30 and 31, TQ-30/31, TQ-36/37 to 43, TQ-44/45, TQ-46/47 and TQ-56/57 to 58.

A special treatment was implemented for PQ-24 ("Not used in this school" vs. all other categories of this question), TQ-19 ("No" vs. all other categories of this question) and TQ-29 ("I have never received this feedback in this school" vs. all other categories of this question). The respective category (i.e. "Not used in this school", "No", or "I have never received this feedback in this school") was set to "not checked" to resolve logical inconsistencies that appeared within the dimension. If, for example, in the case of TQ-29, a respondent marked the category "I have never received this feedback in this school" for the first dimension (i.e. TQ-29A4) but also marked any of the other categories within this same dimension (i.e. TQ-29A1 to A3: "External individuals or bodies", "School principal" or "Other colleagues within the school"), the category "I have never received this feedback in the school" (i.e. TQ-29A4) was set to "not checked".

The IEA Hamburg and Statistics Canada agreed to a special treatment for TQ-12/13 for weighting purposes and calculation of the teacher multiplicity factor (WGTADJ4) (see Chapter 9 for more details).

- If TQ-12 is "yes" (1) and TQ-13 is "omitted or invalid" or zero (0) → recode TQ-12 to "no" (2) and TQ-13 to "logically not applicable".
- If TQ-12 = "no" (2) and TQ-13 is zero (0) or one (1) → recode TQ-13 to "logically not applicable".
- If TQ-12 is "no" (2) but TQ-13 is two (2) or more → recode TQ-12 to "yes" (1).

8.4.5. Final action for yes/no lists with more than two items

For those questions with lists that were partially answered with "yes" and "omitted or invalid", all omitted responses were recoded to "no". These questions included PQ-07, PQ-15 (Part A), PQ-33, PQ-38, PQ-39, TQ-06A (Part A), TQ-20, TQ-22, TQ-23, TQ-24, TQ-26, TQ-31, TQ-47, TQ-56 and TQ-57.

8.4.6. Final action for check-all-that-apply questions with more than two items

For those questions that had checkboxes that were partially "checked", "not checked" and "omitted or invalid", all omitted responses were recoded to "not checked"; for checkboxes that were all marked "not checked", all responses were recoded to "omitted or invalid". The relevant questions were PQ-20, PQ-24, TQ-15, TQ-19 and TQ-29.

8.4.7. Final action for out-of-range percentage sums

With PQ-11, the entire set of variables was set to "omitted or invalid" if the sum of percentages fell outside of 90–110. If any individual variable was larger than 100, this variable was set to "omitted or invalid".

For PQ-21, the entire set of variables was set to "omitted or invalid" if the sum of percentages fell outside of 90–110. If any individual variable was larger than 100, the variable was set to "omitted or invalid".

For TQ-39, the entire set of variables was set to "omitted or invalid" if the sum of percentages fell outside of 45–110. If any individual variable was larger than 100, the variable was set to "omitted or invalid".

8.4.8. Final action for out-of-range/implausible numerical variables

The treatments specified for the following questions were:

- Treatment for PQ-4a/b: if value is higher than 50 → set to "omitted or invalid".
- Treatment for PQ-4c/d/e: if value is higher than 49 → set to "omitted or invalid".
- Treatment for PQ-13a: if value is zero (0) in the questionnaire → set to "omitted or invalid".
- Treatment for PQ-13d: if value is zero (0) in the questionnaire → set to "omitted or invalid".
- Treatment for PQ-13a–e: if value is higher than 500 → set to "omitted or invalid".

- Treatment for PQ-16: if value is zero (0) in the questionnaire → set to "omitted or invalid".
- Treatment for PQ-42: if sum of self-reported principal age (PQ-2) and PQ-42 is higher than 100 → set to "omitted or invalid".
- Treatment for TQ-05: if value is between 40 and 99 → add 1900 so values are changed to 1940–1999.
- Treatment for TQ-05: if value is not between 1940 and 2018 → set to "omitted or invalid".
- Treatment for TQ-11a/b: if value is higher than 58 → set to "omitted or invalid".
- Treatment for TQ-11c/d: if value is higher than 57 → set to "omitted or invalid".
- Treatment for TQ-16/17/18: if value is higher than 120 → set to "omitted or invalid".
- Treatment for TQ-38: if enrolment is zero (0) or larger than 100 → set to "omitted or invalid".
- Treatment for TQ-50: if sum of self-reported teacher age (TQ-2) and TQ-50 is higher than 100 → set to "omitted or invalid".

8.4.9. Final recoding for inconsistent teacher age and gender in listing and questionnaire information

The recoding instructions for PQ-1, TQ-1, TQ-2, GENDER (gender on listing form) and ITBIRTHY (birth year on listing form) were as follows:

- Teacher birth year (ITBIRTHY): if value is outside the range of 1941–2000 → set to "omitted or invalid".
- Gender (TQ-1 vs. GENDER): (a) believe questionnaire information and substitute listing information gender in case it is missing or inconsistent; (b) impute missing questionnaire value from listing if questionnaire variable was omitted.
- Teacher age (TQ-2, ITBIRTHY): (a) believe questionnaire information and delete listing information if inconsistent; (b) impute missing questionnaire value from listing form.
- Teacher age (TQ-2): if outside of range of 18-76 → set to "omitted or invalid".
- Principal age (PQ-2): if outside of range of 23-73 → set to "omitted or invalid".

8.4.10. Handling of missing data

During the TALIS manual data entry at the national centres using DME, two types of entries were possible: valid data values and missing data values. Data-entry staff could assign either the valid values or a value for "omitted or invalid". Later, at the ISC, additional missing values were applied to the data for further analyses and to differentiate response behaviour.

Four missing codes were used in the international database:

- Omitted or invalid (9): the respondent had the opportunity to respond to the question but did not do so or provided an invalid response. This value was also assigned in extremely rare cases where questions were misprinted or otherwise not legible.
- Not administered (8): If the returned questionnaire was empty, all variables referring to that instrument were coded as "not administered" (unit non-response). In addition, a country/economy may have chosen not to administer a certain question in its national questionnaire as documented in the NAF. The variables corresponding to the question that was not administered were coded as "not administered". The same rule applied if all respondents for a questionnaire left out a particular variable.
- Not reached (7): A special missing code was assigned to questions that were deemed "not reached" to distinguish them from omitted responses. Omitted questions were those that a respondent most probably read but either consciously decided not to answer or accidentally skipped. In other words, the respondent started answering the questions but stopped answering before the end of the questionnaire, probably because of a lack of time, interest or willingness to co-operate. Not reached variables were exclusively located towards the end of the questionnaires. The following algorithm was used for the "not reached" code. First, the last valid answer given in a questionnaire was identified. Next, the first omitted response after this last answer was coded as "omitted or invalid". However, all following responses were then coded as "not reached". For example, the response pattern "1 9 4 2 9 9 9 9 9 9" (where "9" represents "omitted or invalid") was recoded to "1 9 4 2 9 7 7 7 7 7" (where "7" represents "not reached"). When recoding "omitted or invalid" values to "not reached", all "not administered" values were ignored. For example, the pattern "3 1 5 2 9 9 9 8 9 9" would have been recoded to "3 1 5 2 9 7 7 8 7 7".
- Logically not applicable (6): the respondent answered a preceding filter question in a way that made the following dependent questions not applicable to him or her. This value was assigned only during data processing.

8.5. Interim data products

Building the TALIS international database was an iterative process during which the ISC provided the OECD Secretariat and NPMs with a new version of data files whenever a major step in data processing was completed. This process guaranteed that NPMs had a chance to review their data and run additional plausibility and statistical checks to validate the data. The data products that the ISC released to the OECD Secretariat and each NPM included the teacher and principal data files as well as data summaries. All interim data were made available to the OECD Secretariat in full, whereas each participating country/economy received only its own data.

The ISC sent the first version of cleaned and weighted data to the OECD Secretariat at the end of September 2018, by which time all known identification, linkage and content issues in these data had been resolved. Estimation weights and variables facilitating variance estimation were also included. To protect respondents' identity, the ISC scrambled the respondents' IDs. These data were also used to produce the first set of draft tables for the

international report, presented to NPMs at the fourth NPM meeting in Seoul, Korea, in October 2018. Before this meeting, all NPMs received a version of their own cleaned and weighted data, giving them a chance to review their data and the tables produced by the OECD Secretariat for accuracy and validity.

During the fourth NPM meeting, NPMs were able to raise any issues concerning their data that had, thus far, gone unnoticed. This process resulted in a second, updated data version that concluded the main survey's field work and included scale scores. The ISC sent this version to the OECD Secretariat and NPMs at the end of November 2018.

All interim data products were accompanied by detailed data processing and weighting documentation and summary statistics. The latter contained weighted and unweighted univariate statistics and frequencies for all questionnaire variables for each country/economy. For categorical variables, which represent the majority of variables in TALIS, the percentages of respondents choosing each of the response options were displayed. For numeric or count variables, various descriptive measures were reported. These included the minimum, the maximum, the mean, the standard deviation, the median, the mode, percentiles and quartiles. For both types of variables, the percentages of missing information due to respondents omitting or not reaching a particular question were reported. These summaries were used for a more in-depth review of the data at the international and national levels in terms of plausibility, unexpected response patterns, suspicious profiles and so on.

8.6. Building the international database

For the draft and final IDB, data cleaning at the ISC ensured that the information coded in each variable was, in fact, internationally comparable, that national adaptations were reflected appropriately in all variables concerned and that all records could be successfully linked across the two levels. For countries/economies participating in the TALIS-PISA link option, a variable was included that enabled later linkage to schools in the PISA 2018 database (PISASCHOOLID).

The interim data products described above and the draft and final (public-use) international databases had two key differences:

- All interim products included one record for each sampled unit (school or teacher), even if the school did not return the corresponding questionnaire or returned it empty. In contrast, the draft and final IDB included only records that satisfied the sampling standards. Data from those units that either did not participate or did not pass adjudication (e.g. because within-school participation was insufficient) were removed.
- To protect the confidentiality of respondents' information, disclosure avoidance measures were applied at the international level (1) consistently for all participating countries/economies and (2) in specific national data sets. These measures were implemented for all data versions and exports of the IDB for use by all other countries/economies and public users.

The measures applied to all international-level data sets involved the following:

- Scrambling of the teacher identifier (IDTEACH) and school identifier (IDSCHOOL): Because these identifiers were scrambled, they did not match those used during data collection; however, the structural link between the school and

teacher level (the variable IDSCHOOL in the teacher file and the first four digits of any IDTEACH) was maintained. Unique matching tables were created for each country/economy and made available to authorised individuals within that country/economy.

- Variables used purely for the stratification of the teacher sample, that is, birth year (ITBIRTHY) and gender (GENDER): These were removed. Only the gender (TT3G01) and age (TT3G02) variables, as collected in the questionnaire, were retained.
- Variables used purely for stratification of schools, that is IDSTRATE and IDSTRATI: These were removed to prevent identification of geographical or organisational groups. Because the stratum information is mostly of interest for national-level analysis, it was of course made available to the country/economy concerned. Researchers from other countries wanting to conduct analysis by stratification will need to request the stratification variables directly from the respective country/economy.
- Information used in the calculation of final sample and replicate weights (for the school level, WGTFAC1 and WGTADJ1; for the teacher level, WGTFAC1, WGTADJ1, WGTFAC2, WGTADJ2, WGTADJ3 and WGTADJ4): This information was removed from the IDB because it could allow identification of stratification cells.
- Replication zone and unit variables (BRRSZONE, BRRSREP, BRRTZONE and BRRTREP): These were dropped from public-use micro-data because they could enable indirect identification of schools.

The process of building the IDB complied, at all times, with the OECD's rules for the processing and transfer of personal data and, where relevant, with rules stipulated by national or regional legislation for the protection of personal data (e.g. the European Union's General Data Protection Regulation).

To protect its respondents' privacy, Iceland decided to withdraw all data from the IDB. This information can, therefore, be procured only by applying directly to this country.[1]

After each NPM and the OECD Secretariat had agreed on data-release policy and confidentiality agreements, a draft IDB that included data from all participating countries/economies was made available at the end of February 2019, prior to publication of the first international report in June 2019. This release enabled participating countries/economies to replicate results presented in the draft chapters of the international report. This data version was also used in an international database training session that ISC staff held in Lüneburg, Germany, in March 2019. However, only accredited members, that is, the people who signed the confidentiality agreement with the OECD Secretariat, had access to it. Non-accredited members had access to a separate mock database.

The final public-use IDB was scheduled for release in May 2019, supplemented by full documentation in the *TALIS 2018 and TALIS Starting Strong Survey 2018 User Guide* (OECD, forthcoming[1]). The database, which contains data from schools and teachers from 83 different samples in 48 participating countries/economies across 5 continents, provides a unique resource for policymakers and analysts.

Although data for all participating TALIS 2018 entities are included in the IDB, the sample adjudication process determined that the ISCED level 1 teacher and principal data for Australia and the Netherlands and the ISCED level 2 principal data for Australia cannot

reliably represent the population from which the sample was drawn. The sampling adjudication variable INTAL18 was therefore set to zero. When conducting any analyses, database users need to ensure that they use only those cases where INTAL18 equals 1.

Reference

OECD (forthcoming), *TALIS 2018 and TALIS Starting Strong Survey 2018 User Guide*, OECD, Paris. [1]

Note

[1] Please contact the TALIS team at the OECD to be put in contact with Iceland.

Chapter 9. Estimation weights, participation rates and sampling error

This chapter covers three important aspects of the quality of the TALIS 2018 outcomes. The first is the weighting of the data to correct for unequal probabilities of selection and to produce unbiased estimates. Descriptions are provided of how each component of the final estimation weights was defined and how those components were assembled into the final estimation weights. The second aspect, participation rates, is also described. Finally, the balanced repeated replication (BRR) weights for the estimation of the sampling error, the third aspect, are detailed.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

9.1. Overview

This chapter covers three important aspects of the quality of the TALIS 2018 outcomes: the weighting of the data to correct for unequal probabilities of selection and produce unbiased estimates, the participation rates and the estimation of sampling error.

Although the international sampling design was prepared as a self-weighting sampling plan of teachers (whereby each individual ultimately had the same final estimation weight), the conditions in the field, school and teacher non-response, and the co-ordination of multiple samples made it impossible to fulfil that ideal plan. In the end, in most participating countries, the national sampling plan was a stratified multi-stage probability sampling plan with unequal probabilities of selection.

Because the sample of schools and principals was an intermediary step, that is, a by-product of the teacher sampling design, schools and principals had the same design weights. In a few participating countries, namely Cyprus,[1] Iceland, Malta, the Netherlands, the Russian Federation, Singapore and the United Arab Emirates, the canonical plan was modified to suit local conditions (see Chapter 5, Annex E). How each component of the final estimation weight was defined and how those components were assembled into the final estimation weight are detailed below.

The section of this chapter covering the second aspect presents a description of the participation rates and how they were computed. Annex E provides the results for each participating country and each survey in which they participated.

Because of the unequal weights and because of the structure of the samples, sampling error must be estimated using the design and weights. Failure to do this can translate into severely biased estimates of sampling error. Correctly estimating sampling error for complex samples is often a daunting task but simple and approximately unbiased methods are available. TALIS 2018, like its predecessors, opted for balanced repeated replication (BRR) not only because of this method's statistical properties (consistency, asymptotic unbiasedness) and its portability (one formula fits all types of parameter estimates) but also because it is comparatively easy to compute.

The last section of this chapter explains how the replicates were created and how the BRR estimates of sampling error were computed. These estimates of the sampling error were another key element of the statistical quality of the TALIS survey outcomes.

A more detailed description of the survey design and its implementation can be found in Chapter 2, 5 and 6 of this report, in the *TALIS 2018 Survey Operations Procedures Unit 1: Sampling Schools*, in the *TALIS 2018 National Project Managers Manual* and in the *TALIS 2018 School Co-Ordinator Manual* (internal documents).

9.2. Estimation weights

The statistics produced for TALIS 2018 were derived from data obtained through samples of schools, school principals and teachers. For these statistics to be meaningful for a country/economy, they needed to reflect the whole population from which they were drawn and not merely the sample used to collect them. The process of going from the sample data to information about the parent population is called estimation. When the sample is equiprobable, unstratified and unclustered, simple sample averages may suffice as estimates of population averages (e.g. the average number of ISCED level 2 teachers per

school). However, sample counts do not suffice as estimates of population totals (e.g. the total number of ISCED level 2 teachers in a country).

The estimation weight or final weight is the device that allows the production of country-level estimates from the observed sample data. The estimation weight indicates the number of units that a sampled unit represents. The final weight is the combination of many factors reflecting the probabilities of selection at the various stages of sampling and the response obtained at each stage. Other factors may also come into play as dictated by special conditions to maintain unbiasedness of the estimates (e.g. adjustment for teachers working in more than one school).

Because TALIS 2018 consisted of a compulsory core segment (ISCED level 2) and three optional segments (ISCED level 1, ISCED level 3 and the TALIS-PISA link), estimation weights had to be computed independently for each segment. This requirement held true even when samples were co-ordinated across TALIS segments (ISCED levels 2 and 3, for example) or across survey programmes (TALIS and TIMSS,[2] for example).

Basically, final weights are the product of a design or base weight and of one or many adjustment factors; the former is the inverse of the selection probability and the latter compensates for random non-response and other random occurrences that could, if not accounted for, induce biases in the estimates. These design weights and adjustment factors are specific to each stage of the sample design and to each explicit stratum used by the design. Clearly, in instances where the participating countries/economies adapted the general sample design of TALIS 2018 to their own conditions, the estimation weights had to conform to these national adaptations.

The following are the conventional notations used in this chapter. As usual, the letters *h*, *i*, and *j* are used as subscripts, the lower-case letters *k*, *l*, *m*, *n*, *r* and *t* refer to the sample, and the upper-case letters *H*, *L*, *M* and *N* refer to the population.

- Each participating country has H explicit strata and the index $h = 1, \ldots, H$ points to the explicit stratum. If no explicit strata were defined, then $H = 1$.
- In each explicit stratum, a sample of size n_h schools was drawn from the N_h schools forming stratum h. The index $i = 1, \ldots, n_h$, therefore, points to the ith sampled school in stratum h.
- Each school $i = 1, \ldots, n_h$ within the explicit stratum h has a measure of size (MOS) noted as M_{hi}; the sum of the individual measures of size is noted as M_h.
- In each responding school, a sample of m_{hi} teachers was drawn from the listing of L_{hi} teachers. If no changes had occurred in the school since the creation of the sampling frame, then $L_{hi} = M_{hi}$, but this was seldom the case. If the selected school was large enough, $m_{hi} = 20$ by design. The index $j = 1, \ldots, m_{hi}$ points to the teachers and m_{hi} can, therefore, differ from 20 if local conditions dictated that the sample size should differ. For example, if the size of the listing was $L_{hi} = 18$, then all teachers were selected and $m_{hi} = 18$.

9.3. Weights for school and principal data

9.3.1. Design weight for school and principal data

The first stage of sampling in TALIS 2018 consisted of drawing the sample of schools. In most of the participating countries/economies, the sample of schools followed a systematic random sampling scheme with probability proportional to size (PPS). Thus, a school base

weight is needed to represent this first stage of sampling. If a census sample of schools was implemented in a country or in an explicit stratum of a country, then the school base weight is set to 1.

Use of the above notation established the school base weight for each school $i = 1, \ldots, n_h$ and each explicit stratum $h = 1, \ldots, H$, as:

$$WGTFAC1_{hi} = \frac{M_h}{n_h \times M_{hi}}.$$

In those countries (Cyprus,[3] Iceland, Malta and the United Arab Emirates) where all schools were selected (i.e. $n = N$), there was only one stratum, and $WGTFAC1_i = 1$ for all $i = 1, ..., N$. In the Russian Federation, where geographical regions were first selected at random, the weight component corresponding to that selection was incorporated into the school base weight (WGTFAC1).

9.3.2. Weight adjustment for school or principal non-response

Despite all efforts to secure the participation of all selected schools, some were unable or unwilling to participate. Therefore, the schools represented by the non-participating schools needed to be represented by those that did participate.

If we assume that the respondents and non-respondents are similar within the stratum, a non-response adjustment factor is required within each explicit stratum. It is important to remember at this point that a participating school is one for which the principal returned a questionnaire and had completed at least one item in it.

For each explicit $h = 1, \ldots, H$, if r_h schools out of the n_h selected schools participated in TALIS 2018 (i.e. their principals each returned a questionnaire) and if d_h schools were closed or out of scope, the non-response adjustment factor was:

$$WGTADJ1_h = \begin{cases} \frac{n_h - d_h}{r_h} & \text{for participating schools (returned principal questionnaire)} \\ 1 & \text{for closed or out-of-scope schools} \\ 0 & \text{for non-participating schools (no principal questionnaire)} \end{cases}$$

In countries where a census was conducted, the school non-response adjustment factor $WGTADJ1_i = (N\text{-}d) / r$ for all schools $i = 1, ..., N$, where N is the total number of schools on the sampling frame, d is the number of sampled units found to be closed or out of scope and r is the number of participating schools.

At the time of weighting, the "out-of-scope" records on the file needed to be assigned a value that could be used when the final weight was assembled at a later step. The value 1 is neutral and thus assigned to those records. Later in the process, a binary flag (INTAL18, see Chapter 8) was set to 0 for the non-responding and out-of-scope records, indicating that they were not to be used during the compilation of tables or modelling of data.

While "closed or out-of-scope schools" did not provide data to the estimates of interest, they still carried a positive weight because they represented those other closed or out-of-scope schools that were on the frame but not in the sample.

9.3.3. Final (estimation) school weight for school and principal data

As described earlier, because the school estimation weight is the product of the school base weight and the school non-response adjustment factor, it should be used for estimation of school-related parameters.

The final school weight (school estimation weight) for each participating school $i = 1, ..., r_h$ and each explicit stratum $h = 1, \ldots, H$ was given as:

$$SCHWGT_{hi} = WGTFAC1_{hi} \times WGTADJ1_h = \frac{M_h}{n_h \times M_{hi}} \times \frac{n_h - d_h}{r_h}.$$

For those countries where a census was conducted, the final school weight was $SCHWGT_i = 1 \times (N - d) / r = (N - d) / r$.

9.4. Weights for teacher data

9.4.1. Design weight for teacher data

The teacher data were obtained through a two-stage sampling design, whereby the TALIS 2018 sampling team first selected a sample of schools and then selected a sample of teachers from each selected school. The design weight for teacher data, therefore, has two components, one to allow expansion from the individual teacher to the school and one to allow expansion from the school to the country or economy.

The first component of the final teacher weight is as described for the school data: for each school $i = 1, \ldots, n_h$ and each explicit stratum $h = 1, \ldots, H$, the school base weight is $WGTFAC1_{hi}$. This is the same school design weight as above (see Section *Design weight for school and principal data*9.3.1), unchanged.

The second component is the teacher design, or base, weight. In each selected school, the national sampling team selected a systematic random sample with equal probability of in-scope teachers. Although the nominal sample size within each school was set at $m_{hi} = 20$, the number of in-scope teachers of each selected school meant that the local team sometimes had to modify the size of the teacher sample.

In some countries, or in some smaller schools, school principals also had teaching duties. In an effort to maintain the response burden at a tolerable level, the team considered these individuals to be incidental exclusions even though they remained in scope for the survey. In five countries, Cyprus,[4] Iceland, Malta, Singapore and the United Arab Emirates, the number of teachers in them meant that the teachers who had participated in the TALIS field trial were excused for the same reason as above. These groups of teachers were given special exclusion codes (noted as *NEXCL*5 and *NEXCL*6 respectively) during the compilation of the school list in the Windows Within-School Sampling Software (WinW3S). Both groups needed to be accounted for in the estimates (see Section *Weight adjustment factor for incidental exclusion of teachers*.

In a school where this did happen, the size of the list for that school, L_{hi}, was not the size of the list from which the sample was drawn. Consequently, let $L^{-}_{hi} = L_{hi} - NEXCL5_{hi} - NEXCL6_{hi}$ be the reduced size of the list used for teacher sampling. Thus, for each selected teacher $j = 1, \ldots, m_{hi}$ of school $i = 1, \ldots, n_h$ in explicit stratum $h = 1, \ldots, H$, the teacher base weight was:

$$WGTFAC2_{hi} = \frac{L^{-}_{hi}}{m_{hi}}.$$

9.4.2. Weight adjustment for non-participating schools

In the case of teacher data, a school was considered a participating school if at least 50% of the selected teachers returned their questionnaire or filed it on line (remember that a teacher questionnaire was deemed to be a return if it contained at least one answer). This

condition held whether or not a principal returned his or her questionnaire. Therefore, some schools for which principal data were available could be deemed non-participant because fewer than 50% of the selected teachers returned their questionnaires. An adjustment factor to the school design weight was thus necessary and it was possible that it would differ from the adjustment factor computed for the school database.

For each explicit stratum $h = 1, \ldots, H$, if r_h schools participated (i.e. at least 50% of selected teachers returned their questionnaire) in TALIS 2018 out of the n_h selected schools, and if d_h schools were closed or out of scope, the non-response adjustment factor was:

$$WGTADJ1_h = \begin{cases} \frac{n_h - d_h}{r_h} & \text{for participating schools (at least 50\% teacher questionnaires)} \\ 1 & \text{for closed or out-of-scope schools} \\ 0 & \text{for non-participating schools (less than 50\% teacher questionnaire)} \end{cases}.$$

9.4.3. Weight adjustment for non-participating teachers

Unfortunately, because not all selected teachers were able or willing to participate in TALIS, the non-participating teachers needed to be represented by the participating ones. Under the assumption of "missing at random", representation was achieved by way of the teacher non-response adjustment factor.

Each participating school $i = 1, \ldots, r_h$ of each explicit stratum $h = 1, \ldots, H$, had three kinds of teachers: those who responded (noted t_{hi}), those who left the school permanently after the sample had been selected or were found to be out of scope and those who did not respond but who were still at the selected school (noted q_{hi}). Here, the teacher non-response adjustment factor was:

$$WGTADJ2_{hij} = \begin{cases} \frac{t_{hi} + q_{hi}}{t_{hi}} & \text{for participating teachers} \\ 1 & \text{for teachers out of scope / left school} \\ 0 & \text{for non-participating teachers} \end{cases}.$$

While "teachers who had left school permanently" did not provide data to most of the estimates of interest, they still carried a positive weight because they represented those other "teachers who had left school permanently" and who were listed on the school roster but not included in the sample.

9.4.4. Weight adjustment factor for incidental exclusion of teachers

Because some teachers were excluded from sampling although they were in scope (see preceding discussion), they needed to be represented by the sample. An adjustment factor was required to account for these so-called incidental exclusions.

The weight adjustment factor for incidental exclusion of teachers in each participating school i=1, …, r_h in explicit stratum h = 1, …, H, was:

$$WGTFAC3_{hij} = \frac{L_{hi}}{\bar{L_{hi}}}.$$

In this adjustment factor, the numerator is the full school measure of size as listed and the denominator is the size of the reduced list from which the sample was actually selected.

9.4.5. Weight adjustment for teacher multiplicity

Some teachers were working in more than one school. Because the measure of the size of each school was taken independently, these teachers were counted more than once. Also, because the samples of teachers were independent from one school to the next, selecting the same teacher more than once was possible (though in practice not very likely). An adjustment was needed to account for the number of schools in which a given teacher worked. In TALIS, this information came from the teacher questionnaire. For most teachers, the adjustment factor was 1; for the others, it was the reciprocal of the number of schools in which they taught (capped to 6, if required, to avoid unnecessary dramatic jumps in teacher weights).

The weight adjustment for teachers working in more than one school computed for each responding teacher j = 1, …, t_{hi}, in each participating school i= 1, …, r_h, in explicit stratum h = 1, …, H, was:

$$WGTADJ4_{hij} = \begin{cases} \dfrac{1}{nb_schools_{hij}} & \text{for teachers working in more than 1 school} \\ 1 & \text{for teachers working in 1 school} \end{cases}.$$

This factor was set to 1 for teachers who had left the school permanently.

9.4.6. Final (estimation) weight for teacher data

The final teacher weight (estimation weight) was the product of the school design weight, the weight adjustment for school non-response, the teacher design weight and the three adjustment factors associated with each participating teacher. All estimates pertaining to the populations of teachers needed to use the final teacher weight.

The final teacher weight computed for each participating teacher j = 1, …, t_{hi}, in each participating school i= 1, …, r_h, in explicit stratum h = 1, …, H, was:

$$\begin{aligned} &TCHWGT_{hij} \\ &= \{WGTFAC1_{hi} \times WGTADJ1_{hi}\} \\ &\times \{WGTFAC2_{hij} \times WGTADJ2_{hij} \times WGTADJ3_{hij} \times WGTADJ4_{hij}\} \\ &= \left\{\frac{M_h}{n_h \times M_{hi}} \times \frac{n_h - d_h}{r_h}\right\} \times \left\{\frac{\bar{L_{hi}}}{m_{hi}} \times \frac{L_{hi}}{\bar{L_{hi}}} \times \frac{t_{hi} + q_{hi}}{t_{hi}} \times \frac{1}{nb_schools_{hij}}\right\}. \end{aligned}$$

In the simplest of cases, the sampling design prepared for TALIS 2018 would have yielded equal weights for all teachers. If we assume (1) that the sample size of schools was distributed among the explicit strata proportionally to the number of teachers in each stratum, (2) that samples of 20 teachers could be selected from every selected school, (3) that the school listings were equal to the measures of size used to select the schools,

(4) that the school listings contained only in-scope teachers, (5) that no incidental exclusion occurred, (6) that each selected school and teacher participated, and (7) that each teacher was teaching in only one school, then the final teacher weight will be the same for all the teachers in the sample:

$$TCHWGT_{hij} = \{WGTFAC1_{hi} \times WGTADJ1_{hi}\} \times \{WGTFAC2_{hij} \times WGTADJ2_{hij} \times WGTADJ3_{hij} \times WGTADJ4_{hij}\} = \left\{\frac{M_h}{n_h \times M_{hi}} \times 1\right\} \times \left\{\frac{M_{hi}}{20} \times 1 \times 1 \times 1\right\} = \left\{\frac{M}{200 \times M_h}\right\} \times \left\{\frac{M_h}{20}\right\} = \frac{M}{4000}$$

for $h = 1, \ldots, H$; $i = 1, \ldots, n_h$; $j = 1, \ldots, m_{hi}$, and where M is the total number of teachers in the population of interest.

9.5. Weights for the TALIS-PISA link data

As described in Chapter 5, the sample of schools for the TALIS-PISA link was a subset of the sample of schools selected to take part in PISA 2018. Given the sequencing of events between TALIS and PISA, the sampling team could not limit subsampling for the TALIS-PISA link to schools that had participated in PISA. They, therefore, had to draw the subsample from the full sample of schools prior to the PISA data collection. However, because data collection for the TALIS-PISA link was scheduled to take place after completion of the data collection for PISA (at least, for any given school), the school base weight was that of the PISA 2012 design, adjusted for subsampling. Where school non-response occurred, computation of the non-response adjustment was similar to the process described above. Again, the (TALIS-PISA link) school estimation weight was the product of the (TALIS-PISA link) school base weight and the (TALIS-PISA link) school non-response adjustment factor. It should also be used for estimation of the TALIS-PISA school-related parameters.

Because teacher sampling for the TALIS-PISA link followed the same rules as for the ISCED levels, the construction of the "PISA teacher" weight followed the same steps: base weight within a TALIS-PISA school, non-response adjustment within the school, and multiplicity and exclusion adjustments. The final TALIS-PISA-teacher weight (estimation weight) was thus the product of the teacher base weight, the three adjustment factors associated with each participating teacher and the final TALIS-PISA link school weight. All estimates pertaining to the populations of PISA teachers, therefore, needed to use the (TALIS-PISA link) final teacher weight.

9.6. Participation rates

The quality requirements for TALIS 2013 translated into participation rates (response rates) for schools and for teachers (see Chapter 10 for individual participants' results). Reaching the required levels of participation does not preclude some degree of error in the results but should reduce reliance on the "missing at random" assumptions made for the non-response weighting adjustments. Experience and knowledge gained from TALIS 2008 and TALIS 2013 showed that the targets set for TALIS 2018 participation were realistic.

9.6.1. Participation rate for schools

TALIS considered schools where the principal returned a questionnaire to be "participating" schools for the purposes of the school weights and database. TALIS 2018 set the minimum school participation rate at 75% after replacement. Although replacement schools could be called upon as substitutes for non-responding schools, the study's national project managers were encouraged to do all they could to obtain the participation of the schools in the original sample. As the number of replacement schools increased, the sample would have lost its probabilistic features and become increasingly "purposive", a situation that had the potential to undermine the reliability, validity and interpretability of a country's/economy's results.

Countries that reached less than 75% school participation after replacement had to demonstrate convincingly that their sample was not significantly biased.

The unweighted school participation rate was computed as:

$$UNWSCPART = \frac{\sum_{h=1}^{H}\sum_{i=1}^{r_h} 1}{\sum_{h=1}^{H}\sum_{i=1}^{n_h-d_h} 1} = \frac{\sum_{h=1}^{H} r_h}{\sum_{h=1}^{H}(n_h-d_h)} \ ,$$

where r_h, n_h and d_h are as defined above. This formula represents the crude proportion of schools from which a principal questionnaire was received (the unweighted participation rate is sometimes interpreted as a crude measure of the effectiveness of collection).

The weighted school participation rate was computed as:

$$WTDSCPART = \frac{\sum_{h=1}^{H}\sum_{i=1}^{r_h} WGTFAC1_{hi}}{\sum_{h=1}^{H}\sum_{i=1}^{r_h} SCHWGT_{hi}} \ .$$

This formula represents the proportion of the population of schools or principals accounted for by the participating schools.

Both rates were computed once over the complete set of participating schools (after replacement) and once over the subset of participating schools in the original selection (before replacement).

9.6.2. Participation rate for teachers

TALIS considered schools where at least 50% of selected teachers responded to the questionnaire to be "participating" schools for the purposes of the teacher weights and database, regardless of their participation status on the school database, that is, regardless of whether or not their principal returned his or her questionnaire. TALIS deemed schools that failed to meet this threshold as "non-participating" even though the number of responding teachers may have been sufficient to contribute to some of the analyses.

Teacher participation was calculated over all participating schools, whether the schools were in the original sample or used as a replacement. As a consequence, the participation rate for the teachers was a requirement only at the national level and not at the school level.

The unweighted teacher participation rate was defined as:

$$UNWTPART = \frac{\sum_{h=1}^{H}\sum_{i=1}^{r_h}\sum_{j}^{t_{hi}} 1}{\sum_{h=1}^{H}\sum_{i=1}^{r_h}\sum_{j}^{m_{hi}} 1} = \frac{\sum_{h=1}^{H}\sum_{i=1}^{r_h} t_{hi}}{\sum_{h=1}^{H}\sum_{i=1}^{r_h} m_{hi}} \ .$$

This formula gives the crude ratio of the number of responding teachers in participating schools with respect to the expected sample size from the participating schools. The weighted teacher participation rate was, therefore:

$$WTDTPART = \frac{\sum_{h=1}^{H}\sum_{i=1}^{r_h}\sum_{j=1}^{t_{hi}}\{WGTFAC1_{hi} \times (WGTFAC2_{hij} \times WGTADJ3_{hij} \times WGTADJ4_{hij})\}}{\sum_{h=1}^{H}\sum_{i=1}^{r_h}\sum_{j=1}^{t_{hi}}\{TCHWGT_{hij}\}}.$$

9.6.3. Overall participation rates

The overall weighted and unweighted participation rates were the products of the respective school and teacher participation rates. In the case of teachers, we had to adapt the "school participation rate" to the context of the teacher database by using the appropriate "school weight" defined for that context (i.e. 50% teacher participation within each school).

9.6.4. Reporting participation rates

Weighted and unweighted participation rates, with and without replacement schools, were produced for the school and principal data and for the teacher data. The analytical results for each country were annotated according to whether or not the response rate requirements were adequately met.

9.6.5. Meeting participation rates' standard for TALIS

Chapter 10 provides a detailed review of the adjudication process.

9.6.6. Evolution of participation rates over time

As a general rule, there are no visible trends. It is also visible that teacher participation in participating schools is almost always higher than principal participation. This has to be taken in context: when the participation of principals is 100%, teacher participation cannot be higher than that of the principals'. Also, changes need to be considered with caution; given the size of the sample, 200 schools, a 1% change in participation translates to 1 to 3 schools. Still, from one cycle to the next, one can observe some important changes in participation rates. In all cases, the changes are explained by either a concerted effort to improve participation of principals or teachers, or at the opposite end, by adverse conditions out of the control of the national TALIS team. Among the 29 countries/economies that participated in both TALIS 2013 and TALIS 2018, the average participation rate for principals dropped by 1.5%; some countries/economies showed remarkable improvement (+16%) due to judicious choices of collection strategies, while others experienced marked drops (-36%) due to local adverse conditions and untimely events. Among the same set of countries/economies, the changes in participation rates for teachers ranged from -36% to +21%, but the average change was only 0.3%.

9.7. Sampling error with balanced repeated replication (BRR)

Estimation, especially estimation of sampling error for surveys with complex designs such as TALIS, requires special attention. Both the survey design and the unequal weights are needed to obtain (approximately) unbiased estimates of sampling error. Not taking this approach can lead to severe underestimation of the sampling error. While exact formulae exist in theory for stratified PPS sample designs, the required computations become

practically impossible as soon as the number of primary units selected per stratum exceeds two.

Over the years, various statisticians have proposed approximate solutions for this problem. An important class of solutions is that of resampling or replication. The best-known examples of replication methods are interpenetrating subsamples (Mahalanobis), Balanced Half-Samples or Balanced Repeated Replication (McCarthy, Fay), the Jackknife (Quenouille, Tukey, Durbin, Frankel), and the Bootstrap (Efron). For reviews of these methods, see, for example, Lohr (1999[1]), Rust and Rao (1996[2]) or Wolter (2007[3]).

In a similar vein to what was done for PISA (see, for example, OECD (2009[4])), TALIS adopted the Balanced Repeated Replication (BRR) for estimation of the sampling error of the estimates. BRR is a replication method suited to sample designs where exactly two primary sampling units (PSUs) are selected in each stratum.

The principle of BRR is as follows: each of the two PSUs can provide an unbiased estimate of the total (or another parameter of interest) of its stratum. If the sampling design comprises H strata, there are then 2^H possible unbiased estimates of the parameter of interest, obtained by combining either PSU from each of the H strata. The sampling error of the estimate of the parameter of interest can be directly computed by comparing each of the 2^H estimates with their mean, as is usually done in simple basic statistics. Even with moderate values of H, the number of unbiased estimates may be quite large (e.g. $2^5 = 32$, $2^{10} = 1\,024$, $2^{20} = 1\,048\,576$). BRR provides a way to extract from the complete set of 2^H possible replicates a much smaller subset that gives the same measure of sampling error as the full set.

9.7.1. Creating replicates for BRR

BRR was developed for sample designs that use only two PSUs per stratum. Clearly, none of the countries participating in TALIS 2018 implemented such a sample design. Fortunately, it is possible to use a superimposed "BRR-ready" sample plan to approximate the implemented sample design. The participating schools (of the original sample or the replacements), listed in the order in which they appear on the sampling frame, were paired within explicit strata and each pair was dubbed "pseudo stratum" or "zone". If the number of participating schools in an explicit stratum was odd, then a triplet was formed with the last three schools. The pairs (or triplets) were then numbered sequentially from 1 to G, spanning the whole sample; within each pseudo stratum or zone, each school was assigned a random pseudo PSU number of 1 or 2 (or 3 for a triplet) as depicted in Table 9.1.

Table 9.1. Example of BRR-ready sample design and random assignment of pseudo PSUs

Explicit stratum	School ID	Zone = pseudo stratum	Pseudo PSU	Other variables of interest…	
1	1001	1	1	…	…
1	1002	1	2		
1	1003	2	1		
1	1004	2	2		
2	1005	3	2		
2	1006	3	1		
2	1007	4	1		
2	1008	4	2		
…	…				

Explicit stratum	School ID	Zone = pseudo stratum	Pseudo PSU	Other variables of interest…
H	…	G-1	2	
H	…	G	2	
H	…	G	1	

As with the Jackknife Repeated Replication, one of the two pseudo PSUs is dropped, which means the weight of the remaining PSU doubles. This PSU is the one that is used to compute an estimate of the parameter of interest. Rather than randomising which PSU to drop, we used a special matrix (of order 4t) of +1′s and -1′s (the so-called Hadamard matrix) to indicate which PSU should be kept (+1) and which should be dropped (-1) from each pseudo stratum in BRR, a process that associated the +1′s with the PSUs numbered 1 and the -1′s with the PSUs numbered 2. As an example, the Hadamard matrix of order 8 can be written as:

$$Hadamard_8 = \begin{pmatrix} +1 & +1 & +1 & -1 & +1 & -1 & -1 & -1 \\ -1 & +1 & +1 & +1 & -1 & +1 & -1 & -1 \\ -1 & -1 & +1 & +1 & +1 & -1 & +1 & -1 \\ +1 & -1 & -1 & +1 & +1 & +1 & -1 & -1 \\ -1 & +1 & -1 & -1 & +1 & +1 & +1 & -1 \\ +1 & -1 & +1 & -1 & -1 & +1 & +1 & -1 \\ +1 & +1 & -1 & -1 & -1 & -1 & +1 & -1 \\ -1 & -1 & -1 & -1 & -1 & -1 & -1 & -1 \end{pmatrix}.$$

In this matrix, each column is a BRR replicate and each line is a pseudo stratum or zone. The matrix entry indicates which pseudo PSU should be kept from each pseudo stratum to create the BRR replicate. For example, the previous matrix translates into:

	BRR 1	BRR 2	BRR 3	BRR 4	BRR 5	BRR 6	BRR 7	BRR 8
ZONE 1	PSU1	PSU1	PSU1	PSU2	PSU1	PSU2	PSU2	PSU2
ZONE 2	PSU2	PSU1	PSU1	PSU1	PSU2	PSU1	PSU2	PSU2
ZONE 3	PSU2	PSU2	PSU1	PSU1	PSU1	PSU2	PSU1	PSU2
ZONE 4	PSU1	PSU2	PSU2	PSU1	PSU1	PSU1	PSU2	PSU2
ZONE 5	PSU2	PSU1	PSU2	PSU2	PSU1	PSU1	PSU1	PSU2
ZONE 6	PSU1	PSU2	PSU1	PSU2	PSU2	PSU1	PSU1	PSU2
ZONE 7	PSU1	PSU1	PSU2	PSU2	PSU2	PSU2	PSU1	PSU2
ZONE 8	PSU2	PSU2	PSU2	PSU2	PSU2	PSU2	PSU2	PSU2

For TALIS 2018, and in keeping with what was done in the previous cycles of TALIS and PISA, a variation of the BRR developed by Fay (1989[5]) was implemented. Instead of a PSU being completely dropped and the weight of the other one doubled, the final weight ($TCHWGT_{hij}$) of every teacher in the PSU indicated by the Hadamard matrix is multiplied by the replicate factor of 1.5 to get the replicate weight. Likewise, the final weight ($TCHWGT_{hij}$) of the teachers in the remaining PSU is multiplied by the replicate factor of 0.5 to get the replicate weight. This strategy removes the risk of completely deleting a domain.

In cases where there was an odd number of PSUs in an explicit stratum, the last three PSUs were treated as a zone in the following manner: one of the PSUs was randomly designated as "+1" while the remaining two were both designated as "-1". For each replicate, as indicated by the Hadamard matrix, the weight of the selected unit was multiplied by 1.7071 if it was the single unit and the weights of the remaining pair were multiplied by 0.6464. If the matrix indicated that the pair should be selected, then the weights of the paired units were multiplied by 1.3536 and the weight of the single unit was multiplied by 0.2929. This strategy, developed by Judkins (OECD, 2002[6]), ensured that the sum of the factors was 3.

Because the nominal sample size for TALIS 2018 was n = 200 schools, a maximum of G = 100 zones or pseudo strata was created for each participating country and a series of G=100 BRR replicate weights were also computed and stored. The creation of BRR weights was applied to all participating countries/economies, regardless of the size of the sample and of the method of sample selection.

9.7.2. Estimating the sampling error

Let θ be the population parameter of interest. Let $\hat{\theta}^*$ be the full sample estimate for θ obtained by using the final weight and let $\hat{\theta}_g$, g = 1, ..., 100, be the G = 100 BRR replicate estimates of the same parameter of interest obtained by using the BRR weights described earlier. Then, with k set to equal 0.5, Fay's BRR estimate of the sampling variance and sampling error of $\hat{\theta}^*$ are respectively given as:

$$\hat{V}_{FAY}(\hat{\theta}^*) = \frac{1}{G(1-k)^2}\sum_{g=1}^{G}(\hat{\theta}_g - \hat{\theta}^*)^2 = 0.04\sum_{g=1}^{100}(\hat{\theta}_g - \hat{\theta}^*)^2$$

$$se_{FAY}(\hat{\theta}^*) = \sqrt{\hat{V}_{FAY}(\hat{\theta}^*)}.$$

9.7.3. Using sampling error when comparing estimates

Whenever we compare estimates (either variables or groups within a country) across two countries or a country value to the international average, it is important that we use the appropriate estimate of sampling error to scale this comparison.

Here, the standard error for the difference of two estimates within one country, say $\hat{\theta}_1$ and $\hat{\theta}_2$, is given as:

$$se(\hat{\theta}_1 - \hat{\theta}_2) = \{\hat{V}_{FAY}(\hat{\theta}_1) + \hat{V}_{FAY}(\hat{\theta}_2) - 2\widehat{Cov}(\hat{\theta}_1, \hat{\theta}_2)\}^{\frac{1}{2}} \ ,$$

where $\hat{\theta}_1$ and $\hat{\theta}_2$ are the two characteristics of interest (e.g. hours paid, hours worked) measured within each participating school.

The standard error for the difference of the estimates for two countries, say $\hat{\theta}_A$ and $\hat{\theta}_D$, is:

$$se(\hat{\theta}_A - \hat{\theta}_D) = \{\hat{V}_{FAY}(\hat{\theta}_A) + \hat{V}_{FAY}(\hat{\theta}_D)\}^{\frac{1}{2}} ,$$

and the standard error for the difference of an estimate for a given country, say $\hat{\theta}_A$ and the international average $\hat{\bar{\theta}}$, is:

$$se\left(\hat{\theta}_A - \hat{\bar{\theta}}\right) = \left\{\frac{(C^2 - 2C)\hat{V}_{FAY}(\hat{\theta}_A) + \sum_{k=1}^{C}\hat{V}_{FAY}(\hat{\theta}_k)}{C^2}\right\}^{\frac{1}{2}},$$

where $\hat{\bar{\theta}} = \sum \hat{\theta}_k / C$, C is the number of countries contributing to the mean $\hat{\bar{\theta}}$, and $\hat{\theta}_A$ is the estimate for country A.

Comparisons of subpopulations within a country should be done with a regression on a dummy variable, as illustrated in the following example. Suppose that the difference between male and female teachers for some characteristic (e.g. hours of class management per week) is of interest. We can set a dummy variable *Gender* = 0 if male, *Gender* = 1 if female. A regression model can then be written as $Score = a_0 + a_1\ Gender$. Clearly, if *Gender* = 0, then $Score_{male} = a_0$. Likewise, by setting *Gender* = 1, we obtain $Score_{female} = a_0 + a_1$. Design-based estimation of the regression parameters a_0 and a_1 can be done using appropriate software that uses the replicate weights to estimate the standard errors of the regression parameters. If the test of significance on a_1 cannot reject the null hypothesis $H_0: a_1 = 0$, then we must conclude that scores for male teachers and female teachers are not significantly different.

If $\hat{\theta}$ is one of the statistics described above and $se(\hat{\theta})$is the standard error of $\hat{\theta}$, then we can easily obtain confidence intervals about zero by computing the following boundaries:

$$lower_\alpha = \hat{\theta} - t_{\frac{\alpha}{2},df}\, se(\hat{\theta}) \text{ and } upper_\alpha = \hat{\theta} + t_{\frac{\alpha}{2},df}\, se(\hat{\theta}),$$

where 1-α is the pre-set confidence level (e.g. 1-α = 0.95) and $t_{\frac{\alpha}{2},df}$ is 1-α/2 percentile of the Student distribution with *df* degrees of freedom. In most applications, *df* will be large enough to allow the use of the standard normal deviate $z_{1-\frac{\alpha}{2}}$ (e.g. $z_{1-\frac{\alpha}{2}} = 1.96$ for $\alpha = 0.05$). However, in order to confirm the number of degrees of freedom, we still need to verify how many zones actually contribute to the statistic $\hat{\theta}$ and how many BRR replicates contribute to the computation of $se(\hat{\theta})$. This matter is covered in greater detail in the *TALIS 2018 and TALIS Starting Strong Survey 2018 User Guide* (OECD, forthcoming[7]).

9.7.4. Design effect (deff) and effective sample size

Sampling within complex surveys such as TALIS is known to be "less efficient" than simple random samples of the same size. Usual explanations include the fact that respondents are selected in groups of individuals sharing many characteristics – school environment, professional training, classroom equipment, textbooks and so on. The loss in efficiency is often summarised in a statistic called the "design effect" or deff (Kish, 1965[8]). The design effect for a statistic and a sampling plan is the ratio of the variance of the estimate under the sampling plan to the variance of the same estimate under simple random sampling of the same size. In the case of TALIS, the true design effect was approximated by:

$$deff(\hat{\theta}, BRR) = \frac{\hat{V}_{BRR}(\hat{\theta})}{\hat{V}_{SRS}(\hat{\theta})}.$$

Alternatively, the design effect can be regarded as the ratio of sample sizes. We can then speak of "effective sample size" to describe the sample size of the complex survey adjusted for the design effect:

$$n_{\text{effective}} = \frac{n}{deff} \ .$$

The following tables give the estimated design effect for selected key scale variables from the principal questionnaire (Table 9.2 to Table 9.4) and the teacher questionnaire (Table 9.5 to Table 9.7), by the participating country/economy. Deff values near 1 mean that the design was as precise as a simple random sample of the same size (200 schools or 4 000 teachers respectively). Deff values larger than 1 mean that the sampling design was less efficient than a simple random sample of the same size; deff values smaller than 1 indicate a gain in precision. Alternatively, the deff values indicate by what factor the sample size was affected: the larger the deff, the smaller the effective sample size; reciprocally, the smaller the deff, the larger the effective sample size.

Because the value of the deff depends on the design itself (efficiency of the stratification, clustering, sample size) and on the true sampling variance of the variable in the population, it varies from one variable to the next.

In Chapter 5 (Table 5.2), a hypothetical deff of 5.2 was used to derive the expected effective sample size for teachers. The tables presented below show how the actual sample designs implemented in the various participating countries outperformed the design hypotheses, thus resulting in effective samples that were much larger than the expected nominal 400 teachers. However, these tables also show that the various samples are not always as efficient as simple random samples of schools, despite stratification. In all cases, stratification was implemented to obtain reliable estimates for domains of interest rather than as a measure to reduce sampling error.

Table 9.2. Estimated design effects for selected scales, ISCED level 2, principal data

Participating country/economy	Diversity beliefs	Organisational innovativeness	Overall job satisfaction	School leadership
Alberta (Canada)	13.41	2.24	3.23	7.70
Austria	1.67	1.64	1.31	1.73
Belgium	1.15	1.13	1.31	1.14
Flemish Community (Belgium)	1.21	1.59	1.45	1.19
Brazil	1.09	1.23	1.14	1.20
Bulgaria	0.96	1.07	1.11	1.19
Ciudad Autónoma de Buenos Aires (Argentina)	1.17	0.87	0.86	0.79
Chile	1.24	1.04	1.25	0.97
Colombia	1.52	1.98	1.32	1.45
Croatia	3.39	1.53	2.13	1.20
Cyprus[1]	1.16	0.92	1.19	0.51
Czech Republic	1.23	1.07	1.08	1.23
Denmark	0.75	1.22	0.97	1.20
England (United Kingdom)	1.16	1.19	1.09	1.38

Participating country/economy	Diversity beliefs	Organisational innovativeness	Overall job satisfaction	School leadership
Estonia	1.14	0.95	0.86	0.89
Finland	1.18	0.92	1.11	1.10
France	1.00	0.96	0.94	1.14
Georgia	1.23	0.86	1.37	1.50
Hungary	1.22	1.41	0.76	1.00
Iceland	0.95	1.19	0.83	0.93
Israel	1.01	1.18	1.15	1.01
Italy	1.06	1.06	1.23	1.09
Japan	1.35	1.47	1.18	1.37
Kazakhstan	2.06	2.02	1.96	1.58
Korea	1.38	1.47	1.46	1.36
Latvia	2.87	1.46	3.07	1.32
Lithuania	1.56	0.93	1.08	0.91
Malta	1.27	1.2	0.98	0.80
Mexico	0.88	1.5	0.88	0.80
Netherlands	1.34	1.05	1.17	0.86
New Zealand	3.24	4.84	4.58	5.74
Norway	1.45	0.91	1.19	1.15
Portugal	1.20	1.00	1.10	1.10
Romania	1.65	1.77	2.41	1.96
Russian Federation	2.74	2.15	1.56	2.26
Saudi Arabia	0.94	0.93	1.38	1.74
Shanghai (China)	0.84	0.99	1.12	1.25
Singapore	0.84	1.37	1.15	1.68
Slovak Republic	0.90	1.13	1.19	0.97
Slovenia	1.08	0.88	0.83	0.97
Spain	1.50	3.33	1.99	2.39
Sweden	2.34	1.38	3.31	2.26
Chinese Taipei	1.08	1.22	1.40	1.06
Turkey	1.51	1.25	1.09	1.46
United Arab Emirates	0.95	1.11	1.07	1.16
United States	2.96	5.66	3.38	4.55
Viet Nam	1.17	1.41	1.37	1.82

1. See endnote 1.
Source: OECD, TALIS 2018 database.

Table 9.3. Estimated design effects for selected scales, ISCED level 1, principal data

Participating country/economy	Diversity beliefs	Organisational innovativeness	Overall job satisfaction	School leadership
Flemish Community (Belgium)	1.59	1.04	0.70	1.20
Ciudad Autónoma de Buenos Aires (Argentina)	0.99	1.19	1.46	0.88
Denmark	1.14	0.79	1.59	2.06
England (United Kingdom)	0.80	1.64	1.05	2.07
France	0.88	1.39	1.51	1.18
Japan	1.01	1.13	1.08	1.49
Korea	1.31	1.76	1.05	1.46
Spain	2.13	2.70	1.50	3.08
Sweden	0.87	1.82	1.74	1.14
Turkey	2.64	1.96	2.51	2.12
Chinese Taipei	1.15	1.15	1.14	1.28
United Arab Emirates	0.70	0.92	1.26	1.15

Source: OECD, TALIS 2018 database.

Table 9.4. Estimated design effects for selected scales, ISCED level 3, principal data

Participating country/economy	Diversity beliefs	Organisational innovativeness	Overall job satisfaction	School leadership
Alberta (Canada)	0.94	1.19	1.65	1.56
Brazil	1.48	0.91	1.12	1.38
Croatia	1.31	1.91	2.36	1.16
Denmark	1.09	1.09	1.06	0.79
Portugal	1.10	0.94	1.29	1.40
Slovenia	1.08	1.29	0.91	1.04
Sweden	2.04	2.04	0.00	3.04
Turkey	2.49	2.84	2.89	2.64
Chinese Taipei	1.29	1.19	1.03	1.73
United Arab Emirates	1.02	0.80	1.15	0.97
Viet Nam	1.65	1.13	1.10	1.29

Source: OECD, TALIS 2018 database.

Table 9.5. Estimated design effects for selected scales, ISCED level 2, teacher data

Participating country/economy	Job satisfaction	Teacher co-operation	Teacher self-efficacy	Teaching practices
Alberta (Canada)	1.55	3.08	2.03	4.13
Australia	1.83	1.74	1.48	1.41
Austria	2.56	1.90	1.61	1.33
Belgium	1.67	2.16	1.33	0.88
Flemish Community (Belgium)	1.67	2.16	1.33	0.88
Brazil	2.75	3.66	1.96	1.72
Bulgaria	2.64	2.48	2.06	2.06
Ciudad Autónoma de Buenos Aires (Argentina)	3.27	3.43	2.95	1.86

Participating country/economy	Job satisfaction	Teacher co-operation	Teacher self-efficacy	Teaching practices
Chile	2.00	1.56	1.11	1.87
Colombia	4.01	4.58	3.32	2.26
Croatia	3.28	3.33	2.72	1.63
Cyprus[1]	2.94	2.47	1.15	1.75
Czech Republic	2.34	2.98	1.50	1.82
Denmark	1.88	2.79	1.67	1.44
England (United Kingdom)	2.09	1.51	1.73	1.61
Estonia	1.79	3.35	1.61	2.15
Finland	2.8.0	2.33	1.81	1.81
France	2.01	2.00	1.11	0.97
Georgia	2.91	3.09	1.72	2.34
Hungary	3.13	2.60	1.83	1.42
Iceland	1.00	1.10	1.10	0.82
Israel	2.34	2.03	1.39	0.82
Italy	2.16	2.31	1.47	1.42
Japan	1.57	2.44	1.38	1.72
Kazakhstan	2.97	3.63	2.50	2.87
Korea	3.05	2.08	1.83	1.36
Latvia	2.89	1.80	1.98	2.12
Lithuania	3.15	2.25	1.85	1.64
Malta	1.79	2.62	1.57	0.73
Mexico	1.88	1.65	1.82	1.27
Netherlands	2.38	8.42	3.97	4.98
New Zealand	3.41	4.06	2.90	1.94
Norway	2.43	3.61	2.29	1.90
Portugal	2.89	2.29	1.28	1.07
Romania	2.57	2.53	2.38	2.12
Russian Federation	2.33	3.19	4.08	3.34
Saudi Arabia	1.75	1.75	1.83	1.31
Shanghai (China)	2.50	2.20	1.32	1.49
Singapore	1.12	0.92	1.05	1.23
Slovak Republic	1.94	1.80	1.35	1.83
Slovenia	1.57	2.17	1.20	1.17
Spain	3.63	4.47	2.82	4.10
Sweden	2.91	3.17	1.59	1.34
Chinese Taipei	2.15	2.25	1.13	1.15
Turkey	3.25	2.33	1.61	1.81
United Arab Emirates	1.39	0.96	0.98	1.52
United States	6.96	6.83	2.44	4.74
Viet Nam	4.37	5.24	3.75	6.75

1. See endnote 1.
Source: OECD, TALIS 2018 database.

Table 9.6. Estimated design effects for selected scales, ISCED level 1, teacher data

Participating country/economy	Job satisfaction	Teacher co-operation	Teacher self-efficacy	Teaching practices
Flemish Community (Belgium)	2.00	2.01	1.65	2.23
Ciudad Autónoma de Buenos Aires (Argentina)*	3.17	2.50	2.48	2.19
Denmark	2.04	2.15	1.21	1.71
England (United Kingdom)	2.90	2.38	2.05	1.64
France	2.25	2.80	2.56	2.90
Japan	2.25	2.81	1.77	1.83
Korea	3.18	2.32	1.76	1.65
Spain	3.33	4.67	3.70	3.33
Sweden	2.25	2.10	1.57	1.76
Turkey	5.96	3.62	4.01	2.99
Chinese Taipei	2.07	2.64	1.32	1.35
United Arab Emirates	1.07	1.39	1.10	1.34
Viet Nam	3.76	4.80	4.02	2.42

Source: OECD, TALIS 2018 database.

Table 9.7. Estimated design effects for selected scales, ISCED level 3, teacher data

Participating country/economy	Job satisfaction	Teacher co-operation	Teacher self-efficacy	Teaching practices
Alberta (Canada)	2.25	3.42	1.74	1.39
Brazil	2.96	5.67	3.19	1.80
Croatia	1.95	2.47	1.34	2.05
Denmark	2.54	1.66	1.41	1.25
Portugal	2.45	2.60	1.60	1.39
Slovenia	1.17	1.25	1.44	1.22
Sweden	2.48	2.38	1.82	1.80
Turkey	5.78	4.93	5.34	4.13
Chinese Taipei	2.22	2.37	1.60	1.29
United Arab Emirates	1.31	1.11	1.47	1.62
Viet Nam	3.51	4.38	2.64	1.50

Source: OECD, TALIS 2018 database.

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Notes

[1] Note by Turkey: The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".

Note by all the European Union Member States of the OECD and the European Union: The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

[2] TIMSS: trends in International Mathematics and Science Study, https://www.iea.nl/timss.

[3] See endnote 1.

[4] See endnote 1.

Chapter 10. Data adjudication

This chapter covers the adjudication of TALIS 2018. The first two sections of the chapter address the purpose of adjudication and what was adjudicated during TALIS 2018, after which the criteria used to assess each parameter are presented and briefly described in the third section. The last section describes the recommended usage rating for each participating country/economy and survey population. Individual rating recommendations can be found in Annex G.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

10.1. The general adjudication process in TALIS

The TALIS Consortium is responsible for providing participating countries/economies and the OECD with databases that: (1) inform policy relevant to those countries and economies; (2) allow international comparisons; (3) permit the development of indicators; (4) contain valid and reliable data obtained via rigorous, effective and efficient methods; and (5) provide estimates that can be interpreted across participating countries/economies (OECD, 2015[1]).

The consortium is therefore also responsible not only for demonstrating and documenting, through adjudication, that TALIS's survey processes were designed and implemented to meet these requirements but also for alerting the participating countries/economies and the OECD of any shortcomings or limitations affecting the use of any data elements.

This chapter defines and describes the adjudication process for TALIS 2018, with the elements for adjudication listed and commented on in turn. The criteria used to assess the quality of each element appear in the third section of the chapter, while the fourth section focuses on what each rating means in practice. The outcomes of the adjudication, that is, the recommended rating for each participating country/economy and each TALIS 2018 option, are given at the end of this section. The full unweighted and weighted participation rates can be found in Annex G.

10.2. What was adjudicated in TALIS?

The basic principle guiding adjudication was to determine, for each participating country/economy and for each of the TALIS options, whether the data released to the countries and to the OECD were "fit for use" as intended.

To establish fitness for use, several quality assurance processes were designed and activated throughout the survey. Some processes relied on expert advice and opinion; some relied on qualitative information and learned judgement; and some relied on quantitative information. The quality observations that the international quality observers (IQOs) conducted in each participating country/economy provide an example of adjudication in practice (see Chapter 7).

In general, the consortium considered the overall quality of the survey implementation and the data yielded to be high. However, several issues arose during the survey with respect to, for example, national adaptations of the source questionnaires and extensions of the data collection window. The consortium adjudicators discussed and clarified each issue with the relevant participating country/economy and sometimes sought advice from the OECD Secretariat. Once the consortium found a solution that was not only agreeable to the participating country/economy but also complied with the *TALIS 2018 Technical Standards* (see Annex B), it considered the issue settled in terms of having no impact on data quality. Some problems were discovered only during data processing, weighting or scaling. The impact of each of these issues on data quality – that is, their potential to limit the utility of the data – was assessed and documented.

During the adjudication session, held at the IEA Hamburg offices in September 2018 in the presence of representatives of the OECD Secretariat, each individual dataset, that is, all

data from each country's/economy's survey options[1] and questionnaire types,[2] was submitted to the same examination. For the first time since the original TALIS survey of 2008, the consortium adjudicated the principal/school data independently of the teacher data. The members of the consortium responsible for a particular key step of the survey presented, discussed and assessed any unresolved issues that might reduce each dataset's final fitness for use. The following references provide a detailed review of survey processes and of the principles and implementation of quality assurance in a survey: Kish (1965[2]), Statistics Canada (2003[3]; 2009[4]; 2017[5]) and the United Nations Commission for Europe (UNECE, 2014[6]).

Outstanding and unresolved situations likely to diminish the overall utility of a dataset could occur during any step of the survey process. For example:

- *Adaptation of questionnaires to the national context:* incomplete questionnaires (national questionnaires needed to include all of the introductory texts and questions in the international source versions of the questionnaires as well as the corresponding notes, instructions, response categories and coding schemes); questions removed or modified without agreement.
- *Translation and verification:* changes to national translations of trend items that would make comparisons difficult.
- *Quality of sampling frame (before sampling and confirmation at weighting):* measure of size disproportionate to what was known of the participating country/economy; missing values.
- *Handling of out-of-scope and of refusal units:* for example, a replaced unit found to be out of scope.
- *Handling of replacement and "volunteer" units:* for example, replacement schools participating when the original school was also on the database.
- *Teacher rosters and within-school sampling:* apparent incompleteness; apparent biased selection of teacher sample.
- *Main survey administration:* noncompliance with the technical standards and survey operational procedures, units, rules and guidelines; failure to administer the data collection within the agreed data collection window; failure to administer the questionnaires according to the tracking form.
- *Data collection (paper and online modes):* missing records (physical or electronic).
- *Data cleaning:* issues with cleaning and editing; need to make post-collection call-backs to national project managers (NPMs).
- *Quality observers' reports:* reported issues included differences in the documentation of national decisions on translation verification feedback and the actual implementation in the final national instruments; unnatural and non-fluent national translations; deviations in sampling procedures for listing all eligible participants in a school; failure to administer the questionnaires according to the tracking form.
- *Weighting:* miscoded schools or teachers; only rough comparisons of survey results with frame information; need to make call-backs to NPMs; estimates of population sizes not matching information on frame; school listings too short; school ID having no matching unit on frame.

- *Participation rates of principals and teachers:* weighted and unweighted rates strikingly different; participation rates computed within 1% of a rating borderline.

In those instances where there were no outstanding or unresolved issues, the consortium adjudication committee established the recommended rating as per the technical standards. These standards, which were based on participation rates, are repeated below for reference (see also Chapter 9).

10.3. The criteria for assessment

As a general criterion, the consortium members at the adjudication considered that any problem that had been satisfactorily resolved was no longer a problem and that they did not need to discuss it. The consortium member mainly responsible for the issue at hand only presented the issue if unusual circumstances made it stand out.

Otherwise, if a problem had been only partially resolved, the adjudication committee worked through a series of questions to help them clearly determine the nature of the issue and its potential impact on data quality: What was the problem? What solutions had been tried and failed? What solutions had partially worked and to what extent? Was the perceived impact such that words of caution should be issued to users? Did the adjudication committee feel that international (or national) comparisons appeared to have been compromised or limited to the largest subpopulations? Was more information from countries/economies needed to assess the issue in full?

Once the committee had assessed each survey process, they formulated a recommended rating for it that accounted for the participation rates and any unresolved issues.

10.4. Recommended usage ratings for participants

For easy reference, Tables 10.1 and 10.2 reproduce the adjudication tables found in the *TALIS 2018 Technical Standards* (see Annex B).

Table 10.1. Adjudication rules for school or principal data in TALIS 2018

School participation (returned principal questionnaires) (%)		Risk of school non-response bias	Rating	
before replacement	after replacement			
≥ 75	≥ 75		Good	
50–75	≥ 75		Fair	A
	50–75	Low	Fair	C
		High	Poor	D
< 50			Insufficient	

Source: TALIS 2018 Technical Standards (Annex B).

Table 10.2. Adjudication rules for teacher data in TALIS 2018

School participation (minimum teacher participation) (%)		Teacher participation after school replacement (%)	Risk of teacher non-response bias	Rating	
before replacement	after replacement				
≥ 75	≥ 75	≥ 75		Good	
		50–75		Fair	A
50–75	≥ 75	≥ 75		Fair	B
		50–75	Low	Fair	C
			High	Poor	D
50–75	50–75			Poor	E
< 50	≥ 75			Poor	F
< 50	< 75			Insufficient	

Source: TALIS 2018 Technical Standards (Annex B).

The aim of the following bulleted list is to help data users understand what constitutes limitations on use or quality of the data:

- *Good:* the participating country's/economy's data can be used for all reporting and analytical purposes and should be included in international comparisons.
- *Fair (line A):* national and subnational estimates can be produced; some teacher characteristics may be less precise, as indicated by a larger standard error (s.e.), hence the warning "fair", but with no additional warnings to users deemed necessary.
- *Fair (line B, only for teacher data adjudication):* national and subnational estimates can be produced; some subnational estimates may be of lower precision (larger s.e.) if the sample size is locally low, hence the warning "fair", but with no additional warnings to users considered necessary.
- *Fair (line C):* national and subnational estimates can be produced; some subnational estimates may be of lower precision (larger s.e.) if the sample size is locally low, hence the warning "fair", but with the possible inclusion of a note on data quality that points to the outcome of the non-response bias analysis (NRBA); school participation somewhat lower than under (B), meaning that comparison of subnational estimates needs to be done with care given that some of these results are based on just a few schools; comparison of small subnational estimates with similar groups from other countries is unlikely to uncover statistically meaningful differences because of potentially overly large standard errors.
- *Poor (line D):* in addition to the warnings issued for the previous category, a note that warns users of indications of non-response bias in some estimates should be appended; comparisons of subnational estimates need to be limited to the groups with the larger sample sizes (because the sample at this point represents between 37% and 56% of the teaching workforce, from a relatively small sample of schools, comparisons with similar groups in foreign countries is inadvisable).
- *Poor (line E, only for teacher data adjudication):* subnational estimates not recommended; a note pointing out the difficulty of obtaining a representative sample of schools, therefore, needs to be appended.

- *Poor (line F, only for teacher data adjudication):* limitations similar to those for line E, but with the inclusion of a note pointing out the difficulty of obtaining at least 50% participation of the selected sample of schools; evident risk of having a non-representative sample of schools.
- *Insufficient:* weights should not be calculated for any official tabulations, meaning that data should not be incorporated[3] into international tables, models, averages, etc.

Thus, the final ratings depended on participation rates before and after replacements, on data quality issues raised during the adjudication session and on the apparent severity of the non-response biases. The next six tables present the recommended rating for each participating country/economy, by ISCED level and population.[4]

As mentioned earlier, the recommended rating was based on the participation rates (weighted or unweighted) most favourable to the countries. Detailed results of unweighted and weighted participation can be found in Annex G.

Table 10.3. ISCED level 1: Principals' participation and recommended ratings

Participating country/economy	Number of participating principals	Estimated size of school population	Principals' participation before replacement (%)	Principals' participation after replacement (%)	Recommended rating
Australia*	223	6 522	48.8	77.9	Insufficient
Flemish Community (Belgium)*	184	2 193	70.0	92.2	Fair
Ciudad Autónoma de Buenos Aires (Argentina)	175	878	85.0	87.5	Good
Denmark*	145	1 567	56.6	73.2	Fair
England (United Kingdom)	161	16 945	76.4	89.5	Good
France*	178	29 636	89.3	91.5	Good
Japan	197	19 962	97.2	99.5	Good
Korea	161	5 913	78.0	80.5	Good
Netherlands*	135	6 158	40.7	69.6	Insufficient
Spain*	436	13 305	98.2	98.2	Good
Sweden*	166	3 983	84.7	87.4	Good
Chinese Taipei	200	2 644	99.8	100.0	Good
Turkey	171	17 696	99.3	99.3	Good
United Arab Emirates	502	554	90.6	90.6	Good
Viet Nam	194	15 318	100.0	100.0	Good

Notes: A school was deemed a participating school if the principal returned his or her questionnaire with at least 1 question answered.
Australia: data collection window extended into the following school year.
Flemish Community (Belgium): entries on the sampling frame were administrative units and not "schools" as they are usually defined. Because a "school" may comprise one or several administrative units, the principal would have been reporting for the school, not just the selected administrative unit. Users, therefore, need to exercise care when analysing the school-level statistics.
Denmark: because non-response bias analysis showed no evidence of a high risk of school non-response bias, Denmark's rating was upgraded from "poor" to "fair". Item PQ-39b and PQ-39c were dropped because of an inaccurate translation.
France: item PQ-06c was withdrawn at France's request because the wording was not sufficiently clear to ensure non-misinterpretation of the data. Item PQ-14c was dropped due to an inaccurate translation.

Netherlands: the Netherlands began its data collection six weeks earlier than the other Northern Hemisphere countries/economies and had an extended collection window. Because the Netherlands Ministry of Education, Culture and Science decided to support all schools willing to participate, this resulted in the inclusion of some 50 "national" schools that were not included in the international dataset but were left on the national dataset. Thus, participation rates were computed on the international dataset. Item PQ-12 was withdrawn at the Netherlands' request because the public/private status of schools in the Netherlands is not always obvious and this question was often misinterpreted, despite the explanation provided.
Spain: item PQ-03 was dropped because of an inaccurate translation.
Sweden: item PQ-07a was dropped because of an inaccurate translation.
Source: OECD TALIS 2018 Database.

Table 10.4. ISCED level 1: Teachers' participation and recommended ratings

Participating country/economy	Number of participating schools	Number of participating teachers	Estimated size of teacher population	School participation before replacement (%)	School participation after replacement (%)	Teachers' participation in participating schools (%)	Overall teacher participation (%)	Recommended rating
Australia*	213	3 030	133 915	48.8	74.0	76.4	56.5	Insufficient
Flemish Community (Belgium)*	177	2 662	30 192	66.3	88.5	92.2	81.7	Fair
Ciudad Autónoma de Buenos Aires (Argentina)	167	2 514	16 221	81.0	83.5	86.9	72.5	Good
Denmark*	154	2 592	34 166	58.6	77.8	87.5	68.1	Fair
England (United Kingdom)	152	2 009	225 194	74.3	85.9	85.0	73.1	Fair
France	178	1 429	209 981	88.6	91.2	92.1	84.0	Good
Japan	197	3 308	354 795	97.0	99.5	98.8	98.3	Good
Korea*	182	3 207	128 831	86.0	91.0	91.9	83.6	Good
Netherlands*	130	1 504	68 640	39.3	67.0	86.8	58.2	Insufficient
Spain*	442	7 246	210 627	99.3	99.5	95.4	95.0	Good
Sweden	178	2 404	57 183	90.0	93.7	78.8	73.8	Good
Chinese Taipei	200	3 494	89 608	99.5	100.0	97.6	97.6	Good
Turkey	172	3 204	212 347	99.4	99.4	98.5	97.9	Good
United Arab Emirates	552	9 188	16 372	99.6	99.6	96.6	96.2	Good
Viet Nam	194	3 991	385 301	100.0	100.0	98.3	98.3	Good

Notes: A school was deemed a participating school if at least 50% of the selected teachers returned their respective questionnaires with at least 1 question answered.
Australia: Australia's data collection window extended into the following school year.
Flemish Community (Belgium): entries on the sampling frame were administrative units and not "schools" as they are usually defined. Because a "school" may comprise one or several administrative units, the principal would have been reporting for the school, not just the selected administrative unit. Users, therefore, need to exercise care when analysing the school-level statistics.
France: Item TQ-33b and TQ-33d were dropped because of an inaccurate translation.
Denmark: because non-response bias analysis showed no evidence of a high risk of school non-response bias, Denmark's rating was upgraded from "poor" to "fair".
Korea: in some schools, teacher listings were found to be incorrect; these schools were therefore categorised as "non-participant".
Netherlands: the Netherlands began its data collection six weeks earlier than the other Northern Hemisphere countries/economies and had an extended collection window. Because of an unapproved collection protocol that resulted in the inclusion of some 50 "national" schools that were not included in the international dataset but were left on the national dataset, participation rates were computed on the international dataset.
Spain: item TQ-03 was dropped because of an inaccurate translation.
Source: OECD TALIS 2018 Database.

Table 10.5. ISCED level 2: Principals' participation and recommended ratings

Participating country/economy	Number of participating principals	Estimated size of school population	Principals' participation before replacement (%)	Principals' participation after replacement(%)	Recommended rating
Alberta (Canada)*	129	1 038	54.4	66.2	Fair
Australia*	230	2 680	49.0	75.7	Insufficient
Austria*	277	1 483	96.0	100.0	Good
Belgium*	307	1 169	86.6	95.9	Good
Flemish Community (Belgium)*	188	721	82.5	94.0	Good
French Community (Belgium)	119	448	93.3	99.2	Fair
Brazil	184	52 187	88.0	95.4	Good
Bulgaria	200	1 730	97.,5	100.0	Good
Chile	169	5 214	78.9	87.6	Good
Ciudad Autónoma de Buenos Aires (Argentina)	121	488	77.5	82.6	Good
Colombia*	141	10 392	68.8	70.9	Fair
Croatia	188	896	95.0	95.6	Good
Cyprus[1,2]	88	99	88.9	88.9	Good
Czech Republic*	218	2 606	99.5	99.5	Good
Denmark*	140	1 457	51.5	71.4	Fair
England (United Kingdom)	157	3 990	71.9	81.8	Fair
Estonia	195	389	88.3	100.0	Good
Finland	148	706	100.0	100.0	Good
France*	195	6 770	97.6	98.0	Good
Georgia*	177	2 151	91.7	91.7	Good
Hungary	182	2 640	91.2	94.3	Good
Iceland*	101	136	74.3	74.3	Fair
Israel*	184	1 196	90.9	93.7	Good
Italy*	190	5 622	92.4	98.6	Good
Japan	195	10 071	93.9	99.4	Good
Kazakhstan	331	6 302	100.0	100.0	Good
Korea	150	3 134	68.1	77.8	Fair
Latvia	136	653	80.4	91.9	Good
Lithuania	195	833	100.0	100.0	Good
Malta	54	58	93.1	93.1	Good
Mexico*	193	16 327	90.6	97.0	Good
Netherlands*	125	524	56.2	85.6	Fair
New Zealand*	189	1 732	71.7	92.0	Fair
Norway	162	1 091	67.5	81.0	Fair
Portugal	200	1 255	97.7	100.0	Good
Romania	199	4 658	100.0	100.0	Good
Russian Federation*	230	31 948	99.1	100.0	Good
Saudi Arabia*	192	6 119	96.5	96.5	Good
Shanghai (China)*	198	630	100.0	100.0	Good
Singapore	167	193	97.0	98.8	Good

Participating country/economy	Number of participating principals	Estimated size of school population	Principals' participation before replacement (%)	Principals' participation after replacement(%)	Recommended rating
Slovak Republic	180	1 593	84.4	90.5	Good
Slovenia	119	448	74.8	79.3	Good
South Africa	169	8 026	92.3	92.3	Good
Spain*	396	6 861	98.7	99.2	Good
Sweden*	171	1 739	85.9	89.1	Good
Chinese Taipei	202	935	100.0	100.0	Good
Turkey	196	16 100	99.0	99.0	Good
United Arab Emirates*	476	521	91.4	91.4	Good
United States*	164	65 095	63.1	77.6	Fair
Viet Nam	196	10 799	100.0	100.0	Good

1. Note by Turkey: The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".
2. Note by all the European Union Member States of the OECD and the European Union: The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus. *Notes*: A school was deemed a participating school if the principal returned his or her questionnaire.
Alberta (Canada): because non-response bias analysis showed no evidence of a high risk of school non-response bias, Alberta's rating was upgraded from "poor" to "fair". TALIS was conducted as a new Collective Bargaining Agreement for teachers was being negotiated.
Australia: Australia's data collection window extended into the following school year.
Austria: item PQ-06 was withdrawn at Austria's request because the wording was not sufficiently clear to ensure non-misinterpretation of the data.
Belgium and Flemish Community (Belgium): entries on the sampling frame were administrative units and not "schools" as they are usually defined. Because a "school" may comprise one or several administrative units, the principal would have been reporting for the school, not just the selected administrative unit. Users, therefore, need to exercise care when analysing the school-level statistics.
French Community (Belgium): The sample size is lower than the minimum number of schools required for TALIS, namely, 150, unless a census of all schools is conducted. Item PQ-14c was dropped due to an inaccurate translation.
Colombia: non-response bias analysis showed no evidence of a high risk of school non-response bias.
Czech Republic: because some translation issues could still exist in the trend items, users need to exercise caution when comparing results across TALIS cycles.
Denmark: because non-response bias analysis showed no evidence of a high risk of school non-response bias, Denmark's rating was upgraded from "poor" to "fair". Items PQ-39b and PQ-39c were dropped because of an inaccurate translation.
France: item PQ-06c was withdrawn at France's request because the wording was not sufficiently clear to ensure non-misinterpretation of the data. Item PQ-14c was dropped due to an inaccurate translation.
Georgia: the overall quality of the translation was found to be questionable. It is also likely that translation issues still exist in the Georgian and Azerbaijani instruments for Georgia that could affect the data.
Iceland: because Iceland missed 75% participation by only 1 school, Iceland's rating was upgraded from "poor" to "fair".
Israel: ultra-orthodox schools were removed post-facto because of very low responses rates, making coverage identical to that of TALIS 2013. Because translation issues could still exist in the trend items, users need to exercise caution when comparing results across TALIS cycles. Item PQ-12 was withdrawn at Israel's request because the classifications of private schools were not defined well enough to ensure non-misinterpretation of data.
Italy: because translation issues could still exist in the trend items, users need to exercise caution when comparing results across TALIS cycles. Item PQ-16 was withdrawn at Italy's request.
Mexico: item PQ-04e, "years working in other jobs", was dropped because of an inaccurate translation.
Netherlands: the Netherlands began its data collection six weeks earlier than the other Northern Hemisphere countries/economies and had an extended collection window. Because an unapproved collection protocol resulted in the inclusion of some 50 "national" schools that were not included in the international dataset but were left on the national dataset, participation rates were computed on the international dataset. Item PQ-12 was withdrawn at the Netherland's request because the classifications of private schools were not defined well enough to ensure non-misinterpretation of data.

New Zealand: coverage was extended to small schools (four or fewer teachers). While the impact of this action on the target population of teachers was negligible, the impact on the target population of principals is important because, compared to TALIS 2013, the target population for principals nearly doubled in size. TALIS 2018 data comparisons with TALIS 2013 should, therefore, be restricted to the 2013 coverage.
Russian Federation: Moscow was excluded from TALIS 2018.
Saudi Arabia: two provinces bordering Yemen were excluded from TALIS 2018.
Shanghai (China): item PQ-04d, "years worked as a teacher in total", was dropped because of an inaccurate translation.
Spain: item PQ-03 was dropped because of an inaccurate translation.
Sweden: item PQ-07a was dropped because of an inaccurate translation.
United Arab Emirates: Comparisons with TALIS 2013 must be limited to Abu Dhabi; data from Abu Dhabi were not adjudicated independently from those of the UAE. Because of the selection of multi-level schools, the principal data were copied from the original ISCED level 2 principal questionnaire to the ISCED level 1 and ISCED level 3 corresponding forms, except for item PQ-17.
Source: OECD TALIS 2018 Database.

Table 10.6. ISCED level 2: Teachers' participation and recommended ratings

Participating country/economy	Number of participating schools	Number of participating teachers	Estimated size of teacher population	School participation before replacement (%)	School participation after replacement (%)	Teachers' participation in participating schools (%)	Overall teacher participation (%)	Recommended rating
Alberta (Canada)*	122	1 077	9 991	51.8	62.6	83.0	52.0	Fair
Australia*	233	3 573	116 679	50.3	76.6	77.7	59.6	Fair
Austria	246	4 255	45 869	85.9	88.8	84.4	75.0	Good
Belgium*	302	5 257	34 442	86.0	95.1	86.9	82.6	Good
Flemish Community (Belgium)*	182	3 122	18 615	80.0	91.0	84.4	76.8	Good
French Community (Belgium)	120	2 135	15 827	93	100	89.7	89.7	Fair
Brazil	185	2 447	568 510	89.9	96.6	94.9	91.6	Good
Bulgaria	200	2 862	21 208	97.1	100.0	98.3	98.3	Good
Ciudad Autónoma de Buenos Aires (Argentina)	130	2 099	10 218	81.3	86.7	88.6	76.8	Good
Chile	179	1 963	55 969	82.6	91.5	94.3	86.2	Good
Colombia*	154	2 398	164 225	73.9	77.4	93.4	72.3	Fair
Croatia	188	3 358	15 762	95.4	96.2	87.0	83.7	Good
Cyprus[1]	88	1 611	3 860	89.8	89.8	90.3	81.0	Good
Czech Republic	219	3 447	42 348	100.0	100.0	93.8	93.8	Good
Denmark*	141	2 001	22 475	51.1	72.0	86.8	62.5	Fair
England (United Kingdom)	149	2 376	193 134	72.7	81.5	83.6	68.1	Fair
Estonia	195	3 004	7 354	86.6	100.0	95.2	95.2	Good
Finland	148	2 851	18 938	100.0	100.0	96.2	96.2	Good
France*	176	3 006	197 013	87.3	87.8	88.1	77.3	Good
Georgia*	192	3 101	38 195	99.5	99.5	95.8	95.3	Good
Hungary*	189	3 245	44 018	94.9	97.7	95.0	92.8	Good
Iceland*	123	1 292	1 883	90.4	90.4	75.8	68.5	Good
Israel*	172	2 627	32 603	85.3	87.3	84.9	74.2	Good
Italy*	191	3 612	190 447	92.8	99.1	93.8	93.0	Good
Japan	196	3 555	230 558	92.4	99.5	99.0	98.5	Good
Kazakhstan	331	6 566	195 383	100.0	100.0	99.8	99.8	Good
Korea	163	2 931	75 654	70.5	81.5	92.2	75.1	Fair

Participating country/economy	Number of participating schools	Number of participating teachers	Estimated size of teacher population	School participation before replacement (%)	School participation after replacement (%)	Teachers' participation in participating schools (%)	Overall teacher participation (%)	Recommended rating
Latvia	135	2 315	12 003	77.1	91.2	87.9	80.2	Good
Lithuania	195	3 759	19 848	100.0	100.0	97.4	97.4	Good
Malta	55	1 656	1 941	94.8	94.8	86.5	82.0	Good
Mexico	193	2 926	254 794	90.4	96.3	94.3	90.8	Good
Netherlands*	116	1 884	66 672	56.7	79.5	80.9	64.3	Fair
New Zealand*	185	2 257	23 227	62.8	79.5	79.6	63.3	Fair
Norway*	185	4 154	21 828	77.4	92.6	83.2	77.0	Good
Portugal	200	3 676	39 703	97.9	100.0	92.7	92.7	Good
Romania	199	3 658	66 039	100.0	100.0	98.3	98.3	Good
Russian Federation*	230	4 011	646 405	98.7	100.0	99.9	99.9	Good
Saudi Arabia*	179	2 744	99 661	89.7	89.7	86.0	77.1	Good
Shanghai (China)*	198	3 976	38 902	100.0	100.0	99.5	99.5	Good
Singapore	169	3 280	11 544	98.2	100.0	99.2	99.2	Good
Slovak Republic	176	3 015	24 746	82.4	88.9	95.4	84.7	Good
Slovenia	132	2 094	7 422	82.2	88.0	91.5	80.5	Good
South Africa	170	2 046	92 127	92.3	92.9	89.7	83.3	Good
Spain*	399	7 407	186 171	99.5	100.0	94.6	94.6	Good
Sweden	180	2 782	31 421	89.1	93.9	81.3	76.3	Good
Chinese Taipei	200	3 835	53 208	99.0	99.0	97.2	96.2	Good
Turkey	196	3 952	277 187	99.0	99.0	98.5	97.5	Good
United Arab Emirates*	521	8 648	14 489	100.0	100.0	96.0	96.0	Good
United States*	165	2 560	1 144 751	60.1	76.8	89.6	68.8	Fair
Viet Nam	196	3 825	295 033	100.0	100.0	96.3	96.3	Good

1. See endnotes 1 and 2 for Table 10.5.

Notes: A school was deemed a participating school if at least 50% of the selected teachers returned their respective questionnaires.

Alberta (Canada): because non-response bias analysis showed no evidence of a high risk of school non-response bias, Alberta's rating was upgraded from "poor" to "fair". TALIS was conducted as a new Collective Bargaining Agreement for teachers was being negotiated.

Australia: Australia's data collection window extended into the following school year.

Belgium and Flemish Community (Belgium): entries on the sampling frame were administrative units and not "schools" as they are usually defined. Because a "school" may comprise one or several administrative units, the principal would have been reporting for the school, not just the selected administrative unit. Users, therefore, need to exercise care when analysing the school-level statistics.

French Community (Belgium): The sample size is lower than the minimum number of schools required for TALIS, namely, 150, unless a census of all schools is conducted.

Colombia: non-response bias analysis showed no evidence of a high risk of school non-response bias.

Denmark: because non-response bias analysis showed no evidence of a high risk of school non-response bias, Denmark's rating was upgraded from "poor" to "fair". Because some translation issues could still exist in the trend items, users need to exercise caution when comparing results across TALIS cycles.

France: Item TQ-33b and TQ-33d were dropped because of an inaccurate translation. Item TQ-55 was dropped because of an inaccurate translation of the categories.

Georgia: the overall quality of the translation was deemed questionable. Translation issues could therefore still exist in the Georgian and Azerbaijani instruments that could detrimentally affect the comparability of the data.

Hungary: items TQ-24, TQ-25, TQ-26 and TQ-28 were withdrawn at Hungary's request because the wording was not sufficiently clear to ensure non-misinterpretation of the data.

Iceland: because Iceland missed 75% participation by only 1 school, its rating was upgraded from "poor" to "fair".

Israel: ultra-orthodox schools were removed post-facto because of very low responses rates, making coverage identical to that of TALIS 2013. Because translation issues could still exist in the trend items, users need to exercise caution when comparing results across TALIS cycles.

Italy: because translation issues could still exist in the trend items, users need to exercise caution when comparing results across TALIS cycles.
Netherlands: the Netherlands began its data collection six weeks earlier than the other Northern Hemisphere countries/economies and had an extended data collection window. Because an unapproved collection protocol resulted in the inclusion of some 50 "national" schools that were not included in the international dataset but were left on the national dataset, participation rates were computed on the international dataset.
New Zealand: coverage was extended to small schools (four or fewer teachers). While the impact on the target population of teachers was negligible, the impact on the target population of principals is important because, compared to TALIS 2013, the target population of teachers nearly doubled in size. Comparison of TALIS 2018 data with TALIS 2013 data should, therefore, be restricted to the 2013 coverage.
Norway: item TQ-42p was withdrawn on Norway's request because of a problematic national adaptation that could have led to misinterpretation of the data.
Russian Federation: Moscow was excluded from TALIS 2018. Item TQ-10 b was dropped because of an inaccurate translation. Item TQ-34 was dropped because of an error in the layout of the questionnaires that could have led to misinterpretation of the data.
Saudi Arabia: two provinces bordering Yemen were excluded.
Shanghai (China): item TQ-17 was dropped because of an inaccurate translation.
Spain: item TQ-03 was dropped because of an inaccurate translation.
United Arab Emirates: Comparisons with TALIS 2013 must be limited to Abu Dhabi; data from Abu Dhabi were not adjudicated independently from those of the UAE. Because of the selection of multi-level schools, the principal data were copied from the original ISCED level 2 principal questionnaire to the ISCED level 1 and ISCED level 3 corresponding forms, except for item PQ-17.
Source: OECD TALIS 2018 Database.

Table 10.7. ISCED level 3: Principals' participation and recommended ratings

Participating country/economy	Number of participating principals	Estimated size of school population	Principals' participation before replacement (%)	Principals' participation after replacement (%)	Recommended rating
Alberta (Canada)*	115	606	51.8	59.6	Fair
Brazil	187	27 140	91.4	97.5	Good
Croatia	145	391	96.7	96.7	Good
Denmark*	96	372	58.3	70.8	Fair
Portugal*	195	834	98.0	99.5	Good
Slovenia*	103	148	69.6	69.6	Fair
Sweden*	174	1 160	91.6	93.8	Good
Chinese Taipei	151	496	100.0	100.0	Good
Turkey	448	9 256	98.0	98.0	Good
United Arab Emirates*	366	408	89.7	89.7	Good
Viet Nam	199	2 899	100.0	100.0	Good

Notes: A school was deemed a participating school if the principal returned his or her questionnaire.
Alberta (Canada): because non-response bias analysis showed no evidence of a high risk of school non-response bias, Alberta's rating was upgraded from "poor" to "fair". TALIS was conducted as a new Collective Bargaining Agreement for teachers was being negotiated.
Denmark: because non-response bias analysis showed no evidence of a high risk of school non-response bias, Denmark's rating was upgraded from "poor" to "fair". Items PQ-39b and PQ-39c were dropped because of an inaccurate translation.
Portugal: Part B of item PQ-15 was dropped because of an inaccurate translation.
Slovenia: Slovenia missed 75% participation by 0.5% of a principal, which led to the recommendation to upgrade Slovenia's rating from "poor" to "fair".
Sweden: item PQ-07a was dropped because of an inaccurate translation.
United Arab Emirates: Comparisons with TALIS 2013 must be limited to Abu Dhabi; data from Abu Dhabi were not adjudicated independently from those of the UAE. Because of the selection of multi-level schools, the principal data were copied from the original ISCED level 2 principal questionnaire to the ISCED level 1 and ISCED level 3 corresponding forms, except for item PQ-17.

Source: OECD TALIS 2018 Database.

Table 10.8. ISCED level 3: Teachers' participation and recommended ratings

Participating country/economy	Number of participating schools	Number of participating teachers	Estimated size of teacher population	School participation before replacement (%)	School participation after replacement (%)	Teacher participation in participating schools (%)	Overall teacher participation (%)	Recommended rating
Alberta (Canada)*	112	1 094	7 819	51.6	56.6	80.2	45.4	Fair
Brazil	186	2 828	421 593	92.3	97.4	94.5	92.0	Good
Croatia	147	2 661	14 818	97.9	97.9	89.7	87.9	Good
Denmark	111	1 670	16 726	72.2	85.6	84.7	72.4	Fair
Portugal	195	3 551	36 188	99.0	99.7	91.3	91.0	Good
Slovenia	119	2 200	5 393	80.4	80.4	87.8	70.6	Good
Sweden	181	2 933	26 891	95.3	97.8	81.7	79.9	Good
Chinese Taipei	148	2 800	41 220	98.1	98.1	95.8	94.1	Good
Turkey	457	8 342	252 277	100.0	100.0	98.0	98.0	Good
United Arab Emirates*	405	6 118	10 143	99.3	99.3	95.7	95.0	Good
Viet Nam	199	3 884	175 061	100.0	100.0	97.7	97.7	Good

Notes: A school was deemed a participating school if at least 50% of the selected teachers returned their respective questionnaires.
Alberta (Canada): because non-response bias analysis showed no evidence of a high risk of school non-response bias, Alberta's rating was upgraded from "poor" to "fair". TALIS was conducted as a new Collective Bargaining Agreement for teachers was being negotiated.
United Arab Emirates: Comparisons with TALIS 2013 must be limited to Abu Dhabi; data from Abu Dhabi were not adjudicated independently from those of the UAE. Because of the selection of multi-level schools, the principal data were copied from the original ISCED level 2 principal questionnaire to the ISCED level 1 and ISCED level 3 corresponding forms, except for item PQ-17.
Source: OECD TALIS 2018 Database.

10.5. Adjudicating the TALIS-PISA samples

Sampling of schools for the TALIS-PISA link is described in Chapter 5 of this report. In summary, a sample of 150 schools (unless discussions with the NPM led to a different size) was drawn randomly from the sample of schools drawn for PISA. As the PISA data collection proceeded, the set of (original sample or replacement) schools participating in PISA emerged, and thus the set of schools where the TALIS-PISA link should be administered. The distribution of the TALIS Principal Questionnaire and of the TALIS Teacher Questionnaire to a sample of twenty "PISA teachers" (i.e. teachers of 15-year-old students) could then go ahead in each of the schools that had participated in PISA and also sampled for the TALIS-PISA link.

The school and teacher participation rates for the TALIS-PISA link are computed as they are for the ISCED levels (see Chapter 9 for details). Since the TALIS-PISA link sample is a random subsample of the PISA sample of schools, the TALIS-PISA school weights (or school weight component of the teacher weight) refer back to the original PISA population.

The adjudication of the TALIS-PISA samples had to wait until the PISA samples had been adjudicated, as the former was dependent on the latter to allow the final determination of

the recommended rating. Even if the recommended rating for TALIS-PISA link, solely based on what happened during the preparation and collection of the TALIS-PISA link, were "good", if the data or samples from PISA ware to be rated less favourably, the matched file could not be adjudicated as "good". It could only be adjudicated as the weakest, at most, of either rating.

Table 10.9 and Table 10.10 display the participation rates for the principals and teachers in each country/economy that participated in the TALIS-PISA Link.

Table 10.9. TALIS-PISA Link: Principal's participation and recommended ratings

Participating country/economy	Number of schools sub-sampled	Number of eligible schools	Number of participating principals	Principals' participation before replacement (%)	Principals' participation after replacement (%)	Recommended rating
Australia	150	148	131	66.9	88.5	Fair
Ciudad Autónoma de Buenos Aires (Argentina)	104	81	77	88.9	95.1	Good
Colombia	162	162	153	91.4	94.4	Good
Czech Republic	190	182	175	96.8	96.8	Good
Denmark	150	150	83	52.0	57.8	Poor
Georgia	150	144	124	86.1	86.1	Good
Malta	63	50	47	94.0	94.0	Good
Turkey	150	147	142	96.6	96.6	Good
Viet Nam	150	115	115	100.0	100.0	Good

Table 10.10. TALIS-PISA Link: Teacher's participation and recommended ratings

Participating country/ economy	School sample size	Number of eligible schools	Number of participating schools	Number of participating teachers	Estimated size of teacher population	School participation before replacement (%)	School participation after replacement (%)	Teachers' participation in participating schools (%)	Overall teacher participation (%)	Recommended rating
Australia	150	148	131	2 233	34 598	65.6	88.8	93.4	82.9	Good
Ciudad Autónoma de Buenos Aires (Argentina)	104	81	73	1 194	2 673	87.7	90.1	85.1	76.7	Good
Colombia	162	162	154	2 242	179 900	91.4	95.1	94.6	89.9	Good
Czech Republic	190	182	173	2 592	62 040	95.1	95.1	94.8	90.0	Good
Denmark	150	150	100	1 079	20 777	65.8	70.0	85.9	60.2	Poor
Georgia	150	144	132	1 923	24 592	93.1	93.1	94.3	87.8	Good
Malta	63	50	44	857	1 102	88.0	88.0	88.6	78.0	Good
Turkey	150	147	142	3 591	236 904	97.9	97.9	99.6	97.5	Good
Viet Nam	150	115	114	2 170	250 645	99.3	99.3	98.4	97.7	Good

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Notes

[1] Survey option refers to ISCED level 1, ISCED level 2, and ISCED level 3. The TALIS-PISA link data could not be adjudicated at that time.

[2] Questionnaire type refers to the teacher questionnaire or the principal questionnaire.

[3] At their last meeting held in Paris in November 2018, the technical advisory group recommended that data from countries that had not reached 50% participation be nonetheless weighted and displayed in tables but not used in the computation of international averages or models.

[4] Table 10.3 to Table 10.8 display the participation-rate estimates that were the most favourable for the adjudication rating. The most favourable estimates could have been weighted or unweighted depending on the characteristics of the country/economy, the teacher and principal population and the educational level.

Chapter 11. Validation of scales and construction of scale scores

To enable reporting on a latent trait (sometimes referred to as a construct) or other abstract trait, some questions in the TALIS 2018 questionnaires were combined into an index or scale. This chapter explains how the indices were created and describes the methodology used to validate scales and construct scale scores. It details latent trait evaluation and the procedure involved in computing scale scores and illustrates the implications of the evaluation results for using scale scores in further analyses. The chapter also describes the possibilities and limitations of using scale scores for cross-country/economy comparisons and presents each scale in more detail together with its statistical properties.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

11.1. Overview

The TALIS questionnaires include numerous items pertaining to, for example, school characteristics and principals' and teachers' attitudes, perceptions and practices. Use of suitable statistical procedures allows for the combination of responses to these items into indices or scales. In line with previous TALIS cycles, two types of combinations were considered for TALIS 2018:

- Simple indices (e.g. ratios), constructed through simple arithmetical transformations or by recoding one or more items.
- Scale scores, derived using latent modelling within the framework of confirmatory factor analysis (CFA).

CFA treats items as indicators of unobservable personal characteristics of respondents, such as self-efficacy or beliefs, and uses combinations of items to develop a model of the latent construct. After testing and confirming a stable latent construct model, scale scores may be estimated that serve as numeric values for the latent constructs.

While simple indices enhance the analysis of observable (manifest) characteristics, such as student-teacher ratio, scales enable analysis of non-observable (latent) characteristics such as attitudes or other personal traits. This chapter begins by outlining the procedures used to compute simple indices. It then describes the procedures involved in scale evaluation and scale score estimation. A detailed description of the scales, including the items used to compose each scale and the results of scale evaluation, follows. The chapter ends by exploring the implications of these results for further analyses, especially in relation to cross-country/economy comparisons.

11.2. Computation of simple indices

This section describes the construction of simple indices that are used in multiple tables of the OECD final report (OECD, 2019[1]) and are part of the publicly available international database. These indices were constructed through arithmetical transformation or recoding of one or more items. More details are provided in Chapter 12.

11.2.1. Ratios and recoded variables

Student-teacher ratio

The student-teacher ratio was calculated at the school-level based on the information derived from school principals' responses to questions about the number of currently employed teachers[1] (headcounts) and the total number of enrolled students (headcounts) from all grades. Thus, the index reflects the overall student-teacher ratio in each school rather than being restricted to the target population. The ratio (STRATIO) is derived by dividing the total number of students enrolled (TC3G16) by the number of employed teachers in a given school (TC3G13A).

Ratio of teachers and personnel for pedagogical support

The ratio of teachers and personnel for pedagogical support was calculated at the school level based on the information derived from school principals' responses to a question about the number of employed teachers (headcounts; see endnote 1) and the number of personnel for pedagogical support.[2] Thus, the index reflects the overall ratio of teachers

and personnel for pedagogical support in each school rather than being restricted to the target population. The ratio (TPRATIO) was derived by dividing the number of teachers (TC3G13A) by the number of personnel for pedagogical support (TC3G13B).

Ratio of teachers and school administrative or management personnel

The ratio of teachers and school administrative or management personnel was calculated at the school level and was based on information derived from school principals' responses to a question about the number of employed teachers[2] (headcounts) and the number of school administrative or management personnel.[3] Thus, the index reflects the overall ratio of teachers and school administrative or management personnel in each school rather than being restricted to the target population. The ratio (TARATIO) was derived by dividing the number of teachers (TC3G13A) by the number of school administrative or management personnel (TC3G13C + TC3G13D).

School location in urban or rural areas – collapsed variable

The school location variable was calculated by using the responses of school principals to the question about the size of the city in which the school was located (TC3G10). To calculate the new index (SCHLOC), the second and third categories (3 001 to 15 000 people; 15 001 to 100 000 people) were collapsed together as were the fourth and fifth categories (100 001 to 1 000 000; more than 1 000 000 people).

Principal age groups – categorised variable

The principal age group variable was calculated by using the responses of school principals to the question about their age (TC3G02). To calculate the new index (PRAGEGR), the values from the original question were recoded into four categories. The first category includes all principals under the age of 40, the second category includes all principals between 40 and 49 years of age, the third category all principals between 50 and 59, and the fourth category all principals 60 years of age and older.

Teacher age groups – categorised variable

The teacher age group variable was calculated by using the responses of teachers to the question about their age (TT3G02). To calculate the new index (TCHAGEGR), the values from the original question were recoded into six categories. The first category includes all teachers under the age of 25, the second category includes all teachers between 25 and 29 years of age, the third category all teachers between 30 and 39, the fourth category all teachers between 40 and 49, the fifth category all teachers between 50 and 59, and the sixth category all teachers 60 years of age and older.

Number of enrolled students – categorised variable

The number of enrolled students variable was calculated using the responses of principals to the question about the current school enrolment (TC3G16). To calculate the new index (NENRSTUD), the values from the original question were recoded into five categories. The first category includes all schools with fewer than 250 students, the second category includes schools with 250 to 499 students, the third category includes schools with 500 to 749 students, the fourth category includes schools with 750 to 999 students, and the fifth category includes schools with 1000 and more students.

11.2.2. Simple categorisation indices and their parameters

In addition to scale scores developed through CFA, indices for school resources and school autonomy were created using recodings of the frequencies of the items, as CFA models were not appropriate for the measured items comprising these indices.[4]

School autonomy: School autonomy for staffing (T3PAUTS); School autonomy for budgeting (T3PAUTB); School autonomy for educational policies (T3PAUTP), School autonomy for instructional policies (T3PAUTI); School autonomy for curriculum (T3PAUTC)

To describe the extent of school autonomy in decision making, indices were derived from question TC3G20 of the school principal questionnaire. Five simple indices were formed: school autonomy for staffing (T3PAUTS), school autonomy for budgeting (T3PAUTB), school autonomy for educational policies (T3PAUTP), school autonomy for instructional policies (T3PAUTI), and school autonomy for curriculum (T3PAUTC).

School autonomy indices were created using 11 items, each of which had five response options. School principals had to indicate who, among a range of stakeholders, had a considerable responsibility in making decisions relating to tasks listed in the questionnaire. Considerable responsibility could be attributed to one or more of the following: the principal, other members of the <school management team>, teachers (not a part of the <school management team>), <school governing board> or <local, municipality/regional, state, or national/federal>. For a particular task, the extent of school-level autonomy was determined by whether considerable responsibility lay at the school level (i.e. with the principal, other members of the <school management team>, teachers (not as a part of the <school management team>) and the <school governing board>), with other authorities (i.e. <local, municipality/regional, state, or national/federal>) or was shared by both groups. Each response option (checked/not checked) was a variable of its own. The 11 items describing the tasks produced 55 variables in total. Table 11.1 lists the indices with the corresponding items.

Table 11.1. Measured items for school autonomy

T3PAUTS: School autonomy for staffing	
TC3G20: Regarding this school, who has a significant responsibility for the following tasks? A "significant responsibility" is one where an active role is played in decision making. Please mark as many choices as appropriate in each row.	
Response options: Checked (1), Not checked (2)	
TC3G20A: Appointing or hiring teachers	
TC3G20A1	Principal
TC3G20A2	Other members of the school management team
TC3G20A3	Teachers (not as a part of the school management team)
TC3G20A4	School <governing board>
TC3G20A5	<local, municipality/regional, state, or national/federal> authority
TC3G20B: Dismissing or suspending teachers from employment	
TC3G20B1	Principal
TC3G20B2	Other members of the school management team
TC3G20B3	Teachers (not as a part of the school management team)
TC3G20B4	School <governing board>
TC3G20B5	<local, municipality/regional, state, or national/federal> authority

T3PAUTB: School autonomy for budgeting	
TC3G20: Regarding this school, who has a significant responsibility for the following tasks? A "significant responsibility" is one where an active role is played in decision making. Please mark as many choices as appropriate in each row.	
Response options: Checked (1), Not checked (2)	
TC3G20C: Establishing teachers' starting salaries, including setting pay scales	
TC3G20C1	Principal
TC3G20C2	Other members of the school management team
TC3G20C3	Teachers (not as a part of the school management team)
TC3G20C4	School <governing board>
TC3G20C5	<local, municipality/regional, state, or national/federal> authority
TC3G20D: Determining teachers' salary increases	
TC3G20D1	Principal
TC3G20D2	Other members of the school management team
TC3G20D3	Teachers (not as a part of the school management team)
TC3G20D4	School <governing board>
TC3G20D5	<local, municipality/regional, state, or national/federal> authority
TC3G20E: Deciding on budget allocations within the school	
TC3G20E1	Principal
TC3G20E2	Other members of the school management team
TC3G20E3	Teachers (not as a part of the school management team)
TC3G20E4	School <governing board>
TC3G20E5	<local, municipality/regional, state, or national/federal> authority
T3PAUTP: School autonomy for educational policies	
TC3G20: Regarding this school, who has a significant responsibility for the following tasks? A "significant responsibility" is one where an active role is played in decision making. Please mark as many choices as appropriate in each row.	
Response options: Checked (1), Not checked (2)	
TC3G20F: Establishing student disciplinary policies and procedures	
TC3G20F1	Principal
TC3G20F2	Other members of the school management team
TC3G20F3	Teachers (not as a part of the school management team)
TC3G20F4	School <governing board>
TC3G20F5	<local, municipality/regional, state, or national/federal> authority
TC3G20G: Establishing student assessment policies, including <national/regional> assessments	
TC3G20G1	Principal
TC3G20G2	Other members of the school management team
TC3G20G3	Teachers (not as a part of the school management team)
TC3G20G4	School <governing board>
TC3G20G5	<local, municipality/regional, state, or national/federal> authority
TC3G20H: Approving students for admission to the school	
TC3G20H1	Principal
TC3G20H2	Other members of the school management team
TC3G20H3	Teachers (not as a part of the school management team)
TC3G20H4	School <governing board>
TC3G20H5	<local, municipality/regional, state, or national/federal> authority
T3PAUTI: School autonomy for instructional policies	
TC3G20: Regarding this school, who has a significant responsibility for the following tasks? A "significant responsibility" is one where an active role is played in decision making. Please mark as many choices as appropriate in each row.	
Response options: Checked (1), Not checked (2)	
TC3G20F: Establishing student disciplinary policies and procedures	
TC3G20F1	Principal
TC3G20F2	Other members of the school management team

TC3G20F3	Teachers (not as a part of the school management team)
TC3G20F4	School <governing board>
TC3G20F5	<local, municipality/regional, state, or national/federal> authority
TC3G20G: Establishing student assessment policies, including <national/regional> assessments	
TC3G20G1	Principal
TC3G20G2	Other members of the school management team
TC3G20G3	Teachers (not as a part of the school management team)
TC3G20G4	School <governing board>
TC3G20G5	<local, municipality/regional, state, or national/federal> authority
TC3G20J: Determining course content, including <national/regional> curricula	
TC3G20J1	Principal
TC3G20J2	Other members of the school management team
TC3G20J3	Teachers (not as a part of the school management team)
TC3G20J4	School <governing board>
TC3G20J5	<local, municipality/regional, state, or national/federal> authority
TC3G20K: Deciding which courses are offered	
TC3G20K1	Principal
TC3G20K2	Other members of the school management team
TC3G20K3	Teachers (not as a part of the school management team)
TC3G20K4	School <governing board>
TC3G20K5	<local, municipality/regional, state, or national/federal> authority
T3PAUTC: School autonomy for curriculum	
TC3G20: Regarding this school, who has a significant responsibility for the following tasks? A "significant responsibility" is one where an active role is played in decision making. Please mark as many choices as appropriate in each row.	
Response options: Checked (1), Not checked (2)	
TC3G20I: Choosing which learning materials are used	
TC3G20I1	Principal
TC3G20I2	Other members of the school management team
TC3G20I3	Teachers (not as a part of the school management team)
TC3G20I4	School <governing board>
TC3G20I5	<local, municipality/regional, state, or national/federal> authority
TC3G20J: Determining course content, including <national/regional> curricula	
TC3G20J1	Principal
TC3G20J2	Other members of the school management team
TC3G20J3	Teachers (not as a part of the school management team)
TC3G20J4	School <governing board>
TC3G20J5	<local, municipality/regional, state, or national/federal> authority
TC3G20K: Deciding which courses are offered	
TC3G20K1	Principal
TC3G20K2	Other members of the school management team
TC3G20K3	Teachers (not as a part of the school management team)
TC3G20K4	School <governing board>
TC3G20K5	<local, municipality/regional, state, or national/federal> authority

The indices were computed in the following way:

1. A new variable for each item was created (each item had five response options, one for each decision maker). If at least one of the response options was checked, the variable was coded as 0.
2. If, for a given item, from the first four response options (describing decision making as being at the school level) none were checked, and the fifth response option (indicating decision making being the responsibility of other authorities) was

checked, then the new variable was coded as -1. Thus, if the principal checked only the "other authority" response option, the task was considered to be an external responsibility (not autonomous).

3. If the school principal checked response options from both groups (decision making at the school level and decision making by other authorities), the responsibility was considered to be shared, and the value remained 0 (see point 1).
4. If one of the first four response options (the decision making being at the school level) was checked, and the fifth response option (decision making being other authority responsibility) was not checked, the new variable was coded as +1. Therefore, if the principal selected at least one of the four school-level responsibility options and no other authority responsibility option, the task was considered to be a school responsibility (autonomous).
5. The newly created variables were recoded: -1 was recoded to 1, 0 to 2, +1 to 3.
6. For each index, if more than half of the newly created variables were classified as autonomous, the school was classified as autonomous. If more than half of the corresponding tasks were classified as not autonomous, the school was classified as not autonomous. If neither criterion was met, the school was classified as mixed. The final indices were coded 1 for "no autonomy", 2 for "mixed autonomy", and 3 for "autonomy".

School resources: Lack of pedagogical personnel (T3PLACPE); Lack of resources (T3PLACRE); Lack of material resources (T3PLACMA)

To describe the level of resources available in schools, indices were derived from 10 items in question TC3G29 of the principal questionnaire. The question asked school principals to indicate the extent ("not at all", "to some extent", "quite a bit", "a lot") to which a shortage or lack of resources in a range of areas hindered the school's capacity to provide quality instruction. Table 11.2 presents the corresponding items for the three indices: lack of pedagogical personnel (T3PLACPE), lack of resources (T3PLACRE), and lack of material resources (T3PLACMA).

Table 11.2. Measured items for school resources

T3PLACPE: Lack of pedagogical personnel	
TC3G29 To what extent is this school's capacity to provide quality instruction currently hindered by any of the following issues?	
Response options: "Not at all" (1), "To some extent" (2), "Quite a bit" (3), "A lot" (4)	
TC3G29A	Shortage of qualified teachers
TC3G29B	Shortage of teachers with competence in teaching students with special needs
TC3G29C	Shortage of vocational teachers
T3PLACRE: lack of resources	
TC3G29 To what extent is this school's capacity to provide quality instruction currently hindered by any of the following issues?	
Response options: "Not at all" (1), "To some extent" (2), "Quite a bit" (3), "A lot" (4)	
TC3G29D	Shortage or inadequacy of instructional materials (e.g. textbooks)
TC3G29E	Shortage or inadequacy of digital technology for instruction (e.g. software, computers, tablets, smart boards)
TC3G29F	Insufficient Internet access
TC3G29G	Shortage or inadequacy of library materials
TC3G29I	Shortage or inadequacy of instructional space (e.g. classrooms)
TC3G29J	Shortage or inadequacy of physical infrastructure (e.g. classroom furniture, school buildings, heating/cooling, and lighting)
TC3G29M	Shortage or inadequacy of necessary materials to train vocational skills
T3PLACMA: lack of material resources	
TC3G29 To what extent is this school's capacity to provide quality instruction currently hindered by any of the following issues?	
Response options: "Not at all" (1), "To some extent" (2), "Quite a bit" (3), "A lot" (4)	
TC3G29D	Shortage or inadequacy of instructional materials (e.g. textbooks)
TC3G29E	Shortage or inadequacy of digital technology for instruction (e.g. software, computers, tablets, smart boards)
TC3G29F	Insufficient Internet access
TC3G29G	Shortage or inadequacy of library materials

Source: OECD, TALIS database.

The indices were computed in the following way:

1. The responses were recoded so that the first two (1 – "not at all" and 2 – "to some extent") and the last two (3 – "quite a bit" and 4 – "a lot") response categories were collapsed for all the items.
2. If all responses to the items included in the particular index were "not at all" or "to some extent", the index had a value of 1.
3. If all responses to the component variables for the particular index were "quite a bit" or "a lot", the index had a value of 3.
4. All other combinations were coded as 2.

The final indices were coded 1 for "not a problem", 2 for "a bit of a problem", and 3 for "a problem".

11.3. Scaling procedures

TALIS aims to collect robust and rich information about teachers' and principals' characteristics as well as about their schools. Many of the specific personal traits, for instance, teachers' attitudes and self-efficacy, cannot be observed directly, but only through expressed opinions or intended and observed behaviour. Such traits are considered latent, that is, not directly observable. In large-scale studies, sets of items drawn from the studies' instruments are used to estimate these latent traits. The instruments used in the TALIS surveys are the teacher and principal questionnaires, the items of which are designed to reflect specific facets of the envisaged latent traits. The procedure used to combine

responses to these questions into a single scale score representing the latent construct of interest is called *scaling*.[5]

11.3.1. Scale development and methods

TALIS 2018 scale development work began with a theoretical identification of items that seemed indicative of the specified latent constructs. These identifications were based on lessons learned from prior TALIS cycles (particularly with respect to the repeated constructs), research theories from the respective fields, and expert knowledge on item and scale construction. These steps served as an initial validity check of the scales (Messick, 1995[2]). The data intended to represent constructs and to be used for scale score computation were subjected to extensive quality checks that included the use of item-level statistics to check the distribution of missing data, the number of responses per category and the shape of response distributions and reliability analyses.

Field trial data were used to evaluate the latent constructs and then modify them for the main survey. The TALIS International Consortium, the Questionnaire Expert Group (QEG) and the OECD then used the results from these field trial analyses to make decisions about item and scale modifications. In some instances, the decision was to not create scale scores, but instead to report the values at the level of individual items only. In addition, some items were removed from the instruments after the field trial to reduce the length of the questionnaires (for details on this matter, see Chapter 3). All decisions considered the state of instrument development at the time of the field trial and the low number of cases in the field trial data.

Analysis of the main study data, items and scales involved another thorough evaluation of the extent to which each scale measured its construct consistently (construct reliability) (Lyubomirsky and Lepper, 1999[3]) and the extent to which the scale measured the same construct across the participating countries/economies (construct invariance) (Cheung and Rensvold, 2002[4]; Vandenberg and Lance, 2000[5]). The process used for scale evaluation and scale score calculation in the main survey encompassed the following steps:

1. Descriptive and internal consistency analyses
    a. Item analysis of missingness
    b. Item analysis of distribution
    c. Item analysis of item-total correlation
    d. Initial reliability checks.
2. Model analysis: CFA
    a. Model analysis of the predefined construct, involving a joint analysis of data from all participating countries/economies (CFA on a pooled sample)[6]
    b. Model analysis at the country/economy level (separate CFA for each analysed ISCED population in each country/economy).
3. Measurement invariance testing
    a. Comparability of the constructs within ISCED levels across countries/ economies (i.e. measurement invariance testing conducted across countries/economies within each ISCED level)

   b. Comparability of the constructs within countries/economies across ISCED levels (i.e. measurement invariance testing conducted across ISCED levels within each country/economy).

4. Final scale modelling
   a. Modelling of the constructs to account for the invariance levels evident for each cross-country/economy within ISCED level and cross-ISCED level within country/economy measurement invariance result[7]
   b. Reliability analysis of the final models.
5. Scale score computation
   a. Scale score estimation
   b. Scale score standardisation
   c. Composite scale scores

Each of the steps mentioned above is described in more detail in the following (sub)sections. In the subsection titled *Descriptive and internal consistency analyses*, the initial descriptive analysis is described together with the reliability analysis from Steps 1d and 4b. The next subsections, *Model analysis* and *Measurement invariance testing: across countries/economies and across ISCED levels*, describe procedures from the model analysis (Steps 2a and 2b) and measurement invariance testing (Steps 3a and 3b) respectively. The subsection *Final scale modelling* describes how initial analysis led to the final models and parameter estimates (4a). The section *Scale scores computation* is divided into three subsections. The first describes the scale score estimation from Step 5a, the second the scale score standardisation from Step 5b, and the third describes the scale score computation for special types of scales from Step 5c, namely composite scales.

11.3.2. Scale evaluation

Descriptive and internal consistency analyses

As initial checks, items were analysed in relation to missingness, distribution, and corrected item-total correlation. In addition, Cronbach's alpha, as an initial reliability check, was calculated and evaluated. Where applicable, items were reverse coded, which meant that the higher the value on an item the higher the level of the latent construct.

Scale reliability was tested by examining the internal consistency of the scale. The weighted omega statistic was used to measure the reliability of the scales because it does not assume equal factor loadings (tau-equivalent measurement model) in the measurement model (Viladrich, Angulo-Brunet and Doval, 2017[6]; Zhang and Yuan, 2016[7]). Therefore, compared with Cronbach's alpha, the weighted omega is relatively unbiased when items exhibit unequal factor loadings for a single scale, which is true of all scales in TALIS 2018. The weighted omega value is equal to the square of factor score determinacy (FSD) obtained from the final model, which is an estimated correlation between the latent variable and the items (Beauducel, Harms and Hilger, 2016[8]). However, Mplus FSD is used only to calculate models with no binary items. For scales measured by binary items, Cronbach's alpha obtained from initial reliability checks is reported (step 1d).

To estimate the reliability of multidimensional scales (composite scales were computed as the mean of the standardised subscale; for details see the section *Recommendation for*

analysis and interpretation), the omega coefficients from the scale's subscales were used to calculate the stratified coefficient alpha as follows:

$$\gamma_{STRAT,\alpha} = 1 - \frac{\sum_i \sigma_i^2 (1 - \gamma_i)}{\sigma_c^2}$$

where $\gamma_{STRAT,\alpha}$ is the reliability of the composite/multidimensional scale; σ_i^2 is the variance of the *i*th subscale, or the variance of the standardised factor scores of this subscale; γ_i is the reliability of the *i*th subscale or the omega for this subscale; and σ_c^2 is the variance of the composite/multidimensional scale or the variance of the sum of the standardised factor scores of the subscales (He, 2010[9]).

Model analysis

Confirmatory factor analysis (CFA) was conducted to evaluate how well the actual empirical data reflected the predefined latent construct. CFA allows inference on the scale from the scale items by establishing associations between the two. The association between each item and the scale is described in a regression line (OECD, 2014[10]). Using the model fit indices as evaluation criteria (for further details, see Table 11.3), the specified (or theoretical) model of each scale is assessed with respect to its alignment to the empirical data (Hu and Bentler, 1999[11]).

Various procedures can be used to estimate the scale scores, including computation of a sum or mean score over all items that measure the same construct, computations based on classical test theory (CTT), structural equation modelling (SEM) using CFA, and computing person parameters based on item response theory (IRT). The results from these methods are typically highly correlated but are not completely congruent, and each method has its respective advantages and disadvantages.

In keeping with past TALIS cycles, scale score computation based on CFA was used during the current cycle of TALIS (OECD, 2014[10]; OECD, 2010[12]), as it remains a method that has a solid scientific basis and offers great flexibility, given the invariance results for TALIS scales. Also, when employed with certain modelling software (Mplus[8]), this form of computation is well equipped to deal with missing values.

Analysis during the TALIS 2018 cycle was based on the general SEM framework, where CFA is a specific type of model classified within this framework (Schreiber et al., 2006[13]). All constructs with ordinal response categories were scaled using continuous CFA (estimated using robust full-information maximum likelihood estimator on the matrix of Pearson's correlations), while constructs[9] with binary items were scaled using categorical CFA modelling (estimated using robust WLSMV[10] estimator on the pair-wise matrix of tetrachoric correlations). Design weights and replicate weights were used for all analyses, and weights were rescaled so that each country contributed equally to the estimates.[11] Some TALIS 2018 items had already been used in previous TALIS cycles to construct latent scale scores. Item selection for TALIS 2018 was conducted to maximise the overlap of items between TALIS 2018 and TALIS 2013 and thus allow for item level comparisons across cycles.

Given the increased emphasis on measurement invariance testing during the TALIS 2018 cycle (see below) compared to the previous cycles of TALIS, model fit for the current cycle was prioritised over comparability with the earlier cycles. Therefore, directly comparing the scale scores from TALIS 2018 with those of the past cycles is not recommended.

To evaluate overall performance, CFA was conducted on a pooled sample composed of data from all countries/economies for ISCED level 2 (the TALIS core target population surveyed by all participating countries/economies). The initial examination of the pooled CFA models of each scale was based on the model fit indices[12]. The models that passed the cut-off criteria (see Table 11.3) proceeded to further steps, while improvements were made to the models of the scales that originally failed to pass the cut-off values. Model improvements included, for example, changes to the model structure (e.g. item exclusion, and inclusion of residual covariances between specific items). These modifications were included in the models for all following steps.

Most pooled model improvements were suggested by the modification indices produced by the CFA implementation software. These reflect the approximate change to χ^2 if certain fixed/constrained parameters are freely estimated (Brown, 2006, p. 119[14]). To maintain a balance between improving the model and keeping the model as parsimonious as possible, only selected model re-specification resulting in the biggest (or, for some cases, second biggest) change to χ^2 were implemented and tested. For the same reason, cross loadings in multidimensional scales were implemented in rare cases but were generally avoided if other alternatives could bring significant improvements to the model. In certain cases, additional improvements were made to the models when testing for measurement invariance. Changes were made programmatically to the model that (1) should not bias the results and (2) do not change the content of the scale construct. These include, for example, fixing the negative residual variance for items in some scales to be positive and close to zero.

Most of the χ^2 based model modifications included correlations between single items (residual covariance). All scale modifications were accompanied by plausibility checks conducted by the scaling team, as well as by the QEG experts, thus acknowledging that changes to the model structure had relevant implications for scale content. In other words, items were only correlated if the content of the items reflected a plausible and substantive correlation.

In cases where the model did not show acceptable fit, even after improvements, exploratory factor analysis (EFA) was used to analyse scale dimensionality. If the analysis revealed multidimensionality, one of the following modifications was applied: (1) reducing the number of items in order to build a unidimensional construct as indicated by the pattern matrix provided by the oblimin rotation of the principal axis factoring[13] solution; (2) splitting the scale into two constructs as indicated by the EFA results; or (3) keeping the scale as unidimensional during further analysis if there were strong content-related or other reasons for doing so. The latter was relevant in those instances where theoretical arguments supportive of multidimensionality were absent. Multidimensional scales that were originally treated as unidimensional were re-specified and re-evaluated. Constructs that only marginally failed to pass the cut-off criteria were kept for further analysis but eventually dismissed if additional scale modifications did not succeed (see *Excluded scale(s)* sub-sections from the sections *Complex scales from the teacher questionnaire* and *Complex scales from the principal questionnaire*). For the current cycle, the use of EFA for model improvement did not provide any meaningful enhancement to the latent constructs. Therefore, no improvements were undertaken as a result of EFA information.

Scales that could not be improved through modifications were dropped from the analysis. If a scale was deleted it had a fragmented internal structure in which items did not fit together, meaning that either the scale was composed of several factors or poorly defined. In the latter case, it was assumed that the items failed to measure the predefined construct

and that the content validity of the scale was therefore low. Decisions made at this stage were discussed with the TALIS Consortium and the QEG.

During the second step, the CFA model was tested via use of country/economy-level data in each of the analysed populations (in all countries/economies for ISCED levels 1, 2 and 3, as applicable[14]). Improvements implemented in the pooled models were applied to these models. In total, 72 single-country/economy, single-ISCED level models were analysed for each scale.[15] The evaluation procedure for these models was very similar to that of the pooled model. If a model at the single-country/economy, single-ISCED level failed to meet the fit index cut-off criteria (Table 11.3), additional improvements for that specific population were implemented. If one of these scale models could not be improved, then that single-country/economy, single-ISCED level population was removed from further parameter estimation and included for the scale score construction that used fixed parameters from the final scale model.

Table 11.3 provides information on the cut-off criteria for the CFA model fit evaluation (Brown, 2015[15]; Chen, 2007[16]; DeVellis, 2003, pp. 94-96[17]; Hoyle, 2014[18]). It is important to stress that these statistical criteria were used for the decision-making process that was based on an iterative process involving content-related considerations between the IEA scaling team and the QEG members.

Table 11.3. Cut-offs for CFA model evaluation for TALIS 2018

Statistic/index	Description	Cut-offs
Missing total (%)	The percentage of missing values (out of those administered).	More than 80% of valid answers at the item level for each participating country/economy
Cronbach's alpha	Scale reliability index: internal consistency index. Higher values indicate greater internal consistency.	0.600-0.699 (acceptable) ⩾0.700 (good)
Omega	Scale reliability index: factor score determinacy (FSD) squared. Higher values suggest greater scale reliability.	0.600-0.699 (acceptable) ⩾0.700 (good)
Stratified coefficient alpha	Scale reliability index: internal consistency index for composite/multidimensional scales. Higher values indicate greater internal consistency.	0.600-0.699 (acceptable) ⩾0.700 (good)
Corrected item-total correlation	Correlation between the responses to an item and the observed total scores on all other items in the scale (the sum of all the other items). The correlation ranges between -1 and +1. Higher value suggests that the item has better discrimination power.	⩾0.300 (acceptable)
CFI (comparative fit index)	Index of the model-data goodness of fit. This compares the targeted factor structure model and the baseline model (all relationships fixed to zero). Higher value indicates a better model fit.	⩾ 0.900 (acceptable)
TLI (Tucker-Lewis index)	Index of model-data goodness of fit. This gives the distance between the targeted factor structure model and the baseline model as a proportion of the distance between the baseline and the target model. Higher value indicates a better model fit.	⩾ 0.900 (acceptable)
RMSEA (root mean square error approximation)	Index of the model-data misfit. The value indicates the degree of model misspecification. It approaches 0 as the fit of the model improves.	⩽ 0.080 (acceptable)
SRMR (standardized root mean square residual)	Index of the model-data misfit. The value indicates the degree of model misspecification in terms of the model average of squared residuals between the observed covariances and the model-implied covariances as well as differences in observed and model implied item intercepts. The value is provided in a standardised metric	⩽0.060 (acceptable)

Statistic/index	Description	Cut-offs
	ranging from 0 to 1, with smaller values indicating better model fit.	
WRMR (weighted root mean square residual)	Residual-based fit index (experimental fit statistic). This index is suitable for models with varying variances of sample statistics and when sample statistics are on different scales. It is also used with categorical outcomes and was used in TALIS as the model-data misfit for categorical CFA. Smaller values indicate a better model fit.	≤0.900 (acceptable)
Standardised factor loadings	These indicate the strength of the relationship between each item and the latent scale.	0.450-0.600 (moderate) ⩾ 0.600 (strong)

Notes: Cronbach's alpha, omega, and stratified coefficient alpha are all different estimators of the same reliability/internal consistency; therefore, the criteria are the same.
The cut-off criterion for the SRMR was less strict in TALIS 2013 (SRMR≤.1). To enhance alignment with the established cut-off criteria for model evaluation proposed in the literature (Hu and Bentler, 1999[11]; OECD, 2014[10]; Schermelleh-Engel, Moosbrugger and Müller, 2003[19]; Steiger, 1990[20]; Yu, 2002[21]), a stricter cut-off of SRMR was applied during TALIS 2018. This cut-off was justified because the scale construction in TALIS 2018 benefitted from prior TALIS cycles as well as from the field trial.
When the intercepts are fixed to either a very high or low value, the SRMR can be misleading. In these cases, the variances may be very low, resulting in an extremely large SRMR value (Asparouhov and Muthén, 2018[22]). Thus, decisions relating to the performance and the measurement invariance of the scale are primarily based on CFI, TLI, and RMSEA. SRMR was used for model evaluation if other fit indices revealed inconsistent results and in models with varying intercepts (configural and metric models).

Measurement invariance testing: across participating countries/economies and across ISCED levels

The TALIS 2018 data were used for analysis directed towards a cross national perspective focused on comparing results across the different participating countries/economies. Of crucial importance during any comparison of scales across groups (such as education systems, participating countries/economies, ISCED levels) is making sure that the scales are equivalent in meaning in each of the groups being compared. The extent to which the comparability of a scale among groups can be reached varies, and this has direct implications for which statistical calculations (e.g. regression, correlation or mean comparisons) should be used to analyse the scale score. The statistical procedure used to analyse the comparability of latent scales in different groups is called *measurement invariance testing* (Cheung, 1999[23]; Cheung and Rensvold, 2002[4]; Davidov, 2008[24]; Steenkamp and Baumgartner, 1998[25]; OECD, 2014[10]; Van de Vijver et al., 2019[26]). The TALIS 2018 scales were evaluated with respect to their equivalence (comparability) across participating countries/economies and ISCED levels, within the CFA framework. More details on the measurement invariance testing within the CFA framework can be found in (OECD, 2014[10])

It is important to remember that the construction of latent scales are based on associations between several items and the underlying latent construct and the mean structure of the items. The latent construct, including its indicators (items), is reflected within a specified joint model, the *measurement model*. Specified within the CFA framework, the measurement model contains different parameters that are estimated along with the model: item factor loadings, intercepts (or thresholds in the case of categorical CFA) and residual variances,[16] as well as latent means and variances (Davidov et al., 2014[27]).

During the procedure involved in testing measurement invariance, different models are specified and compared to one another. The models differ from one another in terms of certain parameters being either unconstrained (i.e. freely estimated) between groups, which assumes incomparability across groups, or constrained (i.e. to the same value) between

groups, which assumes comparability across groups. The degree to which the stricter model (i.e. a model that assumes equal parameters across groups), as compared to the less strict model (i.e. a model that assumes some degree of flexibility of parameters between groups) suits the data is evaluated via model fit indices and the direction (i.e. better or worse fit) and degree of change between the fit indices of each model.

In the least restrictive model, all parameters are freely estimated for each group[17] (e.g. participating country/economy) separately, meaning that the parameters are unconstrained and vary across these groups. The model implies that there is no comparability between groups because all parameters are group-specific and therefore no statistical comparisons are permitted. Additional models are estimated and become gradually more restrictive (i.e. contain a greater number of parameters that are restricted to be equal across groups), resulting in increasingly equal measurement models with greater levels of comparability between the groups. As the models become more restrictive, the justification for statistical comparability and analysis between the groups (e.g. correlation or mean comparisons) increases. The levels of comparability are called *measurement invariance levels* and are specifically defined by the parameters that are restricted in the model representing each of the levels. The three most common levels of measurement invariance testing are (1) configural, (2) metric and (3) scalar (Cheung, 1999[23]; Cheung and Rensvold, 2002[4]; Davidov, 2008[24]; Davidov et al., 2014[27]; Steenkamp and Baumgartner, 1998[25]; OECD, 2014[10]).

The lowest level of measurement invariance, the configural level, assumes that the underlying latent construct is specified by a particular configuration of items in all analysed groups in the same way. *Configural level of measurement invariance* applies when the construct is measured by the same items. It implies that the structure of the construct indicated by the configuration of items is equivalent across participating countries/economies. If a scale reaches only the configural level of measurement invariance, then any statistical method applied to compare the scale scores across groups will violate the basic assumption of the comparability of the measured construct. The comparability occurs at a conceptual level only, while score comparability is not achieved. Therefore, results (e.g. correlations) from different groups can be discussed only through reference to each specific group.

The meaning of the scale is defined by the content of the questions participants were asked and that were used to create the scale. If the strength of the associations (i.e. the magnitude of the regression parameters) is the same across groups, then the latent construct is assumed to have the same meaning. This is the second level of measurement invariance, the metric level. *Metric level of measurement invariance* applies when (1) the structure of the construct is the same across groups, and (2) the strength of the associations between the construct and the items (factor loadings) is equivalent across groups. Metric invariance makes it possible to claim that one unit of change in the construct will lead to the same amount of average change in the items that constitute the construct across different groups (e.g. participating countries/economies). If a scale establishes the metric level of invariance, it can be assumed that comparisons of correlational analyses (such as correlation or regression analysis) are free of the cross-group bias. Of note, for scales with binary indicators this level of measurement invariance testing was omitted as these models have identification issues when using the Mplus software.

During TALIS 2018, the level of comparability was deemed sufficient if all parameters of a model (except the residuals of the items[18]) were fixed to be the same across groups (e.g. participating countries/economies). This approach is called the scalar level of measurement

invariance. *Scalar level of measurement invariance* applies when (1) the structure of the construct is the same across groups, (2) the strength of the associations between the construct and the items (factor loadings) are equivalent, and (3) the intercepts/thresholds for all items across groups are equivalent. If the intercepts of the items for all groups are equivalent, then the expected value of the items becomes the same across groups when the value of the construct is zero, meaning that the value/degree of the construct for a certain value of the observed item can be claimed to be equivalent across different groups. In this case, cross-group comparisons of scale means are justified, and the results can be assumed to be free of cross-group bias (e.g. cross-cultural bias).

The current cycle of TALIS sought to use up-to-date and valid techniques with solid analytical backgrounds for the scaling procedure to ensure the resulting model of each scale was an accurate representation of teachers' and principals' characteristics in the participating countries/economies. This aim resulted in an examination of the measurement invariance across both participating countries/economies and ISCED levels.

The measurement invariance testing referred to as "cross-country/economy" examined invariance within a single ISCED level. In other words, for the participating countries/economies that participated at the ISCED 1 level, measurement invariance testing was conducted considering each participating country/economy with an ISCED level 1 population was considered to be a separate group during the analysis. This same procedure was followed for each ISCED level (ISCED 1, 2 and 3) separately. The measurement invariance testing referred to as "cross-ISCED level" examined invariance within a single country/economy across ISCED levels. Therefore, measurement invariance testing was conducted for each participating country/economy that participated in the study at more than one ISCED level, which meant that the invariance testing treated each ISCED level a separate group during the analysis. The measurement invariance testing both cross-country and cross-ISCED level was then used to develop each scale's final model containing parameter constraints as suggested by the results of both the cross-country and cross-ISCED level measurement invariance testing conducted for that particular scale.

The modelling method chosen to investigate measurement invariance during TALIS 2018 was the same as that used during for TALIS 2013 and TALIS 2008, namely the multiple group confirmatory factor analysis (MGCFA). During the cross-country measurement invariance testing, the analysis evaluated whether the model was invariant/equal across participating countries/economies within a certain ISCED level.[19] These models were compared at configural, metric, and scalar levels, and the purpose of the analyses was to investigate if statistical analysis of the scale scores could be compared across participating countries/economies within each ISCED level.

During the cross-ISCED level measurement invariance testing, the analysis evaluated whether the model was invariant/equal across ISCED levels within a participating country/economy. To be specific, for a certain country *X*, up to three[20] CFA models were created and compared at configural, metric, and scalar levels. The purpose of this analysis was to investigate whether statistics obtained from the analysis of the scale scores could be compared across ISCED levels within a single country/economy. The scale score estimation was based on the evaluation of each scale's results as described in the following sections.

The changes to the model fit indices CFI, TLI, RMSEA and SRMR/WRMR[21] were used to evaluate the measurement invariance level of each scale, and the criteria used to conduct the evaluation were as follows:

- The *configural* level of invariance (no restriction on factor loadings or intercepts) was established if the model passed the following criteria: CFI⩾0.90 or TLI⩾ 0.90 and RMSEA⩽0.08 or SRMR⩽0.06/WRMR⩽0.90.
- The *metric* level of invariance (with factor loadings set to be the same for different groups) was established if the difference in fit indices between the metric and configural model passed the following criteria: ΔCFI<0.010 or ΔTLI<0.015 and ΔRMSEA>-0.015 or ΔSRMR>-0.03 (Chen, 2007[16]).
- The *scalar* level of invariance (factor loadings and intercepts set to be the same for different groups) was established, if the difference in the fit indices between the scalar and metric model passed the following criteria: ΔCFI<0.010 or ΔTLI<0.015 and ΔRMSEA>-0.015 or ΔSRMR>-0.01/ΔWRMR>-0.40 (Chen, 2007[16]).

There were some cases where the configural model was "just identified", meaning that the model fit could not be evaluated due to the lack of degrees of freedom. The fit indices therefore indicated perfect model fit because the model was derived directly from the data (Brown, 2006, p. 66[14]). These cases occur in unidimensional scales with three items, resulting in a model that perfectly described the empirical structure of data. When comparing the fit indices of a perfectly fitting configural invariant model with a metric invariant model, differences are often greater than the recommended thresholds. Thus, in the TALIS 2018 scale evaluation, the models with three indicators were considered to be metrically invariant if the metric model fitted the data well (with the same criteria used for the configural model used for the evaluation). The reason for these special evaluation criteria is that the addition of constraints to a just identified model typically leads to worse fit indices beyond the difference criterion between the metric and configural models outlined above, with this worsening having the potential to influence the resulting level of invariance.

Final scale modelling

The specification of parameters in the final model depended on the level of invariance established in previous steps of the analysis both cross-country and cross-ISCED level. For example, if for one scale, scalar invariance was established across participating countries/economies within ISCED level 2, then the final model allowed equal factor loadings and intercepts across participating countries/economies within ISCED level 2. If, for the same scale, metric invariance had been established across participating countries/economies within ISCED level 1, then the final model also allowed equal factor loadings (while allowing intercepts to vary) across participating countries/economies within ISCED level 1 *in the same model*. Similarly, for the same scale's results of measurement invariance testing in ISCED level 3, the model allowed for necessary constraints for ISCED level 3 within the same model. Finally, the invariance testing results of the same scale's cross-ISCED levels within each participating country/economy were also allowed the necessary constraints within the same model.

In sum, the measurement invariance testing results for all three ISCED levels across participating countries/economies and all participating countries'/economies' cross-ISCED levels for a single scale were modelled together in the scale's final model. Therefore, the final scale models accounted for all invariance results both cross-country and cross-ISCED level. The final scale models underwent MGCFA where each individual country/economy and ISCED level was modelled. The final scale models underwent the same evaluation with regard to their fit assessments and final model improvements were made if necessary.

For those participating countries/economies that did not meet the TALIS 2018 technical standards,[14] those participating countries/economies with late data submission, and the TALIS-PISA link countries/economies, their respective final scale models used fixed parameters. The parameters were fixed according to the cross-country measurement invariance results of ISCED level 2, the TALIS study's target population. Therefore, if a scale reached scalar invariance cross-country within the ISCED 2 level, then the factor loadings and intercepts were constrained to be equal to those unstandardised parameters in the final scale model; if metric invariance was reached, only factor loadings were constrained; and if configural invariance was reached, then no constraints were imposed on factor loadings and intercepts.[17]

Once the final scale models had been specified for all participating countries/economies and ISCED levels, factor score determinacies from the model were used to calculate the omega reliability coefficient as part of the evaluation of the scale. All parameters estimated in these models are reported below in the section *Results from scales evaluation and scale score creation*. For scales reaching metric or scalar levels of invariance within a certain ISCED level, unstandardised factor loadings and intercepts are presented to show the model's equality restraints. In addition, standardised factor loadings are shown to aid in interpretation of the reliability of the model.[22]

11.3.3. Scale scores computation

Scale score estimation

After completion of the scale evaluation, a scale score for each of the constructs was created. Using scale scores instead of analysing single items or sum scores offers many methodological and practical advantages. Although scale scores are not completely free of measurement error, when compared to individual variables, this error is often minimised thus increasing the reliability of these scores (Brown, 2006[14]; Hansen, Rosen and Gustavson, 2006[28]). In practice, using a single score enhances the readability, interpretation and implementation of analysis as compared to analysis based on a set of variables. Another advantage of scale scores compared to simple sum scores is that the former accounts for differences in the relative strength of the relationships between the latent construct and the items (see, for example (Cheung and Rensvold, 1998[29]). In addition, scale score computations account for missing data while still producing a score for each observation, while this is more difficult to obtain using a simple sum score.

The computation of the scale scores in TALIS 2018 was based on the CFA models previously established within the model evaluation. Thus, specification of the CFA models includes the model modifications and considers the results of the measurement invariance testing. This approach means that the model parameters in each scale are kept constant or allowed to vary according to established levels of measurement invariance (i.e. it considers both the cross-country and cross-ISCED level measurement invariance testing results). Use of the CFA models allows development of scores known as *factor scores*. Within the MGCFA framework, the parameters can be estimated separately, in the multiple group models, for each single-country/economy, single-ISCED level. This approach makes it possible to constrain or freely estimate the factor loadings and item intercepts/thresholds depending on the measurement invariance results. The factor scores are specified as continuous normally distributed. The program Mplus version 8 was used to compute the scale scores used to represent the latent constructs.

According to the SEM framework, an item y is predicted from the latent factor η, which is multiplied with the matrix of factor loadings $\boldsymbol{\Lambda}$. The vector of item intercepts $\boldsymbol{\tau}$ and the vector of residuals ε are both added to the product. This is written as:

$$y = \boldsymbol{\tau}_y + \boldsymbol{\Lambda}_y \eta + \varepsilon$$

To estimate factor models from ordinal items, the MLR estimation procedure for continuous latent constructs was used because it is robust to non-normality. Mplus uses the maximum of the posterior distribution of the factor, which is known as the maximum a posteriori method (Muthén and Muthén, 1998-2017[30]). This method is similar to the latent regression approach (Skrondal and Laake, 2001[31]). If all y items are continuous, the factor score estimate η for individual i is based on a regression method with correlated factors (Muthén, 1977[32]), where the factor score is computed from the mean vector of y items, denoted as $\boldsymbol{\mu}$, the factor score coefficient matrix $\boldsymbol{C}$, the vector of observations $\boldsymbol{v}_i$, the vector of intercepts $\boldsymbol{\tau}$, and the matrix of factor loadings $\boldsymbol{\Lambda}$ multiplied by the mean vector $\boldsymbol{\mu}$:

$$\hat{\eta}_i = \boldsymbol{\mu}_y + \boldsymbol{C}(\boldsymbol{v}_i - \boldsymbol{\tau}_y - \boldsymbol{\Lambda}_y \boldsymbol{\mu}_y)$$

The factor score coefficient matrix, in turn, is based on the item covariance matrix $\boldsymbol{\Sigma}$, the matrix of factor loadings $\boldsymbol{\Lambda}$, and the matrix of residual variances and covariances $\boldsymbol{\Theta}$:

$$C = \boldsymbol{\Sigma}_y \boldsymbol{\Lambda}_y^T (\boldsymbol{\Lambda}_y \boldsymbol{\Sigma}_y \boldsymbol{\Lambda}_y^T + \boldsymbol{\Theta}_y)^{-1}$$

These formulas imply that higher factor loadings on an item are associated with a stronger influence of this item on the factor score estimate. Likewise, the larger the residual variance of an item, the smaller its influence on the factor score estimate. The factor loadings, item intercepts, the mean vector and the variance of the latent variable affect the estimated scores.

The WLSMV estimation procedure was used to estimate factor models with scaled binary items. This method produces weighted least square parameter estimates by using a diagonal weight matrix, robust standard errors, and a mean- and variance-adjusted χ^2 test statistic (Brown, 2006, p. 388[14]). The method also takes a slightly different approach to estimating factor scores. First, the probability of observed binary response 1 is defined as

$$f_j(y_{ij}|\boldsymbol{\eta}_i) = \Phi\left[(\zeta - \boldsymbol{\lambda}_j' \boldsymbol{\eta}_i)\theta_{jj}^{-\frac{1}{2}}\right]$$

and the probability of observed categorical response 0 is therefore $1 - f_j(y_{ij}|\eta_i)$, where ζ is the item threshold based of an item j, $\boldsymbol{\lambda}_j'$ is the j^{th} row of the matrix of factor loadings $\boldsymbol{\Lambda}$, and θ_j is the j^{th} diagonal of the matrix of residual variances and covariances $\boldsymbol{\Theta}$, while $\boldsymbol{\eta}_i$ is a vector of true factor scores.

The factor score estimates $\hat{\eta}_i$ are then found as the mode of the posterior distribution of $\boldsymbol{\eta}_i$ by minimising, through use of quasi-Newton techniques, the following function F with respect to $\boldsymbol{\eta}_i$:

$$F = \frac{1}{2}(\boldsymbol{\eta}_i - \boldsymbol{\mu}_i)' \boldsymbol{\Sigma}^{-1}(\boldsymbol{\eta}_i - \boldsymbol{\mu}_i) - \sum_{j=1}^{p} \ln f_j(y_{ij}|\boldsymbol{\eta}_i)$$

where $\boldsymbol{\mu}$ is the mean vector of y items. Contrary to the factor score estimation for models with categorical items, this approach assumes uncorrelated residual variances even if residual covariances are allowed.

For both continuous and categorical data, Mplus provides a model-based approach to estimating parameters in a model with missing data. Model-based approaches account for the missing data and estimate the missing parameters in one step (Lüdtke et al., 2007[33]), and to do this Mplus uses the expectation maximisation algorithm. For a detailed description see Dempster, Laird and Rubin (1977[34]). This procedure assumes that the data are missing-at-random, meaning the probability of a missing observation depends not on the true score of a person regarding the latent construct but can be correlated with other covariates of the scale (Schafer and Graham, 2002[35]).

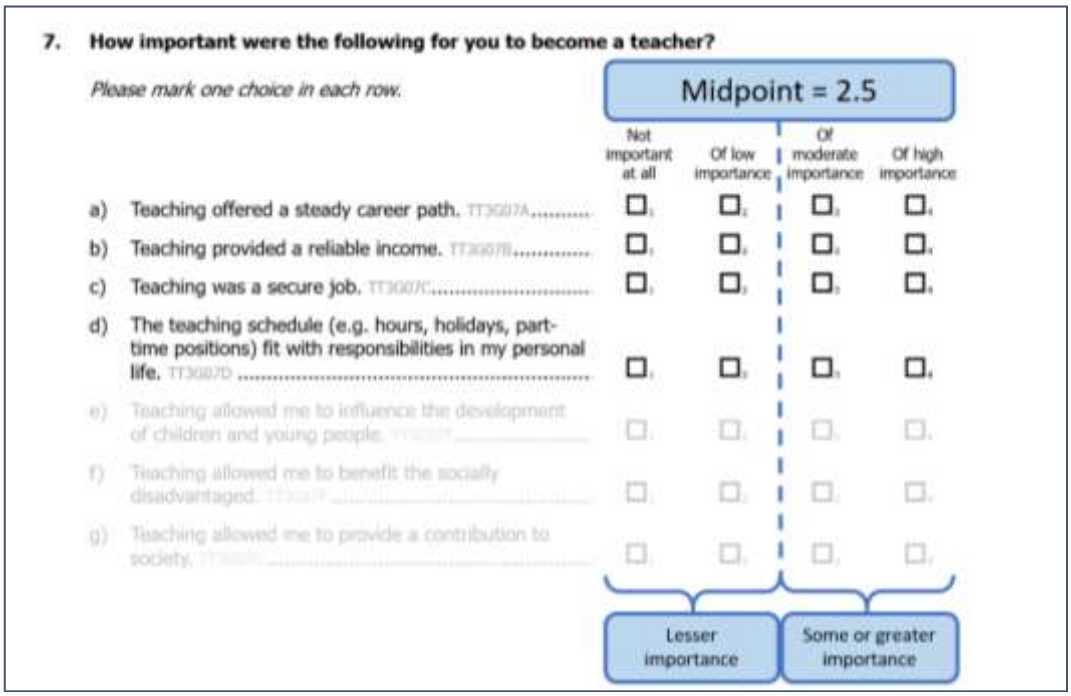
For each TALIS scale, the expectation maximisation algorithm was used to compute a scale score for respondents who responded to at least one of the items belonging to the respective scale. (The algorithm made it possible to deal with missing data and provide the appropriate estimator for the continuous or categorical nature of the respective scales.) The residual variances of the items were allowed to be freely estimated in all models.

Scale score standardisation

To enhance interpretation, the scale scores were standardised in such a way that the value 10 corresponds to the mid-point of the scale. Of note, this approach differs from standardisations in which a specific value is set to be equal to the mean of the scale. Before presenting the formula, the interpretation of the scale score values is explained referring to the example presented in Figure 11.1. The Figure displays the questionnaire items which were used to create the scale *Personal utility motivation to teach* (T3PERUT). The metric of scale scores was transformed to indicate the relative midpoint of the original scale items' categories. More specifically, T3PERUT is measured by responses to items A through D (with variable names TT3G07A through TT3G07D) from question 7 in the teacher questionnaire (additional items are greyed-out in the figure). These items contained the responses "Not important at all", "Of low importance", "Of moderate importance" and "Of high importance" coded 1 through 4, respectively.

Numerically, the midpoint for each item is 2.5, as shown in the figure. To calculate the *item midpoint value* (IMV) for each individual, a simple average was calculated for all item responses. Conceptually, if an individual's IMV is less than 2.5 then this suggests that items on average are considered as *lesser importance*. An IMV greater than 2.5 suggests the items on average are of *some or greater importance*. A value of 2.5 suggests indifference.

Figure 11.1. Illustration of the midpoint of a scale's items



For the standardisation procedure of the scale score, the estimated scale scores were standardised using data from the target population of the TALIS study, ISCED level 2 (with the exception of participating countries/economies not meeting the technical standards and participating countries/economies with late data collection; see Table 11.7). A metric with a standard deviation of 2.0 and a mean of 10 was used to standardise the scale scores. The mathematical transformation ensured that all or almost all values were positive, thus allowing for a convenient interpretation.

Once the scores were adjusted with a standard deviation of 2.0 and mean of 10, a second adjustment was made as follows. The average scale score for the set of those individuals from ISCED level 2 whose IMV was equal to the midpoint of the scale items (in this example, 2.5) was computed and then subtracted from 10, and this difference ($\bar{F}_M^*$) was added to the scale score of each individual, resulting in the final standardised scores.

Mathematically, the standardisation is represented as follows:

$$X_i = 10 + 2\frac{F_i - \bar{F}^*}{\sigma_{F^*}} + \bar{F}_M^*$$

where X_i is the standardised scale score of individual i, F_i is the raw estimated scale score of that individual, $\bar{F}^*$ is the mean scale score of the ISCED level 2 level population, σ_{F^*} is the standard deviation of the scale score of the ISCED level 2 population, and $\bar{F}_M^*$ is as described above.

By adding $\bar{F}_M^*$, standardised scale scores are shifted so that the scale score average is 10 for those individuals from the target population with an IMV equal to the midpoint of the response scale. This shifts the scale score mean to 10 plus the constant $\bar{F}_M^*$ and allows for easy interpretation of scale score: scores above 10 suggest positive associations with the scale (e.g. *agreement, of more importance*), scores below 10 suggest negative associations

with the scale (e.g. *disagreement, of lesser importance*), while scores of exactly 10 suggest indifference.

Table 11.4 provides an example of this procedure for the scale T3PERUT. The column on the left shows all the possible IMVs for individuals when aggregating the responses to the four items of the scale. The column on the right shows the mean factor score of individuals from the target population with the corresponding IMV. As shown, individuals with an IMV of 2.5 have an average scale score of 10. In general, these means rise as the IMV rises, and fall as the IMV falls.[23]

Table 11.4. Items average scale score equivalent table for the scale T3PERUT

Item midpoint value (IMV)	Average scale score
1.00	6.17
1.25	6.71
1.33	7.20
1.50	7.35
1.67	8.31
1.75	8.12
2.00	8.72
2.25	9.29
2.33	9.57
2.50	**10.00**
2.67	10.34
2.75	10.59
3.00	10.93
3.25	11.50
3.33	11.59
3.50	12.16
3.67	12.32
3.75	12.72
4.00	13.06

Composite scale scores

Among the scales created for the TALIS 2018 dataset, there are also scores based on multidimensional constructs that are defined as the combination of two or more components (e.g. the teachers' composite job satisfaction score is composed of two subscales: teachers' job satisfaction with work environment and teachers' job satisfaction with profession). These scales underwent identical model evaluation as outlined in the section *Scale development and methods* and exhibited acceptable reliability and levels of invariance.

As the final scale models and scale scores were created within a complex encoding system (which takes into account different measurement invariance levels across participating countries/economies and within them across ISCED levels), the computation of the scale scores from multidimensional scales failed due to the complexity of the model.[24] Therefore, the scale scores for multidimensional scale's subscales were calculated as other unidimensional scale scores detailed in the above two subsection. Then, after the multidimensional structure of the constructs had been evaluated, composite scores were computed by taking a simple average of the corresponding standardised scores of the

subscales. The computation of the composite scores for individual i can be summarised as follows:

$$Y_i = \frac{\sum_{j=1}^{N} X_{ij}}{N},$$

where Y_i are the composite scores for a certain multidimensional scale for individual i, X_{ij} are the raw scale scores of the subscale j for individual i, and N is the number of subscales of this multidimensional scale. These scores were then standardised in the same manner as described in sub-section *Scale score standardisation*.

Any analysis of the subscale scores and the composite scores needs to take into account the following limitations: (1) the subscale scores should not be used in a correlation or regression analysis simultaneously due to collinearity of these subscales; and (2) the composite scores could be biased because of the weight of the subscale on the latent construct not being taken into account (i.e. assumed to be equal for all subscales).

11.3.4. Recommendation for analysis and interpretation

Cross-country/economy comparability

An important consideration for anyone using the scale scores in analysis is that the results not only from the scale reliability analyses but also the cross-country or ISCED-level measurement invariance testing described above have major implications for (1) the construction of scale scores, and (2) the use of the scale scores in further analysis.

To aid the user regarding the comparability of scale scores, the cross-country levels of invariance are included in the variable labels of each scale in the international data sets. For example, the scale with variable name T3CLASM has the label, "Classroom management / Metric (1) - Configural (2, 3)", which indicates that the scale reached metric invariance for ISCED 1 level and configural invariance for ISCED level 2 and 3. Table 11.5 shows how many scales reached a particular level of invariance. For a more detailed look, Table 11.6 presents the specific invariance levels for each scale, listed by its variable name and label found in the international database.

Table 11.5. Scale counts of the invariance levels for both populations

	Invariance levels		
Population	Configural	Metric	Scalar
Teachers			
ISCED 1	6	23	2
ISCED 2	8	22	1
ISCED 3	9	20	2
Principals			
ISCED 1	5	6	1
ISCED 2	6	5	1
ISCED 3	5	6	1

Source: OECD, TALIS database.

Table 11.6. Invariance level reached for each scale by ISCED level

	Scale label	Variable Name	ISCED 1	ISCED 2	ISCED 3
Principal scales	Academic pressure	T3PACAD	Metric	Metric	Metric
	Stakeholder involvement, partnership	T3PCOM	Metric	Metric	Metric
	School delinquency and violence	T3PDELI	Configural	Configural	Configural
	Diversity beliefs	T3PDIVB	Scalar	Scalar	Configural
	Job satisfaction, overall, teacher	T3PJOBSA	Configural	Configural	Configural
	Job satisfaction with work environment, principal	T3PJSENV	Configural	Configural	Configural
	Job satisfaction with profession, principal	T3PJSPRO	Configural	Configural	Metric
	Lack of special needs personnel	T3PLACSN	Metric	Metric	Metric
	Participation among stakeholders, principals	T3PLEADP	Metric	Metric	Metric
	School leadership	T3PLEADS	Metric	Metric	Scalar
	Organisational innovativeness	T3PORGIN	Configural	Configural	Configural
	Workload stress	T3PWLOAD	Metric	Configural	Metric
Teacher scales	Clarity of instruction	T3CLAIN	Metric	Metric	Metric
	Classroom management	T3CLASM	Metric	Configural	Configural
	Cognitive activation	T3COGAC	Metric	Metric	Metric
	Professional collaboration in lessons among teachers	T3COLES	Metric	Metric	Metric
	Teacher cooperation, overall	T3COOP	Configural	Configural	Configural
	Teachers perceived disciplinary climate	T3DISC	Metric	Metric	Metric
	Diversity practices, teacher	T3DIVP	Configural	Configural	Configural
	Effective professional development	T3EFFPD	Scalar	Configural	Scalar
	Exchange and cooperation among teachers	T3EXCH	Configural	Configural	Configural
	Job satisfaction, overall, teacher	T3JOBSA	Metric	Metric	Metric
	Job satisfaction with work environment, teacher	T3JSENV	Metric	Metric	Metric
	Job satisfaction with profession, teacher	T3JSPRO	Metric	Metric	Metric
	Professional development barriers	T3PDBAR	Configural	Configural	Configural
	Need prof. devel. for teaching for diversity	T3PDIV	Metric	Metric	Metric
	Need prof. devel. in subject matter and pedagogy	T3PDPED	Metric	Metric	Metric
	Personal utility value	T3PERUT	Metric	Metric	Metric
	Satisfaction with target class autonomy	T3SATAT	Metric	Metric	Metric
	Self-efficacy in classroom management	T3SECLS	Metric	Metric	Metric
	Self-efficacy in student engagement	T3SEENG	Metric	Metric	Metric
	Self-related efficacy in multicultural classrooms	T3SEFE	Metric	Metric	Metric
	Self-efficacy in instruction	T3SEINS	Metric	Metric	Metric
	Teacher self-efficacy, overall	T3SELF	Metric	Metric	Metric
	Social utility value	T3SOCUT	Metric	Metric	Metric
	Participation among stakeholders, teachers	T3STAKE	Metric	Metric	Metric
	Student behaviour stress	T3STBEH	Configural	Configural	Configural
	Teacher-student relations	T3STUD	Metric	Metric	Metric
	Team innovativeness	T3TEAM	Scalar	Scalar	Scalar
	Teaching practices, overall	T3TPRA	Metric	Configural	Configural
	Perceptions of value and policy influence	T3VALP	Metric	Metric	Metric
	Workplace well-being and stress	T3WELS	Configural	Metric	Configural
	Clarity of instruction	T3WLOAD	Metric	Metric	Configural

In addition, recommendations for analysis based on the different levels of invariance are provided below. The recommendations are specific to cross-country invariance (i.e. within a single ISCED level) but may also be applied to cross-ISCED level invariance within a single participating country/economy. Different levels of measurement invariance provide

different potentials for the analysis of data and reporting. The proposed analyses for each level of measurement invariance are:

- Cross-country analysis of scales with only configural level of invariance:
  - *Recommendation for analysis:* At the cross-national level, only qualitative (descriptive) comparisons are statistically justified (e.g. "associations of staff-beliefs and staff education is positive in country A and B, whereas there is no significant association in country C"), which should be presented together with the limitations concerning the interpretation of the results, in particular concerning the differences between participating countries/ economies with respect to the meaning of the construct.
  - *Limitation*: If a scale only reaches configural invariance, the scale score is constructed in such a way that the factor loadings and intercepts are allowed to vary across participating countries/economies. Further analysis aimed at cross-country comparisons can only be conducted at the conceptual level meaning that no statistical methods of comparison (such as *t*-tests) are applicable in such cases.
- Cross-country analysis of scales with metric level of invariance:
  - *Recommendation for analysis:* For such a scale, the strength of the association between the scale and items is comparable across participating countries/economies, and statistical methods such as correlation and regression are applicable. Comparisons of associations between participating countries/economies are justified (e.g. "The association of staff-beliefs and level of education are significantly stronger in countries/economies A and B than in country/economy C"). The metric level of measurement invariance means scales can be used for analysis based on correlation and linear regression.
  - *Limitation*: If a scale reaches only the metric level of invariance the score of the scale is created respectively with equal factor loadings but with intercepts allowed to vary across participating countries/economies, and therefore a mean score between participating countries/economies is not possible.
- Cross-country analysis of scales with scalar level of invariance:
  - *Recommendation for analysis*: For these scales, the comparison of the mean score of the scale is meaningful across groups. Scale mean can be compared across participating countries/economies (e.g. "Staff-beliefs are *significantly higher* in country A compared to countries/economies B and C").

Violating these assumptions or ignoring these recommendations may or will lead to biased results and/or interpretations. For instance, if scale scores based on the assumption of metric invariance are created and used to compare the country/economy means of that scale, the differences between participating countries/economies will most likely be biased. Thus, it is recommended that data users apply statistical procedures to analyse scale scores accordingly to its invariance level reached.

Enhancements of the methodological procedures in scale score validation and creation

During the current cycle, and in accordance with the methodological developments of the last decade, the TALIS 2018 consortium endeavoured to bring in scale score estimation that was modified and more rigorous than the estimation used previous TALIS cycles. This was done in order to more accurately represent the data received from teachers and principals.

This approach resulted in a more comprehensive investigation of the invariance of each scale and the creation of more fine-tuned models. Furthermore, the results of the measurement invariance testing were incorporated into the final models and scales score estimation. During the TALIS 2013 cycle, pooled CFA models were estimated for each scale using all participating countries'/economies' ISCED level 2 populations in a joint analysis (a pooled analysis that disregarded the country's/economy's membership) and then, for the score estimation, constrained the loadings and intercepts in each of the within-country/economy samples (all ISCED populations) to the previously estimated pooled values. In this way, the models estimated for the ISCED levels 1 and 3 populations including their respective scale scores were restricted to the model parameters estimated with the ISCED level 2 population, while neglecting the results for the measurement invariance testing (OECD, 2014[10]).[25] The model chosen in 2013 for the scale score estimation assumed strict invariance, where the factor loadings, item means and residuals were constrained so that they were equivalent across participating countries/economies.

This approach meant the estimated scale scores were fully equivalent across all participating countries/economies despite the results of the measurement invariance testing. However, the benefit of the cross-country comparability came with the strong risk of introducing substantial bias to the scale scores (Davidov, 2008[24]; Steenkamp and Baumgartner, 1998[25]). To avoid the risk of bias, during the current cycle the parameters were estimated in each scale respective to the results from the measurement invariance testing, a process similar to that employed during the TALIS 2008 cycle (OECD, 2010, pp. 139-143[12]). However, although the 2008 cycle used only a chosen sub-sample (called below "calibration sample") to perform the cross-country invariance, the current cycle performed cross-country measurement invariance within each ISCED level, that is, 1, 2, and 3. In addition, the current cycle tested cross-ISCED level measurement invariance within each participating country, something that was not done during the previous cycles. Therefore, the scale score estimation during TALIS 2018 incorporated the results of both measurement invariance tests. The cross-ISCED level test was applied in addition to the cross-country/economy invariance testing because of the assumption that it is possible to find greater similarity between two or three ISCED levels within an education system than between all participating countries/economies within one ISCED level. This assumption proved to be valid in many cases, thus, enhancing the statistical options for national reporting on comparisons between ISCED levels. This approach during TALIS 2018 means that the creation of scale scores for this cycle has (a) substantially reduced the risk of bias, and (b) improved the possibilities for comparisons between ISCED levels within participating countries/economies compared to TALIS 2013.

As with the 2013 cycle, weights were constructed for TALIS 2018 that allow each participating country/economy to contribute equally to the analysis. This strategy replaced the strategy applied during TALIS 2008 in which the selection of an equal number of cases from each participating country/economy composed a "calibration sample" where all

participating countries/economies contributed equally to the analysis – see the TALIS 2008 Technical Report 2008 (OECD, 2010, p. 139[12]).

11.4. Results from scales evaluation and scale score creation

11.4.1. Description of scales and their parameters

The remainder of this chapter presents the evaluation results of the scales. While we comment in some detail on the results presented in table format for the first group of scales on *teacher motivation and perceptions*, our comments on the remaining results are relatively short and focus on the most important results. However, we also include information complementary to these results.

The scales are grouped by questionnaire (teacher and principal) and by content (e.g. all self-efficacy scales grouped under one heading), and these scale-specific sections are then divided into several parts that present detailed results for each scale. Each scale description begins with the items used as indicators to measure the latent constructs. These descriptions include item names, item wording and response categories.

This part of the chapter also includes special item notes that indicate whether certain questionnaire items were reverse coded for the purpose of the scale construction or were removed from the scale. Reverse coding of an item ensures that responses align to the continuum of the scale. Consequently, if the response to an item is positive (coded as a higher integer numerically), then it corresponds to a positive association with the latent construct.[26] Item removal from a scale construct was applied in specific cases. Initially, choice of scale items was based on theoretical considerations (see Chapter 3), with the expectation that a latent construct measured by selected items would have certain statistical properties that supported the construct (e.g. sufficiently high factor loadings). However, if an empirical examination of the scales revealed (generally only occasionally), certain items not exhibiting the expected properties, then it could be assumed that the empirical data did not support the conceptual development of the construct. These items were removed and the model was evaluated without them.

Each scale description also contains information on improvements (where applicable) to the implemented model. Improvements either encompassed all participating countries/economies or were country/economy specific and they typically occurred in those instances where the initial model did not fit the data well, but where a minor improvement (such as a correlation between two items) resulted in an acceptable model fit. These improvements come from the results obtained in the model analysis steps of scale evaluation (for details on scale evaluation, see the section *Scale development and methods*).

While all model fit calculations and tests conducted during all further steps included these improvements, there were several instances where additional improvements were made to the models during testing for measurement invariance. Changes were made programmatically so that the models would be estimated in a way that neither biased the results nor changed the content of the scale construct. These changes included, for example, fixing the negative residual variance for items in some scales so that it was positive and close to zero.

The next part of the description presents the reliabilities for each scale. The omega statistic was used for scales based on continuous response options, the Cronbach's alpha coefficient for scales based on categorical response options, and the stratified Cronbach's alpha for the

composite multidimensional scales. Table 11.3 presents the criteria guiding interpretation of each scale's reliability.

The information on reliability is followed by a description of the scale-specific results from the model estimation and comparisons. Confirmatory factor analysis (CFA) was used to evaluate the theoretically developed scale models reflecting the study's latent constructs, while the model fit indices presented at this point were those obtained from the model analysis conducted at the country/economy level for each scale (i.e. the CFA conducted separately for each of the analysed populations at the country/economy level).[27] The criteria used for model evaluation and selection appear in the first part of the chapter (Table 11.3). Not reported are the model fit indices for the scales based on three items.[28]

The results of the measurement invariance testing across participating countries/economies within each ISCED level follows the section on reliabilities (a summary of the results from the measurement invariance testing across ISCED levels within each participating country/economy appear in the Annex I tables.) The results of the model comparisons of measurement invariance testing were used to establish the invariance levels of each scale. Bold font is used to denote the invariance level of each scale in the tables.

The next part of the scale description centres on the international unstandardised model parameters that were estimated via the scales' final models. The factor loadings and intercepts (the parameters that were uniform across participating countries/economies) are reported for the scales that reached scalar invariance. However, only the factor loadings are reported for the metric invariant scales. For those scales that reached only configural invariance unstandardised item parameters are country specific and, therefore, not reported. In addition, the country-level standardised factor loadings are reported for each participating country per ISCED level in a separate table because they were standardised at the country level, meaning that these standardised parameters differed at the country level even for the scalar invariant scales. The factor loadings indicate the strength of the relationship between each item and the latent scale. The values were interpreted in accordance with the cut-off criteria provided in Table 11.3. The standardised factor loadings are presented next to the unstandardised intercepts. The intercepts indicate the predicted values for an item when the value of the latent trait was zero.

Four multidimensional scales were included in the teacher population and one in the principal population. The multidimensional scales were evaluated with the same model fit criteria used for the unidimensional scales (Table 11.3). The fit indices indicated acceptable model fits in all cases. The composite scales[29] were computed by averaging the scores from the subscales.[30] Therefore, in addition to the overall model evaluation of the multidimensional constructs, their respective subscales were evaluated separately. The measurement invariance level for an averaged scale index was determined by the lowest invariance level of its respective subscales.

The international parameters from the final scale models were used to estimate the scale scores for: (1) those participating countries/economies that did not meet the requirements determined in the TALIS technical standards (Australia and the Netherlands for ISCED level 1 for all scales and, in addition, Australia, ISCED level 2, for principals scales only;[31] (2) those participating countries/economies that collected their data later than the designated time; and (3) the TALIS-PISA link populations[32] (Australia, Ciudad Autónoma de Buenos Aires [Argentina], Colombia, the Czech Republic, Denmark, Georgia, Malta, Turkey and Viet Nam). These parameters included fixed factor loadings in the ISCED level 2 metric models, and fixed factor loadings and intercepts in the ISCED level 2 scalar models. At times, additional participating countries/economies were excluded

from the scale evaluation because of model non-convergence, instability or some other issue (Table 11.7). Because these additional countries/economies were excluded during the model analyses at the country/economy level from further evaluation, they did not contribute to the final scale models and there are no scale scores for these scales. This case only pertains to scales from the principal questionnaire. Reporting on these excluded populations is provided, where applicable, in a separate section for excluded populations.

Table 11.7. Excluded populations from the estimation of the parameters of principal scales

Scale	Excluded country/economy	Reason for exclusion
T3PJSENV	Sweden, ISCED level 3	Heywood case
T3JOBSA	Sweden, ISCED level 3	Heywood case for T3PJSENV (subscale)
T3PWLOAD	Portugal, ISCED level 2	Model instability
	Sweden, ISCED level 2	Non-convergence
T3PCOM	Denmark, ISCED level 1	Non-convergence
	Denmark, ISCED level 2	
	Denmark, ISCED level 3	
	Sweden, ISCED level 1	
	Sweden, ISCED level 2	
	Sweden, ISCED level 3	

11.4.2. Complex scales from the teacher questionnaire

Teacher motivation and perceptions: Personal utility motivation to teach (T3PERUT); Social utility motivation to teach (T3SOCUT); Perceptions of value and policy influence (T3VALP)

11.1. Measured items

Three scales concerning teacher motivation and perceptions were developed from the following two question stems:

- "How important were the following for you to become a teacher?" (TT3G07), which was followed by items concerning the teaching profession and its role in society.
- "How strongly do you agree or disagree with the following statements?" (TT3G54), which was followed by items about the perceived value and influence of teachers in society.

Table 11.8 provides the item names, question stems, item statements and response options for each scale.

Table 11.8. Item wording for teacher motivation and perceptions scales

T3PERUT: Personal utility motivation to teach	
TT3G07: How important were the following for you to become a teacher?	
Response options: "Not important at all" (1), "Of low importance" (2), "0f moderate importance" (3), "Of high importance" (4)	
TT3G07A	Teaching offered a steady career path
TT3G07B	Teaching provided a reliable income
TT3G07C	Teaching was a secure job
TT3G07D	The teaching schedule (e.g. hours, holidays, part-time positions) fit with responsibilities in my personal life
T3SOCUT: Social utility motivation to teach	
TT3G07: How important were the following for you to become a teacher?	
Response options: "Not important at all" (1), "Of low importance" (2), "Of moderate importance" (3), "Of high importance" (4)	
TT3G07E	Teaching allowed me to influence the development of children and young people
TT3G07F	Teaching allowed me to benefit the socially disadvantaged
TT3G07G	Teaching allowed me to provide a contribution to society
T3VALP: Perceptions of value and policy influence	
TT3G54: How strongly do you agree or disagree with the following statements?	
Response options: "Strongly disagree" (1), "Disagree" (2), "Agree" (3), "Strongly agree" (4)	
TT3G54C	Teachers' views are valued by policymakers in this country/region
TT3G54D	Teachers can influence educational policy in this country/region
TT3G54E	Teachers are valued by the media in this country/region

Source: OECD, TALIS 2018 database.

11.2. Scale reliability

Table 11.9 presents the reliabilities for all populations. The scale T3PERUT has high reliability in most of the populations, with the omega coefficients for all participating countries above 0.700.

The reliability of the scale T3SOCUT is high for the majority of the populations, but the coefficient is below 0.700 for Denmark and the Flemish Community in Belgium for ISCED level 1, and Alberta (Canada) and Kazakhstan for ISCED level 2. The omega coefficient for the scale T3VALP is below the critical value of 0.700 in Spain and Viet Nam for ISCED level 1, in Brazil, the Netherlands and Viet Nam for ISCED level 2, and in Brazil for ISCED level 3. Analysis using the scale scores must be interpreted with caution for these populations because their omega coefficients indicate insufficient scale reliability. The reliabilities for populations that did not contribute to the model parameters (i.e. participating countries/economies that did not meet the technical standards, participating countries/economies with delayed data collection, and the TALIS-PISA link populations) can be deemed sufficiently high.

Table 11.9. Reliability coefficients for teacher motivation and perceptions scales

Participating countries/economies	T3PERUT	T3SOCUT	T3VALP
	Omega coefficient		
ISCED level 2			
Alberta (Canada)	0.906	0.689	0.867
Australia	0.925	0.783	0.869
Austria	0.899	0.704	0.769
Belgium	0.906	0.785	0.824
Flemish Community (Belgium)	0.901	0.769	0.776
Brazil	0.899	0.846	0.681

Participating countries/economies	T3PERUT	T3SOCUT	T3VALP
	Omega coefficient		
Bulgaria	0.776	0.766	0.832
Ciudad Autónoma de Buenos Aires (Argentina)	0.903	0.780	0.794
Chile	0.889	0.821	0.734
Colombia	0.927	0.812	0.746
Croatia	0.884	0.823	0.839
Cyprus[3]	0.914	0.837	0.826
Czech Republic	0.870	0.794	0.781
Denmark	0.901	0.738	0.808
England (United Kingdom)	0.914	0.781	0.876
Estonia	0.878	0.812	0.778
Finland	0.920	0.817	0.839
France	0.904	0.796	0.797
Georgia	0.792	0.790	0.808
Hungary	0.861	0.752	0.882
Iceland	0.814	0.850	0.728
Israel	0.874	0.808	0.755
Italy	0.899	0.760	0.711
Japan	0.887	0.787	0.891
Kazakhstan	0.738	0.664	0.801
Korea	0.889	0.867	0.867
Latvia	0.789	0.776	0.823
Lithuania	0.843	0.823	0.762
Malta	0.819	0.780	0.799
Mexico	0.859	0.711	0.755
Netherlands	0.929	0.780	0.679
New Zealand	0.887	0.803	0.815
Norway	0.904	0.780	0.832
Portugal	0.918	0.837	0.717
Romania	0.824	0.776	0.776
Russian Federation	0.796	0.817	0.859
Saudi Arabia	0.824	0.857	0.771
Shanghai (China)	0.876	0.852	0.893
Singapore	0.910	0.790	0.861
Slovak Republic	0.852	0.764	0.760
Slovenia	0.933	0.785	0.750
South Africa[2]	0.856	0.854	0.666
Spain	0.931	0.839	0.745
Sweden	0.839	0.845	0.828
Chinese Taipei	0.904	0.863	0.857
Turkey	0.792	0.812	0.780
United Arab Emirates	0.835	0.789	0.865
United States	0.897	0.773	0.834
Viet Nam	0.748	0.738	0.697
ISCED level 1			
Australia[1]	0.912	0.823	0.854
Flemish Community (Belgium)	0.912	0.687	0.723
Ciudad Autónoma de Buenos Aires (Argentina)	0.912	0.757	0.774
Denmark	0.897	0.684	0.799
England (United Kingdom)	0.918	0.736	0.889
France	0.918	0.712	0.792
Japan	0.897	0.794	0.899

Participating countries/economies	T3PERUT	T3SOCUT	T3VALP
	Omega coefficient		
Korea	0.893	0.885	0.856
Netherlands[1]	0.895	0.717	0.764
Spain	0.935	0.824	0.691
Sweden	0.852	0.823	0.850
Chinese Taipei	0.893	0.869	0.861
Turkey	0.814	0.835	0.760
United Arab Emirates	0.837	0.773	0.863
Viet Nam	0.746	0.738	0.682
ISCED level 3			
Alberta (Canada)	0.893	0.738	0.846
Brazil	0.889	0.845	0.658
Croatia	0.887	0.824	0.823
Denmark	0.876	0.736	0.834
Portugal	0.920	0.823	0.728
Slovenia	0.922	0.789	0.780
Sweden	0.854	0.814	0.828
Chinese Taipei	0.899	0.848	0.846
Turkey	0.787	0.808	0.781
United Arab Emirates	0.848	0.792	0.870
Viet Nam	0.773	0.736	0.717
TALIS-PISA link			
Australia	0.927	0.815	0.850
Ciudad Autónoma de Buenos Aires (Argentina)	0.863	0.757	0.815
Colombia	0.897	0.920	0.728
Czech Republic	0.865	0.759	0.835
Denmark	0.878	0.696	0.848
Georgia	0.867	0.880	0.796
Malta	0.863	0.812	0.781
Turkey	0.828	0.901	0.701
Viet Nam	0.885	0.850	0.832

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
3. Note by Turkey
The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".
Note by all the European Union Member States of the OECD and the European Union
The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.
Source: OECD, TALIS 2018 database.

11.3. Model fits

Tables 11.10, 11.11 and 11.12 present the model fit for each *Teacher motivation and perceptions scale* for all ISCED levels and the TALIS-PISA link populations.

As can be observed from Table 11.10, the CFI for T3PERUT is above the cut-off criterion for all populations except Viet Nam's TALIS-PISA link population. The TLI is below the cut-off criterion in Georgia, Japan, Malta and the Russian Federation for ISCED level 2, and in Georgia and Viet Nam for the TALIS-PISA link populations. The RMSEA is below

the cut-off value for all populations except Bulgaria, Georgia, Hungary, Japan, Korea, Lithuania, Malta, the Russian Federation and the Slovak Republic for ISCED level 2, Japan and the Netherlands for ISCED level 1, and Denmark, Malta and Viet Nam for the TALIS-PISA link populations. Finally, the SRMR is above the cut-off criterion in South Africa for ISCED level 2, Australia and the Netherlands for ISCED level 1, and for all the TALIS-PISA link populations except those in Australia and the Czech Republic.

The scales T3SOCUT and T3VALP were both constructed from only three items, which means the model fit indices for them are not reported here (see endnote 28). The only exceptions where the model fit statistics of models with three items could be estimated pertained to those populations for which model parameters were fixed, specifically, those countries that did not meet the TALIS technical standards. These countries were Australia and the Netherlands for ISCED level 1, South Africa for ISCED level 2 because of the delay in its data submission, and all TALIS-PISA link populations. Because the models in these populations were specified by fixing the estimation parameters to be equal to the international parameters, it was possible to estimate model fit.[33] As evident in Table 11.11 and Table 11.12, the model fit statistic for these populations is inconsistent: in some populations the scale models perform well (e.g. the Netherlands' ISCED level 1 population for the scale T3SOCUT), whereas others do not meet some of the fit statistic cut-off criteria (e.g. Australia's ISCED level 1 population for the scale T3SOCUT).

Table 11.10. CFA model-data fits for scale T3PERUT

Personal utility motivation to teach

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Alberta (Canada)	0.988	0.963	0.065	0.014
Australia	1.000	1.001	0.000	0.002
Austria	0.997	0.990	0.039	0.009
Belgium	0.997	0.990	0.033	0.008
Flemish Community (Belgium)	0.993	0.979	0.048	0.013
Brazil	0.998	0.995	0.024	0.006
Bulgaria	0.952	0.855	0.102	0.029
Ciudad Autónoma de Buenos Aires (Argentina)	0.995	0.986	0.044	0.010
Chile	0.997	0.992	0.040	0.009
Colombia	1.000	0.999	0.010	0.005
Croatia	0.998	0.994	0.025	0.007
Cyprus	0.999	0.996	0.028	0.008
Czech Republic	0.997	0.991	0.034	0.010
Denmark	0.999	0.997	0.022	0.006
England (United Kingdom)	1.000	1.001	0.000	0.003
Estonia	0.992	0.977	0.066	0.012
Finland	1.000	0.999	0.011	0.004
France	0.998	0.993	0.035	0.009
Georgia	0.925	0.775	0.129	0.031
Hungary	0.982	0.947	0.086	0.020
Iceland	0.993	0.978	0.056	0.013
Israel	1.000	1.000	0.000	0.004
Italy	0.999	0.997	0.021	0.005
Japan	0.942	0.827	0.147	0.052
Kazakhstan	0.997	0.990	0.021	0.009
Korea	0.978	0.934	0.098	0.019

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Latvia	0.990	0.970	0.041	0.015
Lithuania	0.974	0.923	0.090	0.020
Malta	0.965	0.894	0.099	0.024
Mexico	0.993	0.980	0.056	0.013
Netherlands	0.995	0.985	0.043	0.012
New Zealand	1.000	1.003	0.000	0.004
Norway	0.997	0.990	0.039	0.008
Portugal	0.997	0.990	0.045	0.008
Romania	0.998	0.993	0.023	0.009
Russian Federation	0.942	0.825	0.106	0.025
Saudi Arabia	0.973	0.920	0.064	0.024
Shanghai (China)	1.000	1.000	0.004	0.004
Singapore	0.997	0.992	0.036	0.010
Slovak Republic	0.973	0.920	0.117	0.022
Slovenia	0.998	0.994	0.037	0.007
South Africa[2]	0.984	0.984	0.041	0.167
Spain	1.000	1.000	0.000	0.002
Sweden	0.995	0.985	0.034	0.011
Chinese Taipei	0.994	0.982	0.049	0.011
Turkey	0.998	0.993	0.022	0.008
United Arab Emirates	1.000	1.000	0.002	0.003
United States	0.997	0.990	0.037	0.011
Viet Nam	0.996	0.987	0.035	0.013
ISCED level 1				
Australia[1]	0.996	0.996	0.023	0.064
Flemish Community (Belgium)	0.992	0.975	0.067	0.014
Ciudad Autónoma de Buenos Aires (Argentina)	0.991	0.973	0.058	0.013
Denmark	0.999	0.998	0.017	0.006
England (United Kingdom)	0.996	0.989	0.044	0.013
France	0.999	0.996	0.027	0.007
Japan	0.975	0.925	0.101	0.035
Korea	0.988	0.965	0.074	0.016
Netherlands[1]	0.950	0.950	0.094	0.157
Spain	0.996	0.989	0.042	0.009
Sweden	0.991	0.972	0.058	0.015
Chinese Taipei	0.998	0.993	0.030	0.008
Turkey	0.995	0.984	0.033	0.015
United Arab Emirates	1.000	0.999	0.010	0.004
Viet Nam	0.997	0.991	0.031	0.009
ISCED level 3				
Alberta (Canada)	0.991	0.974	0.061	0.016
Brazil	0.999	0.998	0.015	0.006
Croatia	0.998	0.994	0.026	0.007
Denmark	0.995	0.986	0.043	0.011
Portugal	0.999	0.996	0.027	0.006
Slovenia	1.000	1.000	0.000	0.004
Sweden	0.996	0.988	0.035	0.013
Chinese Taipei	0.994	0.982	0.049	0.012
Turkey	0.994	0.982	0.026	0.012
United Arab Emirates	1.000	1.001	0.000	0.003
Viet Nam	0.994	0.981	0.041	0.011
TALIS-PISA link				

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Australia	1.000	1.001	0.000	0.025
Ciudad Autónoma de Buenos Aires (Argentina)	0.962	0.962	0.080	0.191
Colombia	0.986	0.986	0.039	0.114
Czech Republic	0.995	0.995	0.022	0.045
Denmark	0.959	0.959	0.093	0.165
Georgia	0.881	0.881	0.067	0.454
Malta	0.927	0.927	0.091	0.211
Turkey	0.976	0.976	0.039	0.121
Viet Nam	0.702	0.702	0.109	0.642

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.11. CFA model-data fit for scale T3SOCUT

Social utility motivation to teach

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 1				
Australia[1]	0.873	0.873	0.113	0.529
Netherlands[1]	0.973	0.973	0.065	0.086
TALIS-PISA link				
Australia	0.995	0.995	0.025	0.071
Ciudad Autónoma de Buenos Aires (Argentina)	0.977	0.977	0.034	0.077
Colombia	0.827	0.827	0.105	1.747
Czech Republic	0.947	0.947	0.092	0.189
Denmark	0.982	0.982	0.051	0.095
Georgia	0.867	0.867	0.060	0.626
Malta	0.991	0.991	0.041	0.081
Turkey	1.000	1.000	0.017	0.424
Viet Nam	0.792	0.792	0.091	0.731

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
Source: OECD, TALIS 2018 database.

Table 11.12. CFA model-data fit for scale T3VALP

Perceptions of value and policy influence

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 1				
Australia[1]	0.985	0.985	0.052	0.116
Netherlands[1]	0.696	0.696	0.124	0.251
TALIS-PISA link				
Australia	0.980	0.980	0.058	0.122
Ciudad Autónoma de Buenos Aires (Argentina)	0.897	0.897	0.082	0.088
Colombia	0.975	0.975	0.045	0.066
Czech Republic	0.962	0.962	0.059	0.159
Denmark	0.946	0.946	0.074	0.116
Georgia	0.985	0.985	0.034	0.076
Malta	0.969	0.969	0.062	0.099
Turkey	0.891	0.891	0.048	0.099
Viet Nam	0.874	0.874	0.072	0.395

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
Source: OECD, TALIS 2018 database.

11.4. Invariance testing

Table 11.13 provides the results from the invariance testing for T3PERUT for each ISCED level (see also subsection *Measurement invariance testing: across countries/economies and across ISCED levels* above for a refresher on invariance testing procedures). Because the degree of change in the TLI and the RMSEA between the configural and metric models for the ISCED level 1 and ISCED level 2 populations are within the cut-off criteria, T3PERUT can be considered metric invariant for these two ISCED levels. Although, for ISCED level 3, the differences in the model fit indices between the configural and metric levels exceed the cut-off criteria, T3PERUT at the ISCED 3 level can be considered metric invariant not only because the configural model fit is very high and even almost perfect for some of the fit indices but also because the metric model performs very well.

Tables 11.14 and 11.15 present the results of the measurement invariance testing for the scales T3SOCUT and T3VALP respectively. The model fit differences between the configural and metric models exceed the cut-off criteria. However, because the configural models of the two scales for all populations are just identified and the metric models perform well, the scales can be treated as metric invariant in all populations.

Table 11.13. Invariance tests results for scale T3PERUT

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level of ISCED level 2								
Configural	0.993	0.98	0.051	0.015				
Metric	0.975	0.969	0.063	0.079	0.018	0.011	0.012	0.064
Scalar	0.792	0.841	0.143	0.148	0.183	0.128	0.080	0.069
Invariance level of ISCED level 1								
Configural	0.994	0.982	0.047	0.014				
Metric	0.978	0.972	0.059	0.079	0.016	0.010	0.012	0.065
Scalar	0.779	0.824	0.147	0.159	0.199	0.148	0.088	0.080
Invariance level of ISCED level 3								
Configural	0.997	0.991	0.031	0.01				
Metric	0.973	0.966	0.059	0.083	0.024	0.025	0.028	0.073
Scalar	0.809	0.846	0.126	0.136	0.164	0.120	0.067	0.053

Note: See endnote [34].
Source: OECD, TALIS 2018 database.

Table 11.14: Invariance tests results for scale T3SOCUT

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level of ISCED level 2								
Configural	1.000	1.000	0.000	0.000				
Metric	0.983	0.974	0.054	0.084	0.017	0.026	0.054	0.084
Scalar	0.858	0.891	0.110	0.132	0.125	0.083	0.056	0.048
Invariance level of ISCED level 1								
Configural	1.000	1.000	0.000	0.000				
Metric	0.975	0.959	0.061	0.121	0.025	0.041	0.061	0.121
Scalar	0.858	0.885	0.102	0.214	0.117	0.074	0.041	0.093
Invariance level of ISCED level 3								
Configural	1.000	1.000	0.000	0.000				
Metric	0.987	0.979	0.041	0.058	0.013	0.021	0.041	0.058
Scalar	0.84	0.868	0.103	0.106	0.147	0.111	0.062	0.048

Note: See endnote 34.
Source: OECD, TALIS 2018 database.

Table 11.15. Invariance tests results for scale T3VALP

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level of ISCED level 2								
Configural	1.000	1.000	0.000	0.000				
Metric	0.981	0.971	0.060	0.052	0.019	0.029	-0.060	-0.052
Scalar	0.734	0.796	0.158	0.164	0.247	0.175	-0.098	-0.112
Invariance level of ISCED level 1								
Configural	1.000	1.000	0.000	0.000				
Metric	0.991	0.985	0.036	0.040	0.009	0.015	-0.036	-0.040
Scalar	0.754	0.800	0.132	0.124	0.237	0.185	-0.096	-0.084
Invariance level of ISCED level 3								
Configural	1.000	1.000	0.000	0.000				
Metric	0.983	0.972	0.052	0.042	0.017	0.028	-0.052	-0.042
Scalar	0.611	0.679	0.178	0.166	0.372	0.293	-0.126	-0.124

Note: See endnote 34.
Source: OECD, TALIS 2018 database.

11.5. Item parameters

As mentioned above, the three scales were all metric invariant for all ISCED levels, which indicates that the unstandardised factor loadings were the same across populations and that the intercepts needed to be estimated separately for each population. Table 11.16 presents the unstandardised factor loadings of the three scales for all populations.

Table 11.16. Unstandardised factor loadings for T3PERUT, T3SOCUT and T3VALP for all countries for all populations

T3PERUT (metric)		T3SOCUT (metric)		T3VALP (metric)	
TT3G07A	0.668	TT3G07E	0.458	TT3G54C	0.571
TT3G07B	0.728	TT3G07F	0.607	TT3G54D	0.559
TT3G07C	0.724	TT3G07G	0.535	TT3G54E	0.502
TT3G07D	0.522				

Source: OECD, TALIS 2018 database.

The item parameters in the next three tables are reported for each scale per participating country/economy. The standardised factor loadings indicate the strength of the relationship between each item and the scale construct (see the section *Description of scales and their parameters*). As presented in Table 11.17, the standardised factor loadings for the scale T3PERUT are above 0.450 for all populations, which indicate at least a moderate relationship between the items and the latent construct. More specifically, most values for items TT3G07A, TT3G07B and TT3G07C are above 0.600, and the lowest item loadings found for item TT3G07D are still above 0.450 for all populations.

The standardised factor loadings for the scale T3SOCUT presented in Table 11.18 were all above 0.450. In most populations and for most items, the loadings were above 0.700, indicating a strong relationship between items and the latent construct.

All factor loadings for all items in the scale T3VALP (Table 11.19 were greater than 0.450. The only exception was item TT3G54D in Brazil, ISCED levels 1 and 3.

Table 11.17. Standardised factor loadings and unstandardised intercepts for scale T3PERUT

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G07A	TT3G07B	TT3G07C	TT3G07D	TT3G07A	TT3G07B	TT3G07C	TT3G07D
ISCED level 2								
Alberta (Canada)	0.829	0.893	0.874	0.498	3.323	3.331	3.318	2.919
Australia	0.810	0.918	0.907	0.560	3.100	3.152	3.203	2.861
Austria	0.731	0.899	0.867	0.575	2.038	2.589	2.641	2.449
Belgium	0.852	0.893	0.853	0.585	2.793	2.854	2.763	2.736
Flemish Community (Belgium)	0.838	0.902	0.811	0.571	2.888	2.993	2.751	2.716
Brazil	0.813	0.871	0.874	0.576	3.055	2.843	2.989	2.834
Bulgaria	0.653	0.735	0.742	0.489	2.582	2.308	2.829	2.818
Ciudad Autónoma de Buenos Aires (Argentina)	0.804	0.893	0.862	0.588	2.317	2.199	2.065	2.136
Chile	0.776	0.869	0.861	0.618	2.574	2.316	2.515	2.583
Colombia	0.833	0.924	0.895	0.594	3.060	2.932	2.920	2.783
Croatia	0.638	0.883	0.863	0.582	2.627	2.626	2.707	2.562
Cyprus	0.820	0.910	0.871	0.640	3.237	3.219	3.206	3.216
Czech Republic	0.770	0.852	0.826	0.553	2.547	2.642	2.638	2.894
Denmark	0.782	0.879	0.884	0.555	2.059	2.337	2.303	2.716
England (United Kingdom)	0.774	0.907	0.897	0.509	3.116	3.208	3.270	2.772
Estonia	0.687	0.865	0.861	0.581	2.714	3.080	3.176	3.209
Finland	0.849	0.917	0.869	0.532	2.913	2.931	2.852	2.905
France	0.850	0.897	0.835	0.554	2.881	2.822	2.744	2.658
Georgia	0.618	0.719	0.794	0.548	3.399	3.388	3.633	3.546
Hungary	0.720	0.859	0.808	0.556	2.007	2.435	2.705	2.724
Iceland	0.696	0.778	0.780	0.506	1.960	2.111	2.608	2.862
Israel	0.790	0.776	0.870	0.619	2.991	2.412	2.924	3.092
Italy	0.817	0.858	0.884	0.573	2.602	2.538	2.532	2.531
Japan	0.579	0.891	0.872	0.499	2.452	3.130	3.185	2.677
Kazakhstan	0.528	0.692	0.740	0.479	2.762	3.112	3.203	2.954
Korea	0.707	0.864	0.878	0.635	2.975	3.132	3.359	3.287
Latvia	0.566	0.754	0.787	0.486	2.943	3.406	3.602	3.340
Lithuania	0.705	0.826	0.798	0.572	2.637	2.922	3.236	3.079
Malta	0.711	0.711	0.823	0.537	3.181	2.864	3.291	3.250
Mexico	0.752	0.852	0.798	0.539	3.287	3.063	3.132	3.066
Netherlands	0.884	0.932	0.850	0.570	2.232	2.305	2.224	2.209

New Zealand	0.737	0.874	0.867	0.518	2.954	3.080	3.129	2.865
Norway	0.734	0.887	0.898	0.563	2.479	2.741	2.907	2.829
Portugal	0.856	0.888	0.897	0.622	2.903	2.811	2.839	2.738
Romania	0.696	0.786	0.794	0.563	3.252	2.984	2.969	3.163
Russian Federation	0.611	0.757	0.776	0.549	2.591	2.968	3.312	3.176
Saudi Arabia	0.693	0.812	0.774	0.496	3.475	3.582	3.574	3.324
Shanghai (China)	0.791	0.812	0.864	0.597	3.520	3.369	3.454	3.374
Singapore	0.768	0.906	0.886	0.548	3.132	3.291	3.255	3.036
Slovak Republic	0.713	0.824	0.821	0.581	2.076	2.506	2.919	2.917
Slovenia	0.875	0.919	0.904	0.607	2.520	2.492	2.577	2.268
South Africa[2]	0.751	0.762	0.777	0.525	3.320	3.013	3.216	3.069
Spain	0.856	0.933	0.885	0.612	2.831	2.758	2.676	2.705
Sweden	0.702	0.816	0.809	0.524	2.443	2.743	2.779	2.722
Chinese Taipei	0.837	0.890	0.854	0.600	3.576	3.599	3.542	3.503
Turkey	0.572	0.784	0.752	0.549	2.802	3.202	3.282	3.277
United Arab Emirates	0.756	0.770	0.807	0.530	3.477	3.240	3.401	3.309
United States	0.779	0.872	0.881	0.557	3.174	3.110	3.169	3.129
Viet Nam	0.698	0.681	0.657	0.527	3.576	3.138	3.175	3.414
ISCED level 1								
Australia[1]	0.810	0.911	0.895	0.565	3.102	3.088	3.157	2.683
Flemish Community (Belgium)	0.867	0.909	0.823	0.590	2.888	2.993	2.751	2.716
Ciudad Autónoma de Buenos Aires (Argentina)	0.817	0.897	0.886	0.628	2.317	2.199	2.065	2.136
Denmark	0.785	0.877	0.875	0.566	2.059	2.337	2.303	2.716
England (United Kingdom)	0.772	0.911	0.906	0.508	3.116	3.208	3.270	2.772
France	0.863	0.906	0.868	0.583	2.881	2.822	2.744	2.658
Japan	0.563	0.893	0.894	0.515	2.452	3.130	3.185	2.677
Korea	0.666	0.853	0.900	0.628	2.975	3.132	3.359	3.287
Netherlands[1]	0.873	0.912	0.859	0.615	2.048	2.069	1.984	1.890
Spain	0.870	0.936	0.889	0.651	2.831	2.758	2.676	2.705
Sweden	0.709	0.838	0.813	0.538	2.443	2.743	2.779	2.722
Chinese Taipei	0.820	0.878	0.841	0.603	3.576	3.599	3.542	3.503
Turkey	0.572	0.793	0.786	0.593	2.802	3.202	3.282	3.277
United Arab Emirates	0.769	0.756	0.814	0.537	3.477	3.240	3.401	3.309
Viet Nam	0.700	0.673	0.653	0.543	3.576	3.138	3.175	3.414
ISCED level 3								
Alberta (Canada)	0.814	0.895	0.820	0.472	3.323	3.331	3.318	2.919
Brazil	0.803	0.861	0.863	0.549	3.055	2.843	2.989	2.834
Croatia	0.613	0.883	0.874	0.560	2.627	2.626	2.707	2.562
Denmark	0.753	0.849	0.859	0.539	2.059	2.337	2.303	2.716
Portugal	0.855	0.890	0.901	0.611	2.903	2.811	2.839	2.738
Slovenia	0.845	0.894	0.908	0.591	2.525	2.541	2.556	2.470
Sweden	0.729	0.840	0.815	0.514	2.443	2.743	2.779	2.722
Chinese Taipei	0.841	0.885	0.834	0.603	3.576	3.599	3.542	3.503
Turkey	0.587	0.775	0.740	0.556	2.802	3.202	3.282	3.277
United Arab Emirates	0.773	0.786	0.819	0.539	3.477	3.240	3.401	3.309
Viet Nam	0.730	0.701	0.683	0.545	3.576	3.138	3.175	3.414
TALIS-PISA link								
Australia	0.802	0.918	0.914	0.543	3.125	3.167	3.198	2.891
Ciudad Autónoma de Buenos Aires (Argentina)	0.821	0.899	0.855	0.587	2.381	2.265	2.107	2.228
Colombia	0.827	0.904	0.872	0.568	3.102	2.961	2.968	2.825
Czech Republic	0.756	0.835	0.828	0.545	2.594	2.665	2.652	2.933

Denmark	0.800	0.913	0.864	0.577	2.168	2.393	2.362	2.709
Georgia	0.622	0.703	0.752	0.581	3.412	3.391	3.599	3.572
Malta	0.694	0.714	0.820	0.530	3.081	2.801	3.212	3.227
Turkey	0.594	0.786	0.755	0.559	2.742	3.097	3.203	3.182
Viet Nam	0.707	0.705	0.690	0.530	3.518	3.069	3.089	3.360

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.18. Standardised factor loadings and unstandardised intercepts for scale T3SOCUT

Participating countries/economies	Standardised factor loadings			Unstandardised intercepts		
	TT3G07E	TT3G07F	TT3G07G	TT3G07E	TT3G07F	TT3G07G
ISCED level 2						
Alberta (Canada)	0.716	0.554	0.645	3.778	3.110	3.643
Australia	0.736	0.701	0.773	3.687	3.150	3.569
Austria	0.691	0.653	0.646	3.694	3.065	3.400
Belgium	0.756	0.719	0.746	3.601	2.942	3.328
Flemish Community (Belgium)	0.743	0.679	0.745	3.732	3.109	3.492
Brazil	0.671	0.794	0.865	3.632	3.598	3.788
Bulgaria	0.695	0.652	0.783	3.431	2.674	3.330
Ciudad Autónoma de Buenos Aires (Argentina)	0.583	0.717	0.815	3.431	3.174	3.578
Chile	0.650	0.739	0.853	3.740	3.667	3.842
Colombia	0.693	0.681	0.847	3.835	3.676	3.874
Croatia	0.783	0.734	0.808	3.612	3.090	3.525
Cyprus	0.708	0.759	0.856	3.692	3.408	3.677
Czech Republic	0.738	0.724	0.781	3.475	2.833	3.359
Denmark	0.722	0.709	0.649	3.618	2.823	3.044
England (United Kingdom)	0.727	0.711	0.766	3.710	3.200	3.504
Estonia	0.746	0.786	0.770	3.304	2.745	3.158
Finland	0.766	0.816	0.717	3.192	2.708	2.807
France	0.725	0.780	0.743	3.405	2.911	3.182
Georgia	0.725	0.619	0.819	3.782	3.360	3.761
Hungary	0.702	0.727	0.695	3.457	2.888	3.246
Iceland	0.738	0.844	0.817	3.011	2.648	3.091
Israel	0.745	0.729	0.802	3.782	3.565	3.755
Italy	0.485	0.765	0.769	3.072	3.257	3.540
Japan	0.639	0.799	0.740	3.301	2.794	3.097
Kazakhstan	0.576	0.652	0.651	3.341	2.914	3.324
Korea	0.763	0.853	0.843	3.318	2.947	3.122
Latvia	0.694	0.732	0.760	3.465	3.120	3.450
Lithuania	0.758	0.795	0.783	3.471	2.957	3.330
Malta	0.722	0.720	0.761	3.667	3.229	3.531
Mexico	0.680	0.579	0.723	3.863	3.569	3.828
Netherlands	0.697	0.724	0.773	3.337	2.295	3.123
New Zealand	0.729	0.743	0.795	3.650	3.168	3.522
Norway	0.727	0.752	0.725	3.437	2.771	3.141
Portugal	0.711	0.849	0.776	3.534	3.410	3.543
Romania	0.712	0.728	0.753	3.648	3.314	3.560
Russian Federation	0.715	0.807	0.781	3.387	3.180	3.446
Saudi Arabia	0.744	0.857	0.816	3.651	3.555	3.632
Shanghai (China)	0.743	0.809	0.851	3.521	3.198	3.481
Singapore	0.731	0.723	0.777	3.689	3.308	3.580

Participating countries/economies	Standardised factor loadings			Unstandardised intercepts		
	TT3G07E	TT3G07F	TT3G07G	TT3G07E	TT3G07F	TT3G07G
Slovak Republic	0.705	0.665	0.768	3.494	2.706	3.483
Slovenia	0.700	0.769	0.743	3.278	2.692	3.273
South Africa[2]	0.748	0.614	0.790	3.784	3.385	3.760
Spain	0.683	0.816	0.838	3.377	3.164	3.468
Sweden	0.784	0.823	0.799	3.465	3.074	3.287
Chinese Taipei	0.744	0.852	0.838	3.515	3.318	3.519
Turkey	0.710	0.588	0.857	3.811	3.503	3.831
United Arab Emirates	0.717	0.655	0.811	3.783	3.475	3.761
United States	0.754	0.609	0.772	3.804	3.326	3.707
Viet Nam	0.650	0.688	0.736	3.731	3.485	3.720
ISCED level 1						
Australia[1]	0.706	0.665	0.749	3.777	3.268	3.616
Flemish Community (Belgium)	0.706	0.593	0.631	3.732	3.109	3.492
Ciudad Autónoma de Buenos Aires (Argentina)	0.595	0.695	0.787	3.431	3.174	3.578
Denmark	0.704	0.624	0.594	3.671	2.900	3.062
England (United Kingdom)	0.726	0.668	0.681	3.710	3.200	3.504
France	0.659	0.677	0.682	3.405	2.911	3.182
Japan	0.642	0.810	0.746	3.301	2.794	3.097
Korea	0.792	0.872	0.861	3.318	2.947	3.122
Netherlands[1]	0.685	0.636	0.741	3.546	2.430	3.337
Spain	0.669	0.805	0.821	3.527	3.356	3.558
Sweden	0.753	0.807	0.770	3.558	3.251	3.342
Chinese Taipei	0.759	0.856	0.848	3.515	3.318	3.519
Turkey	0.732	0.619	0.877	3.811	3.503	3.831
United Arab Emirates	0.697	0.634	0.799	3.783	3.475	3.761
Viet Nam	0.592	0.673	0.769	3.731	3.485	3.720
ISCED level 3						
Alberta (Canada)	0.739	0.582	0.722	3.778	3.110	3.643
Brazil	0.634	0.786	0.871	3.632	3.598	3.788
Croatia	0.763	0.725	0.830	3.612	3.090	3.525
Denmark	0.688	0.712	0.681	3.413	2.276	2.968
Portugal	0.692	0.830	0.774	3.534	3.410	3.543
Slovenia	0.706	0.751	0.770	3.278	2.692	3.273
Sweden	0.755	0.771	0.779	3.408	2.951	3.263
Chinese Taipei	0.725	0.832	0.831	3.515	3.318	3.519
Turkey	0.732	0.619	0.843	3.811	3.503	3.831
United Arab Emirates	0.725	0.658	0.814	3.783	3.475	3.761
Viet Nam	0.648	0.674	0.743	3.731	3.485	3.720
TALIS-PISA link						
Australia	0.737	0.738	0.814	3.640	3.195	3.573
Ciudad Autónoma de Buenos Aires (Argentina)	0.622	0.727	0.791	3.410	3.171	3.604
Colombia	0.601	0.662	0.860	3.832	3.719	3.895
Czech Republic	0.736	0.734	0.782	3.428	2.840	3.306
Denmark	0.709	0.664	0.630	3.612	2.702	2.993
Georgia	0.766	0.614	0.822	3.823	3.464	3.796
Malta	0.746	0.748	0.819	3.611	3.159	3.488
Turkey	0.801	0.692	0.885	3.814	3.505	3.814
Viet Nam	0.659	0.679	0.732	3.704	3.396	3.678

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.19. Standardised factor loadings and unstandardised intercepts for scale T3VALP

Participating countries/economies	Standardised factor loadings			Unstandardised intercepts		
	TT3G54C	TT3G54D	TT3G54C	TT3G54D	TT3G54C	TT3G54D
ISCED level 2						
Alberta (Canada)	0.872	0.833	0.710	2.258	2.309	2.349
Australia	0.875	0.830	0.732	2.114	2.194	2.136
Austria	0.722	0.737	0.717	1.928	1.635	1.622
Belgium	0.842	0.750	0.696	1.755	1.818	1.803
Flemish Community (Belgium)	0.807	0.690	0.640	1.970	2.059	2.112
Brazil	0.750	0.437	0.613	1.514	2.552	1.704
Bulgaria	0.832	0.787	0.722	1.884	1.880	1.817
Ciudad Autónoma de Buenos Aires (Argentina)	0.833	0.599	0.708	1.576	1.962	1.596
Chile	0.754	0.461	0.736	1.576	2.324	1.527
Colombia	0.775	0.580	0.694	1.828	2.471	1.951
Croatia	0.863	0.710	0.754	1.395	1.663	1.536
Cyprus	0.843	0.750	0.712	2.087	2.190	1.984
Czech Republic	0.793	0.737	0.642	1.748	1.762	1.934
Denmark	0.819	0.745	0.695	1.454	1.676	1.661
England (United Kingdom)	0.876	0.855	0.715	1.701	1.701	1.796
Estonia	0.770	0.744	0.668	2.026	2.120	2.055
Finland	0.829	0.827	0.676	2.043	2.056	2.416
France	0.788	0.753	0.706	1.589	1.596	1.542
Georgia	0.799	0.766	0.713	2.304	2.256	2.227
Hungary	0.864	0.873	0.750	1.732	1.699	1.642
Iceland	0.773	0.543	0.662	1.543	2.023	1.554
Israel	0.797	0.551	0.692	1.851	2.396	1.911
Italy	0.745	0.547	0.661	1.555	2.059	1.690
Japan	0.880	0.882	0.739	1.788	1.736	1.667
Kazakhstan	0.789	0.766	0.697	2.220	2.385	2.604
Korea	0.847	0.854	0.752	1.978	1.863	1.815
Latvia	0.803	0.822	0.652	1.802	1.844	2.094
Lithuania	0.795	0.715	0.556	1.518	1.671	1.883
Malta	0.826	0.665	0.715	1.763	1.985	1.704
Mexico	0.796	0.517	0.703	1.580	2.392	1.714
Netherlands	0.702	0.630	0.571	1.934	2.106	2.203
New Zealand	0.847	0.713	0.674	1.834	2.092	1.964
Norway	0.834	0.802	0.680	2.053	2.046	2.017
Portugal	0.766	0.473	0.672	1.451	2.120	1.575
Romania	0.772	0.687	0.721	1.989	2.166	2.045
Russian Federation	0.826	0.851	0.759	2.052	2.023	2.058
Saudi Arabia	0.783	0.654	0.714	2.060	2.500	2.234
Shanghai (China)	0.895	0.818	0.830	2.492	2.387	2.524
Singapore	0.857	0.835	0.727	2.424	2.322	2.518
Slovak Republic	0.786	0.702	0.607	1.521	1.734	1.858
Slovenia	0.793	0.591	0.655	1.506	1.786	1.606
South Africa[2]	0.713	0.677	0.724	2.119	2.444	2.017
Spain	0.796	0.592	0.630	1.512	1.757	1.785
Sweden	0.822	0.822	0.630	1.750	1.715	1.830
Chinese Taipei	0.812	0.870	0.709	1.885	1.780	1.944
Turkey	0.803	0.591	0.737	1.750	2.311	1.721
United Arab Emirates	0.854	0.831	0.770	2.705	2.635	2.826
United States	0.844	0.769	0.722	1.907	2.212	2.102
Viet Nam	0.678	0.656	0.643	2.852	2.998	3.077

Participating countries/economies	Standardised factor loadings			Unstandardised intercepts		
	TT3G54C	TT3G54D	TT3G54C	TT3G54D	TT3G54C	TT3G54D
ISCED level 1						
Australia[1]	0.883	0.840	0.739	2.056	2.129	2.110
Flemish Community (Belgium)	0.752	0.650	0.606	1.970	2.059	2.112
Ciudad Autónoma de Buenos Aires (Argentina)	0.821	0.550	0.693	1.576	1.962	1.596
Denmark	0.810	0.733	0.689	1.454	1.676	1.661
England (United Kingdom)	0.883	0.878	0.732	1.701	1.701	1.796
France	0.733	0.787	0.713	1.589	1.596	1.542
Japan	0.882	0.894	0.760	1.788	1.736	1.667
Korea	0.817	0.851	0.746	1.978	1.863	1.815
Netherlands[1]	0.673	0.553	0.549	1.760	2.123	2.159
Spain	0.738	0.537	0.622	1.512	1.757	1.785
Sweden	0.855	0.837	0.631	1.750	1.715	1.830
Chinese Taipei	0.825	0.865	0.718	1.885	1.780	1.944
Turkey	0.790	0.572	0.713	1.750	2.311	1.721
United Arab Emirates	0.854	0.821	0.782	2.705	2.635	2.826
Viet Nam	0.677	0.626	0.627	2.852	2.998	3.077
ISCED level 3						
Alberta (Canada)	0.840	0.824	0.707	2.164	2.270	2.139
Brazil	0.738	0.429	0.578	1.514	2.552	1.704
Croatia	0.851	0.717	0.698	1.395	1.663	1.536
Denmark	0.850	0.773	0.694	1.454	1.676	1.661
Portugal	0.775	0.494	0.676	1.451	2.120	1.575
Slovenia	0.807	0.657	0.690	1.506	1.786	1.606
Sweden	0.832	0.817	0.602	1.750	1.715	1.830
Chinese Taipei	0.816	0.850	0.686	1.885	1.780	1.944
Turkey	0.813	0.587	0.725	1.750	2.311	1.721
United Arab Emirates	0.862	0.832	0.787	2.705	2.635	2.826
Viet Nam	0.668	0.687	0.677	2.852	2.998	3.077
TALIS-PISA link						
Australia	0.884	0.836	0.735	1.941	2.038	2.020
Ciudad Autónoma de Buenos Aires (Argentina)	0.845	0.508	0.659	1.423	1.912	1.599
Colombia	0.780	0.604	0.701	1.856	2.385	1.949
Czech Republic	0.799	0.745	0.660	1.766	1.803	1.984
Denmark	0.826	0.769	0.713	1.464	1.669	1.670
Georgia	0.795	0.754	0.699	2.404	2.328	2.341
Malta	0.832	0.691	0.757	1.759	1.977	1.725
Turkey	0.793	0.594	0.705	1.825	2.357	1.791
Viet Nam	0.697	0.731	0.685	2.817	3.016	3.027

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Instructional practices: Teaching practices, composite (T3TPRA); Clarity of instruction (T3CLAIN); Cognitive activation (T3COGAC); Classroom management (T3CLASM)

11.6. Measured items

Three subscales and one composite scale measuring instructional practices were derived from the following question stem:

- "Thinking about your teaching in the <target class>, how often do you do the following?" (TT3G42), which was followed by items on instruction that were used for the subscale *Clarity of instruction* (T3CLAIN), items on student tasks for the subscale *Cognitive activation* (T3COGAC), and items on engaging students in the lesson for the subscale *Classroom management* (T3CLASM), as presented in Table 11.20.

These three subscales formed the multidimensional scale *Teaching practices, composite* (T3TPRA).

Table 11.20. Item wording for instructional practices scale items

T3TPRA: Teaching practices, composite	
T3CLAIN: Clarity of instruction (subscale)	
TT3G42: Thinking about your teaching in the <target class>, how often do you do the following?	
Response options: "Never or almost never" (1), "Occasionally" (2), "Frequently" (3), "Always" (4)	
TT3G42A	I present a summary of recently learned content
TT3G42B	I set goals at the beginning of instruction
TT3G42C	I explain what I expect the students to learn
TT3G42D	I explain how new and old topics are related
T3COGAC: Cognitive activation (subscale)	
TT3G42: Thinking about your teaching in the <target class>, how often do you do the following?	
Response options: "Never or almost never" (1), "Occasionally" (2), "Frequently" (3), "Always" (4)	
TT3G42E	I present tasks for which there is no obvious solution
TT3G42F	I give tasks that require students to think critically
TT3G42G	I have students work in small groups to come up with a joint solution to a problem or task
TT3G42H	I ask students to decide on their own procedures for solving complex tasks
T3CLASM: Classroom management (subscale)	
TT3G42: Thinking about your teaching in the <target class>, how often do you do the following?	
Response options: "Never or almost never" (1), "Occasionally" (2), "Frequently" (3), "Always" (4)	
TT3G42I	I tell students to follow classroom rules
TT3G42J	I tell students to listen to what I say
TT3G42K	I calm students who are disruptive
TT3G42L	When the lesson begins, I tell students to quieten down quickly

Source: OECD, TALIS 2018 database.

11.7. Model improvements

Each scale was improved by one or more modifications. A correlation between items TT3G42B and TT3G42D was added to the model for T3CLAIN, which meant that this addition was implemented for all populations. A correlation between items TT3G42G and TT3G42H was added to the model for T3COGAC, and a correlation between items TT3G42K and TT3G42L was added to the model for T3CLASM. These improvements persisted in all subsequent analyses of the scales.

11.8. Scale reliability

Table 11.21 presents the reliability coefficients (omega for the subscales, stratified Cronbach's alpha for T3TPRA) for all populations for each scale. As can be seen, reliability is generally high for the subscales T3CLAIN and T3CLASM. The reliabilities for T3COGAC are also generally high. Exceptions include the ISCED level 2 populations in Belgium and the Flemish Community (Belgium) for T3CLAIN, and the ISCED level 1

population in Viet Nam for T3CLASM. However, low omega values are evident in many participating countries for the scale T3COGAC, especially with respect to the ISCED level 2 population and for the ISCED level 1 and ISCED level 3 populations. The coefficients for the composite scale T3TPRA indicate a high level of reliability in all populations.

Table 11.21. Reliability coefficients for instructional practices scales

Participating countries/economies	T3CLAIN	T3COGAC	T3CLASM	T3TPRA
		Omega coefficient[3]		Stratified Cronbach's alpha
ISCED level 2				
Alberta (Canada)	0.870	0.740	0.889	0.884
Australia	0.876	0.726	0.876	0.871
Austria	0.724	0.578	0.895	0.827
Belgium	0.669	0.651	0.893	0.803
Flemish Community (Belgium)	0.619	0.707	0.904	0.803
Brazil	0.815	0.646	0.830	0.852
Bulgaria	0.776	0.599	0.867	0.834
Ciudad Autónoma de Buenos Aires (Argentina)	0.901	0.726	0.872	0.877
Chile	0.878	0.707	0.889	0.866
Colombia	0.850	0.736	0.867	0.885
Croatia	0.752	0.624	0.904	0.838
Cyprus	0.910	0.666	0.884	0.881
Czech Republic	0.893	0.566	0.872	0.860
Denmark	0.808	0.743	0.935	0.882
England (United Kingdom)	0.843	0.699	0.901	0.864
Estonia	0.824	0.638	0.901	0.848
Finland	0.839	0.767	0.922	0.884
France	0.712	0.567	0.899	0.818
Georgia	0.918	0.750	0.895	0.890
Hungary	0.781	0.645	0.852	0.828
Iceland	0.865	0.664	0.897	0.883
Israel	0.897	0.776	0.897	0.891
Italy	0.821	0.672	0.869	0.844
Japan	0.876	0.687	0.897	0.886
Kazakhstan	0.859	0.776	0.869	0.881
Korea	0.897	0.834	0.893	0.908
Latvia	0.854	0.707	0.824	0.864
Lithuania	0.846	0.615	0.895	0.849
Malta	0.916	0.760	0.861	0.889
Mexico	0.821	0.599	0.790	0.819
Netherlands	0.741	0.787	0.885	0.846
New Zealand	0.814	0.664	0.857	0.838
Norway	0.790	0.723	0.889	0.853
Portugal	0.740	0.717	0.887	0.853
Romania	0.857	0.706	0.882	0.868
Russian Federation	0.893	0.767	0.904	0.884
Saudi Arabia	0.931	0.845	0.859	0.931
Shanghai (China)	0.908	0.830	0.880	0.911
Singapore	0.916	0.808	0.848	0.908
Slovak Republic	0.837	0.687	0.916	0.870
Slovenia	0.789	0.635	0.878	0.850
South Africa[2]	0.821	0.702	0.867	0.883

Participating countries/economies	T3CLAIN	T3COGAC	T3CLASM	T3TPRA
		Omega coefficient[3]		Stratified Cronbach's alpha
Spain	0.781	0.716	0.897	0.849
Sweden	0.810	0.585	0.920	0.863
Chinese Taipei	0.935	0.774	0.910	0.914
Turkey	0.925	0.771	0.880	0.899
United Arab Emirates	0.899	0.799	0.880	0.901
United States	0.920	0.711	0.882	0.895
Viet Nam	0.903	0.721	0.748	0.897
ISCED level 1				
Australia[1]	0.870	0.774	0.889	0.886
Flemish Community (Belgium)	0.740	0.734	0.885	0.826
Ciudad Autónoma de Buenos Aires (Argentina)	0.910	0.731	0.843	0.888
Denmark	0.832	0.748	0.935	0.876
England (United Kingdom)	0.790	0.762	0.901	0.870
France	0.821	0.671	0.872	0.842
Japan	0.863	0.706	0.904	0.871
Korea	0.912	0.845	0.916	0.912
Netherlands1	0.912	0.794	0.899	0.899
Spain	0.808	0.734	0.897	0.865
Sweden	0.845	0.619	0.904	0.857
Chinese Taipei	0.897	0.778	0.899	0.902
Turkey	0.922	0.817	0.874	0.913
United Arab Emirates	0.880	0.817	0.859	0.903
Viet Nam	0.850	0.599	0.659	0.841
ISCED level 3				
Alberta (Canada)	0.887	0.666	0.899	0.883
Brazil	0.865	0.623	0.832	0.865
Croatia	0.796	0.672	0.904	0.845
Denmark	0.826	0.664	0.918	0.864
Portugal	0.752	0.723	0.876	0.861
Slovenia	0.834	0.654	0.865	0.857
Sweden	0.821	0.575	0.891	0.849
Chinese Taipei	0.912	0.759	0.916	0.911
Turkey	0.933	0.787	0.874	0.906
United Arab Emirates	0.925	0.790	0.880	0.905
Viet Nam	0.843	0.691	0.729	0.849
TALIS-PISA link				
Australia	0.859	0.734	0.885	0.872
Ciudad Autónoma de Buenos Aires (Argentina)	0.856	0.677	0.895	0.865
Colombia	0.880	0.729	0.852	0.886
Czech Republic	0.835	0.724	0.872	0.859
Denmark	0.801	0.766	0.941	0.879
Georgia	0.916	0.755	0.891	0.894
Malta	0.887	0.721	0.887	0.880
Turkey	0.924	0.702	0.867	0.884
Viet Nam	0.904	0.721	0.812	0.893

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
3. Calculation of the omega coefficient was based on the unidimensional models for every single subscale of the multidimensional construct.
Source: OECD, TALIS 2018 database.

11.9. Model fits

Table 11.22 presents the model fits for the subscale T3CLAIN. The table shows that the CFI is acceptable for all populations. Although the TLI, RMSEA and SRMR do not reach the cut-off criteria in some populations, they are acceptable in most populations. The model fit indices are also acceptable for most of the populations that were excluded from the parameter estimation.

The model fits for T3COGAC are acceptable for all populations, with the exception of the ISCED level 2 population in Brazil (see Table 11.23). However, the CFI and TLI are below the cut-off criteria for the TALIS-PISA link populations in the Czech Republic and Denmark.

The subscale T3CLASM performed well in all populations, as evident from the model fits presented in Table 11.24.

Table 11.22. CFA model-data fit for scale T3CLAIN

Clarity of instruction

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Alberta (Canada)	0.907	0.440	0.239	0.044
Australia	0.988	0.930	0.068	0.019
Austria	0.987	0.920	0.065	0.018
Belgium	0.991	0.947	0.043	0.012
Flemish Community (Belgium)	0.994	0.962	0.037	0.011
Brazil	0.999	0.995	0.016	0.007
Bulgaria	1.000	0.998	0.008	0.006
Ciudad Autónoma de Buenos Aires (Argentina)	0.998	0.989	0.025	0.009
Chile	0.967	0.804	0.127	0.032
Colombia	1.000	1.009	0.000	0.000
Croatia	0.993	0.955	0.043	0.013
Cyprus	0.998	0.987	0.030	0.012
Czech Republic	0.990	0.940	0.073	0.015
Denmark	0.985	0.909	0.077	0.017
England (United Kingdom)	0.993	0.958	0.055	0.017
Estonia	0.996	0.978	0.048	0.012
Finland	0.972	0.832	0.141	0.027
France	1.000	1.005	0.000	0.003
Georgia	0.994	0.962	0.066	0.012
Hungary	0.996	0.977	0.039	0.011
Iceland	0.998	0.989	0.038	0.009
Israel	0.975	0.847	0.094	0.022
Italy	0.976	0.854	0.100	0.023
Japan	0.977	0.861	0.105	0.024
Kazakhstan	0.985	0.910	0.061	0.019
Korea	1.000	0.998	0.014	0.005
Latvia	0.999	0.993	0.021	0.006
Lithuania	0.975	0.851	0.099	0.027
Malta	0.995	0.968	0.060	0.012
Mexico	1.000	1.003	0.000	0.003
Netherlands	0.984	0.902	0.080	0.017
New Zealand	0.998	0.989	0.026	0.011

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Norway	0.967	0.804	0.109	0.028
Portugal	0.994	0.962	0.049	0.012
Romania	1.000	1.001	0.000	0.004
Russian Federation	0.991	0.947	0.055	0.014
Saudi Arabia	0.998	0.987	0.034	0.009
Shanghai (China)	0.998	0.990	0.028	0.005
Singapore	0.999	0.994	0.025	0.008
Slovak Republic	0.972	0.830	0.120	0.029
Slovenia	0.986	0.916	0.088	0.018
South Africa[2]	0.957	0.948	0.058	0.201
Spain	1.000	1.000	0.000	0.004
Sweden	0.985	0.911	0.082	0.020
Chinese Taipei	1.000	1.003	0.000	0.000
Turkey	1.000	1.003	0.000	0.002
United Arab Emirates	0.986	0.917	0.078	0.018
United States	0.990	0.942	0.056	0.017
Viet Nam	1.000	1.000	0.077	0.018
ISCED level 1				
Australia[1]	0.974	0.969	0.045	0.080
Flemish Community (Belgium)	1.000	1.000	0.000	0.005
Ciudad Autónoma de Buenos Aires (Argentina)	0.971	0.828	0.104	0.024
Denmark	0.998	0.989	0.031	0.008
England (United Kingdom)	0.993	0.957	0.051	0.016
France	1.000	0.998	0.013	0.006
Japan	0.990	0.942	0.068	0.017
Korea	0.991	0.945	0.067	0.018
Netherlands[1]	0.931	0.917	0.072	0.257
Spain	1.000	1.004	0.000	0.002
Sweden	0.996	0.976	0.050	0.013
Chinese Taipei	1.000	1.002	0.000	0.002
Turkey	1.000	1.008	0.000	0.002
United Arab Emirates	0.992	0.952	0.054	0.012
Viet Nam	0.995	0.967	0.052	0.011
ISCED level 3				
Alberta (Canada)	0.998	0.991	0.032	0.014
Brazil	1.000	1.005	0.000	0.003
Croatia	0.997	0.983	0.033	0.012
Denmark	0.996	0.975	0.035	0.011
Portugal	0.999	0.997	0.014	0.005
Slovenia	0.998	0.988	0.031	0.011
Sweden	0.995	0.969	0.039	0.018
Chinese Taipei	0.998	0.990	0.036	0.007
Turkey	1.000	1.000	0.000	0.004
United Arab Emirates	0.998	0.987	0.027	0.007
Viet Nam	0.985	0.912	0.071	0.019
TALIS-PISA link				
Australia	0.981	0.977	0.047	0.045
Ciudad Autónoma de Buenos Aires (Argentina)	0.963	0.955	0.038	0.075
Colombia	0.981	0.977	0.033	0.117
Czech Republic	0.991	0.989	0.032	0.089
Denmark	0.953	0.943	0.049	0.158
Georgia	0.987	0.984	0.034	0.144

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Malta	0.856	0.827	0.129	0.211
Turkey	0.996	0.996	0.012	0.051
Viet Nam	0.998	0.998	0.022	0.065

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.23. CFA model-data fit for scale T3COGAC

Cognitive activation

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Alberta (Canada)	1.000	1.021	0.000	0.001
Australia	1.000	1.002	0.000	0.003
Austria	1.000	1.002	0.000	0.002
Belgium	0.989	0.937	0.059	0.011
Flemish Community (Belgium)	1.000	1.004	0.000	0.002
Brazil	0.863	0.175	0.207	0.031
Bulgaria	0.995	0.967	0.043	0.011
Ciudad Autónoma de Buenos Aires (Argentina)	0.993	0.959	0.044	0.008
Chile	0.999	0.995	0.021	0.006
Colombia	0.993	0.955	0.061	0.010
Croatia	0.998	0.987	0.025	0.009
Cyprus	0.986	0.913	0.066	0.017
Czech Republic	1.000	1.002	0.000	0.003
Denmark	1.000	1.006	0.000	0.001
England (United Kingdom)	1.000	1.002	0.000	0.003
Estonia	1.000	1.005	0.000	0.002
Finland	0.997	0.980	0.046	0.009
France	0.986	0.917	0.066	0.016
Georgia	0.993	0.960	0.053	0.008
Hungary	0.994	0.966	0.045	0.010
Iceland	1.000	1.006	0.000	0.006
Israel	1.000	1.005	0.000	0.001
Italy	0.998	0.990	0.028	0.006
Japan	1.000	0.997	0.015	0.004
Kazakhstan	1.000	1.002	0.000	0.001
Korea	0.998	0.989	0.036	0.006
Latvia	0.972	0.834	0.100	0.020
Lithuania	0.995	0.969	0.031	0.009
Malta	1.000	1.006	0.000	0.002
Mexico	0.996	0.979	0.032	0.007
New Zealand	1.000	1.015	0.000	0.001
Norway	0.999	0.995	0.018	0.005
Portugal	0.998	0.986	0.036	0.007
Romania	0.962	0.774	0.106	0.023
Russian Federation	0.995	0.973	0.039	0.011
Saudi Arabia	0.992	0.951	0.073	0.013
Shanghai (China)	0.995	0.972	0.054	0.007
Singapore	0.992	0.952	0.078	0.011
Slovak Republic	0.985	0.912	0.083	0.015

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Slovenia	0.997	0.980	0.038	0.009
South Africa[2]	0.943	0.931	0.061	0.070
Spain	0.999	0.995	0.016	0.004
Sweden	1.000	1.022	0.000	0.001
Chinese Taipei	1.000	0.998	0.013	0.003
Turkey	1.000	1.001	0.000	0.002
United Arab Emirates	0.998	0.989	0.035	0.006
United States	0.999	0.994	0.013	0.008
Viet Nam	1.000	1.007	0.000	0.002
ISCED level 1				
Australia[1]	0.982	0.979	0.047	0.059
Flemish Community (Belgium)	1.000	1.002	0.000	0.003
Ciudad Autónoma de Buenos Aires (Argentina)	0.996	0.979	0.040	0.008
Denmark	0.999	0.997	0.016	0.006
England (United Kingdom)	1.000	1.003	0.000	0.003
France	1.000	1.022	0.000	0.000
Japan	0.999	0.996	0.019	0.004
Korea	1.000	1.001	0.000	0.002
Netherlands[1]	0.956	0.947	0.069	0.194
Spain	0.999	0.993	0.017	0.006
Sweden	1.000	1.013	0.000	0.001
Chinese Taipei	0.997	0.979	0.045	0.009
Turkey	1.000	1.005	0.000	0.001
United Arab Emirates	0.991	0.946	0.072	0.014
Viet Nam	1.000	0.999	0.009	0.006
ISCED level 3				
Alberta (Canada)	1.000	1.006	0.000	0.005
Brazil	0.931	0.587	0.127	0.030
Croatia	0.990	0.939	0.063	0.014
Denmark	1.000	1.008	0.000	0.004
Portugal	1.000	1.001	0.000	0.002
Slovenia	0.998	0.986	0.030	0.008
Sweden	0.990	0.939	0.042	0.011
Chinese Taipei	0.999	0.996	0.021	0.004
Turkey	1.000	1.002	0.000	0.000
United Arab Emirates	0.982	0.891	0.095	0.017
Viet Nam	1.000	0.999	0.009	0.007
TALIS-PISA link				
Australia	1.000	1.001	0.000	0.021
Ciudad Autónoma de Buenos Aires (Argentina)	0.966	0.959	0.040	0.056
Colombia	0.956	0.947	0.052	0.086
Czech Republic	0.801	0.761	0.071	0.176
Denmark	0.870	0.844	0.071	0.237
Georgia	0.987	0.984	0.022	0.057
Malta	0.982	0.979	0.051	0.082
Turkey	0.937	0.925	0.082	0.142
Viet Nam	0.973	0.968	0.051	0.091

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.24. CFA model-data fit for scale T3CLASM

Classroom management

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Alberta (Canada)	1.000	1.001	0.000	0.005
Australia	0.998	0.990	0.033	0.005
Austria	0.996	0.978	0.057	0.007
Belgium	0.998	0.990	0.036	0.005
Flemish Community (Belgium)	0.999	0.992	0.037	0.005
Brazil	1.000	1.007	0.000	0.001
Bulgaria	0.998	0.987	0.037	0.007
Ciudad Autónoma de Buenos Aires (Argentina)	0.998	0.986	0.041	0.006
Chile	0.999	0.995	0.024	0.006
Colombia	1.000	1.007	0.000	0.001
Croatia	1.000	0.998	0.022	0.004
Cyprus	0.989	0.935	0.092	0.011
Czech Republic	1.000	1.001	0.000	0.002
Denmark	1.000	1.002	0.000	0.002
England (United Kingdom)	0.995	0.971	0.072	0.007
Estonia	1.000	1.002	0.000	0.001
Finland	0.994	0.962	0.092	0.007
France	1.000	1.003	0.000	0.000
Georgia	0.999	0.991	0.033	0.005
Hungary	0.985	0.909	0.103	0.015
Iceland	1.000	1.007	0.000	0.002
Israel	0.999	0.997	0.018	0.004
Italy	0.995	0.969	0.071	0.009
Japan	0.999	0.996	0.031	0.003
Kazakhstan	0.999	0.995	0.021	0.004
Korea	1.000	0.999	0.014	0.003
Latvia	1.000	1.007	0.000	0.001
Lithuania	0.999	0.991	0.034	0.004
Malta	0.993	0.961	0.096	0.012
Mexico	1.000	1.003	0.000	0.001
Netherlands	1.000	1.002	0.000	0.002
New Zealand	1.000	1.000	0.000	0.003
Norway	1.000	1.002	0.000	0.000
Portugal	1.000	1.002	0.000	0.002
Romania	1.000	0.999	0.011	0.003
Russian Federation	0.995	0.970	0.062	0.005
Saudi Arabia	0.999	0.994	0.018	0.006
Shanghai (China)	1.000	1.002	0.000	0.001
Singapore	1.000	1.003	0.000	0.001
Slovak Republic	1.000	1.003	0.000	0.000
Slovenia	1.000	0.998	0.018	0.003
South Africa[2]	0.984	0.907	0.075	0.018
Spain	1.000	1.001	0.000	0.001
Sweden	1.000	1.002	0.000	0.002
Chinese Taipei	1.000	1.002	0.000	0.000
Turkey	0.996	0.975	0.049	0.006
United Arab Emirates	0.998	0.988	0.034	0.005
United States	0.999	0.994	0.020	0.006

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Viet Nam	1.000	1.005	0.000	0.002
ISCED level 1				
Australia[1]	0.997	0.984	0.048	0.006
Flemish Community (Belgium)	0.998	0.990	0.037	0.005
Ciudad Autónoma de Buenos Aires (Argentina)	0.987	0.924	0.069	0.015
Denmark	1.000	1.002	0.000	0.001
England (United Kingdom)	0.996	0.979	0.049	0.008
France	0.997	0.980	0.038	0.007
Japan	0.998	0.989	0.044	0.004
Korea	1.000	0.998	0.015	0.003
Netherlands[1]	1.000	1.009	0.000	0.001
Spain	1.000	0.999	0.007	0.003
Sweden	1.000	1.001	0.000	0.003
Chinese Taipei	0.999	0.993	0.031	0.004
Turkey	0.998	0.985	0.031	0.008
United Arab Emirates	0.985	0.912	0.089	0.015
Viet Nam	0.993	0.959	0.061	0.014
ISCED level 3				
Alberta (Canada)	0.999	0.997	0.026	0.005
Brazil	1.000	0.998	0.010	0.004
Croatia	1.000	1.002	0.000	0.001
Denmark	0.999	0.995	0.028	0.005
Portugal	1.000	0.999	0.008	0.003
Slovenia	0.998	0.985	0.042	0.007
Sweden	1.000	0.999	0.015	0.004
Chinese Taipei	1.000	1.001	0.000	0.001
Turkey	0.999	0.996	0.016	0.004
United Arab Emirates	0.991	0.947	0.077	0.011
Viet Nam	0.999	0.997	0.016	0.005
TALIS-PISA link				
Australia	0.997	0.984	0.051	0.006
Ciudad Autónoma de Buenos Aires (Argentina)	0.996	0.975	0.054	0.008
Colombia	0.999	0.997	0.016	0.004
Czech Republic	1.000	1.003	0.000	0.000
Denmark	1.000	1.006	0.000	0.000
Georgia	0.997	0.985	0.038	0.008
Malta	0.999	0.993	0.035	0.006
Turkey	1.000	1.005	0.000	0.001
Viet Nam	1.000	1.004	0.000	0.002

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

11.10. Invariance testing

11.25, 11.26 and 11.27 present the results from the measurement invariance testing for the instructional practices scales. Here it is evident that the subscale T3CLAIN reached metric invariance for all ISCED levels. For ISCED level 2, improvement can be seen in both the TLI and RMSEA, while for ISCED levels 1 and 3, the change in at least the TLI and RMSEA is below the cut-off criterion between the metric and configural models.

The change in the TLI and RMSEA for the subscale T3COGAC is acceptable for all ISCED levels between the metric and configural models, thus resulting in a metric invariance level

for all ISCED levels. Although the subscale T3CLASM reaches configural invariance for ISCED levels 2 and 3 only, it meets the criteria for metric invariance for ISCED level 1. Based on the lowest invariance level of its subscales, the composite scale T3TPRA can be considered metric invariant for ISCED level 1 and configural invariant for ISCED levels 2 and 3.

Table 11.25. Invariance test results for scale T3CLAIN

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level of ISCED level 2								
Configural	0.991	0.947	0.061	0.016				
Metric	0.979	0.968	0.048	0.058	0.012	-0.021	0.013	-0.042
Scalar	0.744	0.777	0.126	0.132	0.235	0.191	-0.078	-0.074
Invariance level of ISCED level 1								
Configural	0.995	0.973	0.043	0.012				
Metric	0.982	0.971	0.044	0.057	0.013	0.002	-0.001	-0.045
Scalar	0.718	0.741	0.134	0.168	0.264	0.230	-0.090	-0.111
Invariance level of ISCED level 3								
Configural	0.998	0.989	0.028	0.010				
Metric	0.991	0.986	0.031	0.037	0.007	0.003	-0.003	-0.027
Scalar	0.814	0.827	0.109	0.115	0.177	0.159	-0.078	-0.078

Source: OECD, TALIS 2018 database.

Table 11.26. Invariance test results for scale T3COGAC

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level of ISCED level 2								
Configural	0.996	0.976	0.042	0.009				
Metric	0.975	0.962	0.052	0.053	0.021	0.014	-0.010	-0.044
Scalar	0.644	0.689	0.148	0.152	0.331	0.273	-0.096	-0.099
Invariance level of ISCED level 1								
Configural	0.998	0.986	0.033	0.008				
Metric	0.983	0.973	0.046	0.051	0.015	0.013	-0.013	-0.043
Scalar	0.778	0.797	0.126	0.127	0.205	0.176	-0.080	-0.076
Invariance level of ISCED level 3								
Configural	0.994	0.962	0.053	0.012				
Metric	0.974	0.958	0.056	0.053	0.020	0.004	-0.003	-0.041
Scalar	0.544	0.576	0.177	0.202	0.430	0.382	-0.121	-0.149

Note: See endnote 34.
Source: OECD, TALIS 2018 database.

Table 11.27. Invariance test results for scale T3CLASM

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level of ISCED level 2								
Configural	0.999	0.993	0.030	0.005				
Metric	0.981	0.971	0.060	0.080	0.018	0.022	-0.030	-0.075
Scalar	0.858	0.876	0.123	0.136	0.123	0.095	-0.063	-0.056
Invariance level of ISCED level 1								
Configural	0.995	0.972	0.053	0.009				
Metric	0.978	0.965	0.059	0.076	0.017	0.007	-0.006	-0.067
Scalar	0.846	0.858	0.119	0.124	0.132	0.107	-0.060	-0.048
Invariance level of ISCED level 3								
Configural	0.998	0.988	0.037	0.006				
Metric	0.970	0.952	0.073	0.099	0.028	0.036	-0.036	-0.093
Scalar	0.849	0.859	0.126	0.125	0.121	0.093	-0.053	-0.026

Note: See endnote 34.
Source: OECD, TALIS 2018 database.

11.11. Item parameters

Table 11.28 reports the unstandardised item parameters for the subscales that reached metric invariance (T3CLAIN and T2COGAC).

Table 11.28. Unstandardised factor loadings for T3CLAIN and T3COGAC for all countries for all populations

T3CLAIN (metric)		T3COGAC (metric)	
TT3G42A	0.352	TT3G42E	0.484
TT3G42B	0.549	TT3G42F	0.534
TT3G42C	0.436	TT3G42G	0.360
TT3G42D	0.480	TT3G42H	0.428

Source: OECD, TALIS 2018 database.

Tables 11.29, 11.30 and 11.31 present the standardised factor loadings and unstandardised intercepts for the subscales T3CLAIN, T3COGAC and T3CLASM respectively. For T3CLAIN, the factor loadings for items TT3G42B, TT3G42C and TT3G42D are generally high and all above 0.450. However, item TT3G42BA shows lower factor loadings in many participating countries (also seen in Table 11.28 above), suggesting that this item is only weakly related to the scale construct.

In general, the factor loadings for items included in the subscale T3COGAC are above 0.450 in most populations. The strongest relationship observed is that between item TT3G42F and the latent construct, whereas most of the factor loadings for item TT3G42G are between 0.450 and 0.600.

In most populations, the factor loadings for T3CLASM for all items are higher than 0.600, indicating a strong relationship between the items and the latent construct. However, several populations exhibit lower loadings for items TT3G42K and TT3G42L, as observed in Latvia for ISCED level 2, and for item TT3G42L in Portugal for ISCED levels 2 and 3.

Table 11.29. Standardised factor loadings and unstandardised intercepts for scale T3CLAIN

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G07A	TT3G07B	TT3G07C	TT3G07D	TT3G07A	TT3G07B	TT3G07C	TT3G07D
ISCED level 2								
Alberta (Canada)	0.565	0.774	0.717	0.721	3.022	3.080	3.389	3.230
Australia	0.515	0.802	0.738	0.698	2.897	3.165	3.389	3.134
Austria	0.443	0.642	0.588	0.616	2.803	2.709	3.099	3.002
Belgium	0.381	0.549	0.589	0.601	2.874	2.727	3.401	3.144
Flemish Community (Belgium)	0.347	0.491	0.601	0.570	2.675	2.550	3.535	3.216
Brazil	0.476	0.743	0.676	0.700	3.054	3.211	3.389	3.287
Bulgaria	0.455	0.733	0.646	0.647	3.209	3.515	3.569	3.486
Ciudad Autónoma de Buenos Aires (Argentina)	0.413	0.763	0.608	0.763	2.751	3.115	3.215	3.453
Chile	0.392	0.796	0.676	0.677	3.055	3.679	3.630	3.471
Colombia	0.447	0.796	0.695	0.712	3.011	3.389	3.498	3.424
Croatia	0.386	0.646	0.665	0.682	2.722	3.079	3.481	3.395
Cyprus	0.498	0.841	0.676	0.725	3.354	3.508	3.508	3.478
Czech Republic	0.491	0.807	0.624	0.702	3.179	3.380	3.159	3.118
Denmark	0.527	0.709	0.643	0.661	2.858	2.682	3.048	2.893
England (United Kingdom)	0.451	0.782	0.687	0.651	2.884	3.310	3.552	3.108
Estonia	0.514	0.771	0.690	0.681	2.982	3.242	3.348	3.180
Finland	0.533	0.747	0.658	0.727	2.648	2.786	2.872	2.870
France	0.435	0.681	0.635	0.580	3.156	3.170	3.355	2.976
Georgia	0.558	0.845	0.656	0.770	3.433	3.536	3.429	3.518
Hungary	0.490	0.702	0.662	0.656	2.997	3.297	3.510	3.270
Iceland	0.511	0.780	0.736	0.736	2.304	2.921	3.143	2.939
Israel	0.475	0.807	0.686	0.758	2.967	3.135	3.239	3.366
Italy	0.460	0.728	0.599	0.716	3.080	3.172	3.189	3.447
Japan	0.436	0.762	0.649	0.652	2.795	3.422	3.306	2.776
Kazakhstan	0.418	0.796	0.657	0.722	3.048	3.538	3.507	3.480
Korea	0.580	0.807	0.785	0.796	3.090	3.133	3.388	3.214
Latvia	0.479	0.816	0.674	0.694	3.147	3.459	3.517	3.360
Lithuania	0.369	0.843	0.738	0.599	2.758	3.691	3.726	3.312
Malta	0.477	0.846	0.673	0.696	2.996	3.201	3.302	3.127
Mexico	0.406	0.760	0.631	0.645	2.758	3.364	3.474	3.363
Netherlands	0.424	0.647	0.627	0.647	2.730	3.050	3.318	3.147
New Zealand	0.466	0.744	0.678	0.643	2.711	3.054	3.365	2.989
Norway	0.507	0.697	0.632	0.650	2.893	2.944	3.066	2.987
Portugal	0.402	0.658	0.594	0.657	3.121	2.721	2.956	3.216
Romania	0.385	0.814	0.688	0.711	3.038	3.650	3.675	3.604
Russian Federation	0.501	0.827	0.671	0.766	2.963	3.463	3.182	3.236
Saudi Arabia	0.563	0.890	0.742	0.801	3.255	3.480	3.491	3.479
Shanghai (China)	0.581	0.877	0.768	0.737	3.266	3.542	3.473	3.375
Singapore	0.532	0.843	0.741	0.707	2.938	3.131	3.320	3.072
Slovak Republic	0.490	0.762	0.641	0.674	3.137	3.400	3.409	3.261
Slovenia	0.477	0.695	0.630	0.670	3.008	2.951	3.270	3.132
South Africa[2]	0.535	0.811	0.776	0.772	3.137	3.268	3.523	3.391
Spain	0.439	0.698	0.657	0.683	2.955	3.134	3.454	3.334
Sweden	0.505	0.747	0.681	0.663	2.958	3.172	3.312	2.893
Chinese Taipei	0.561	0.862	0.676	0.773	3.025	3.199	3.139	3.236
Turkey	0.522	0.880	0.681	0.772	3.177	3.348	3.317	3.390
United Arab Emirates	0.439	0.871	0.724	0.677	3.298	3.703	3.721	3.532

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G07A	TT3G07B	TT3G07C	TT3G07D	TT3G07A	TT3G07B	TT3G07C	TT3G07D
United States	0.503	0.824	0.687	0.770	2.902	3.208	3.353	3.190
Viet Nam	0.562	0.835	0.654	0.785	3.014	3.243	3.118	3.192
ISCED level 1								
Australia[1]	0.458	0.814	0.730	0.682	2.944	3.234	3.488	3.134
Flemish Community (Belgium)	0.464	0.648	0.612	0.663	2.768	2.669	3.248	2.954
Ciudad Autónoma de Buenos Aires (Argentina)	0.431	0.794	0.617	0.756	2.717	3.180	3.118	3.334
Denmark	0.542	0.728	0.673	0.684	2.886	2.732	3.095	2.829
England (United Kingdom)	0.403	0.759	0.707	0.616	2.884	3.310	3.552	3.108
France	0.510	0.784	0.702	0.667	3.156	3.170	3.355	2.976
Japan	0.410	0.810	0.590	0.617	2.798	3.659	3.320	2.815
Korea	0.518	0.876	0.796	0.743	3.160	3.468	3.570	3.362
Netherlands[1]	0.456	0.768	0.642	0.647	2.983	3.516	3.455	3.119
Spain	0.449	0.733	0.631	0.709	2.955	3.134	3.454	3.334
Sweden	0.553	0.783	0.723	0.709	2.936	2.947	3.174	2.737
Chinese Taipei	0.525	0.846	0.663	0.741	3.025	3.199	3.139	3.236
Turkey	0.529	0.875	0.657	0.774	3.177	3.348	3.317	3.390
United Arab Emirates	0.434	0.869	0.728	0.681	3.298	3.703	3.721	3.532
Viet Nam	0.488	0.792	0.601	0.739	3.014	3.243	3.118	3.192
ISCED level 3								
Alberta (Canada)	0.543	0.763	0.698	0.728	3.022	3.080	3.389	3.230
Brazil	0.513	0.796	0.681	0.736	3.054	3.211	3.389	3.287
Croatia	0.433	0.689	0.685	0.719	2.722	3.079	3.481	3.395
Denmark	0.497	0.704	0.642	0.704	2.923	2.943	3.091	3.047
Portugal	0.418	0.675	0.596	0.657	3.121	2.721	2.956	3.216
Slovenia	0.520	0.729	0.636	0.719	3.065	2.879	3.197	3.176
Sweden	0.488	0.731	0.665	0.677	2.935	3.054	3.231	2.989
Chinese Taipei	0.562	0.866	0.692	0.774	3.025	3.199	3.139	3.236
Turkey	0.533	0.887	0.684	0.769	3.177	3.348	3.317	3.390
United Arab Emirates	0.435	0.885	0.725	0.690	3.298	3.703	3.721	3.532
Viet Nam	0.491	0.772	0.616	0.723	3.014	3.243	3.118	3.192
TALIS-PISA link								
Australia	0.526	0.777	0.724	0.715	2.950	3.191	3.400	3.172
Ciudad Autónoma de Buenos Aires (Argentina)	0.389	0.692	0.614	0.729	2.776	3.123	3.265	3.478
Colombia	0.444	0.763	0.672	0.703	3.005	3.360	3.491	3.444
Czech Republic	0.494	0.805	0.645	0.725	3.175	3.336	3.152	3.120
Denmark	0.480	0.627	0.583	0.641	2.921	2.750	3.114	3.009
Georgia	0.523	0.825	0.645	0.760	3.450	3.606	3.487	3.596
Malta	0.481	0.859	0.693	0.697	3.001	3.199	3.286	3.233
Turkey	0.539	0.854	0.683	0.760	3.194	3.324	3.335	3.425
Viet Nam	0.536	0.841	0.663	0.799	3.028	3.284	3.124	3.229

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.30. Standardised factor loadings and unstandardised intercepts for scale T3COGAC

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G42E	TT3G42F	TT3G42G	TT3G42H	TT3G42E	TT3G42F	TT3G42G	TT3G42H
ISCED level 2								
Alberta (Canada)	0.556	0.789	0.501	0.586	2.144	2.927	2.612	2.566
Australia	0.558	0.785	0.469	0.562	2.071	2.786	2.520	2.410
Austria	0.508	0.623	0.418	0.458	1.711	2.475	2.401	2.275
Belgium	0.583	0.676	0.434	0.523	2.147	2.399	2.204	2.008
Flemish Community (Belgium)	0.610	0.732	0.496	0.575	1.960	2.336	2.344	2.054
Brazil	0.437	0.737	0.445	0.443	2.343	3.089	2.601	2.261
Bulgaria	0.481	0.645	0.460	0.507	1.828	2.685	2.499	2.556
Ciudad Autónoma de Buenos Aires (Argentina)	0.558	0.785	0.510	0.541	2.638	3.066	2.803	2.617
Chile	0.571	0.753	0.505	0.580	2.624	2.889	2.929	2.831
Colombia	0.547	0.789	0.552	0.559	2.744	3.221	3.118	2.807
Croatia	0.473	0.678	0.455	0.504	2.104	2.659	2.280	2.021
Cyprus	0.472	0.749	0.424	0.495	1.985	2.883	2.543	2.414
Czech Republic	0.501	0.607	0.416	0.430	1.672	2.378	2.191	2.235
Denmark	0.671	0.759	0.538	0.552	2.501	2.635	2.889	2.506
England (United Kingdom)	0.589	0.746	0.449	0.549	2.202	2.775	2.519	2.399
Estonia	0.497	0.685	0.464	0.520	1.755	2.458	2.367	2.191
Finland	0.668	0.799	0.467	0.601	2.233	2.320	2.403	2.093
France	0.493	0.618	0.371	0.463	2.012	2.535	2.479	2.052
Georgia	0.545	0.804	0.522	0.605	2.405	2.911	2.696	2.788
Hungary	0.524	0.694	0.488	0.509	2.119	2.607	2.331	2.300
Iceland	0.536	0.712	0.428	0.552	1.857	2.512	2.399	2.529
Israel	0.663	0.802	0.554	0.639	2.196	2.539	2.314	2.293
Italy	0.568	0.711	0.485	0.530	2.363	2.771	2.434	2.358
Japan	0.613	0.733	0.389	0.510	1.731	1.738	2.405	2.044
Kazakhstan	0.601	0.806	0.583	0.644	2.724	3.031	3.043	2.946
Korea	0.736	0.865	0.568	0.653	2.268	2.454	2.712	2.538
Latvia	0.503	0.770	0.510	0.533	2.674	2.853	2.475	2.473
Lithuania	0.453	0.683	0.405	0.493	1.693	2.858	2.532	2.758
Malta	0.572	0.820	0.483	0.592	2.096	2.674	2.383	2.347
Mexico	0.482	0.652	0.455	0.491	2.195	2.796	2.862	2.812
Netherlands	0.644	0.843	0.442	0.558	2.317	2.566	2.434	2.305
New Zealand	0.520	0.725	0.448	0.523	2.050	2.791	2.631	2.502
Norway	0.651	0.750	0.470	0.528	2.549	2.524	2.661	2.543
Portugal	0.657	0.748	0.434	0.552	2.758	2.778	2.545	2.424
Romania	0.528	0.743	0.531	0.551	1.869	2.815	2.582	2.409
Russian Federation	0.618	0.811	0.541	0.596	2.604	2.665	2.421	2.438
Saudi Arabia	0.651	0.888	0.571	0.666	2.434	2.845	3.082	2.755
Shanghai (China)	0.626	0.864	0.635	0.707	2.391	2.663	2.891	2.843
Singapore	0.651	0.853	0.548	0.625	2.224	2.618	2.473	2.283
Slovak Republic	0.522	0.738	0.496	0.531	2.138	2.624	2.379	2.503
Slovenia	0.490	0.691	0.455	0.519	2.172	2.647	2.181	2.151
South Africa[2]	0.500	0.807	0.444	0.511	2.481	3.065	2.617	2.601
Spain	0.586	0.773	0.471	0.523	2.373	2.758	2.436	2.326
Sweden	0.516	0.619	0.398	0.472	2.012	2.499	2.478	2.416
Chinese Taipei	0.652	0.815	0.505	0.620	2.296	2.546	2.395	2.341

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G42E	TT3G42F	TT3G42G	TT3G42H	TT3G42E	TT3G42F	TT3G42G	TT3G42H
Turkey	0.599	0.804	0.575	0.664	1.869	2.652	2.471	2.643
United Arab Emirates	0.536	0.850	0.592	0.634	2.425	3.142	3.211	2.936
United States	0.524	0.783	0.436	0.534	2.021	2.947	2.633	2.436
Viet Nam	0.646	0.716	0.546	0.613	2.855	2.368	2.821	2.639
ISCED level 1								
Australia[1]	0.598	0.810	0.522	0.595	2.193	2.701	2.680	2.516
Flemish Community (Belgium)	0.644	0.763	0.515	0.580	2.081	2.383	2.652	2.425
Ciudad Autónoma de Buenos Aires (Argentina)	0.562	0.785	0.518	0.572	2.616	3.107	2.885	2.934
Denmark	0.668	0.773	0.512	0.552	2.301	2.294	2.561	2.256
England (United Kingdom)	0.627	0.805	0.539	0.591	2.391	2.756	2.755	2.622
France	0.622	0.691	0.442	0.505	2.003	2.187	2.493	2.388
Japan	0.622	0.752	0.438	0.523	1.742	1.745	2.582	2.310
Korea	0.722	0.876	0.613	0.662	2.325	2.522	2.956	2.605
Netherlands[1]	0.641	0.751	0.507	0.556	2.293	2.592	2.748	2.598
Spain	0.594	0.786	0.499	0.563	2.396	2.753	2.710	2.581
Sweden	0.555	0.660	0.424	0.463	1.996	2.291	2.479	2.332
Chinese Taipei	0.646	0.814	0.532	0.621	2.370	2.599	2.625	2.452
Turkey	0.600	0.858	0.602	0.690	1.869	2.652	2.471	2.643
United Arab Emirates	0.546	0.866	0.623	0.652	2.425	3.142	3.211	2.936
Viet Nam	0.517	0.591	0.508	0.529	2.734	2.345	3.047	2.765
ISCED level 3								
Alberta (Canada)	0.505	0.739	0.409	0.519	2.144	2.927	2.612	2.566
Brazil	0.436	0.716	0.423	0.436	2.343	3.089	2.601	2.261
Croatia	0.506	0.723	0.481	0.545	2.104	2.659	2.280	2.021
Denmark	0.584	0.673	0.503	0.510	2.439	2.627	2.929	2.416
Portugal	0.664	0.757	0.428	0.543	2.758	2.778	2.545	2.424
Slovenia	0.504	0.716	0.449	0.523	2.172	2.647	2.181	2.151
Sweden	0.483	0.617	0.420	0.455	2.029	2.652	2.522	2.411
Chinese Taipei	0.641	0.794	0.523	0.624	2.289	2.531	2.387	2.370
Turkey	0.629	0.819	0.562	0.672	1.869	2.652	2.471	2.643
United Arab Emirates	0.527	0.845	0.584	0.620	2.425	3.142	3.211	2.936
Viet Nam	0.604	0.690	0.532	0.596	2.902	2.480	2.743	2.659
TALIS-PISA link								
Australia	0.562	0.793	0.479	0.559	2.100	2.818	2.479	2.408
Ciudad Autónoma de Buenos Aires (Argentina)	0.530	0.713	0.464	0.512	2.597	3.082	2.816	2.643
Colombia	0.497	0.753	0.498	0.506	2.697	3.222	3.094	2.781
Czech Republic	0.510	0.640	0.406	0.433	1.675	2.360	2.177	2.275
Denmark	0.627	0.705	0.537	0.530	2.539	2.690	2.916	2.587
Georgia	0.522	0.803	0.534	0.593	2.475	2.977	2.754	2.814
Malta	0.599	0.804	0.486	0.616	2.061	2.709	2.339	2.381
Turkey	0.616	0.792	0.552	0.657	1.799	2.548	2.335	2.533
Viet Nam	0.643	0.719	0.545	0.656	2.924	2.382	2.820	2.646

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.31. Standardised factor loadings and unstandardised intercepts for scale T3CLASM

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G42I	TT3G42J	TT3G42K	TT3G42L	TT3G42I	TT3G42J	TT3G42K	TT3G42L
ISCED level 2								
Alberta (Canada)	0.872	0.870	0.729	0.682	2.694	2.614	2.724	2.716
Australia	0.851	0.873	0.674	0.616	2.726	2.749	2.715	2.886
Austria	0.818	0.902	0.789	0.639	2.775	2.835	2.769	2.744
Belgium	0.857	0.902	0.702	0.554	3.160	3.153	3.203	3.278
Flemish Community (Belgium)	0.876	0.907	0.722	0.646	3.185	3.169	3.274	3.358
Brazil	0.635	0.867	0.663	0.596	3.362	3.434	3.251	3.065
Bulgaria	0.833	0.864	0.698	0.618	3.304	3.217	3.038	2.908
Ciudad Autónoma de Buenos Aires (Argentina)	0.809	0.884	0.714	0.625	3.319	3.237	3.086	2.935
Chile	0.728	0.921	0.732	0.632	3.483	3.446	3.380	3.125
Colombia	0.717	0.893	0.723	0.642	3.368	3.336	3.319	3.004
Croatia	0.804	0.930	0.723	0.632	2.624	2.599	2.448	2.117
Cyprus	0.853	0.890	0.684	0.576	3.359	3.322	3.301	3.101
Czech Republic	0.742	0.905	0.689	0.583	2.552	2.635	2.492	2.221
Denmark	0.852	0.952	0.782	0.701	2.642	2.721	2.820	2.873
England (United Kingdom)	0.849	0.910	0.702	0.692	2.990	3.000	2.852	3.148
Estonia	0.852	0.916	0.661	0.650	2.394	2.259	2.307	1.902
Finland	0.878	0.931	0.759	0.689	2.744	2.876	2.752	2.818
France	0.849	0.911	0.703	0.639	3.206	3.167	3.047	2.980
Georgia	0.669	0.930	0.695	0.679	2.761	2.363	2.316	2.260
Hungary	0.606	0.882	0.716	0.707	3.427	3.138	3.087	2.909
Iceland	0.729	0.928	0.694	0.569	2.878	3.104	3.019	2.579
Israel	0.761	0.925	0.727	0.647	3.433	3.365	3.216	3.020
Italy	0.759	0.899	0.698	0.561	3.207	3.098	2.927	2.548
Japan	0.849	0.913	0.708	0.641	2.895	2.904	2.471	2.266
Kazakhstan	0.802	0.881	0.736	0.606	2.839	2.771	2.403	2.392
Korea	0.779	0.918	0.749	0.641	3.069	3.124	2.996	2.876
Latvia	0.615	0.889	0.414	0.410	3.543	3.525	2.600	2.822
Lithuania	0.850	0.909	0.717	0.632	3.048	2.938	2.755	2.288
Malta	0.812	0.845	0.742	0.686	3.129	3.117	2.966	3.123
Mexico	0.596	0.828	0.654	0.584	3.257	3.381	3.301	2.896
Netherlands	0.846	0.894	0.712	0.533	3.285	3.405	3.197	3.162
New Zealand	0.798	0.866	0.659	0.632	2.716	2.683	2.740	2.781
Norway	0.808	0.907	0.729	0.712	2.584	2.705	2.795	2.873
Portugal	0.894	0.879	0.541	0.125	3.740	3.744	3.389	3.113
Romania	0.757	0.915	0.667	0.566	3.483	3.409	3.218	2.879
Russian Federation	0.893	0.893	0.769	0.688	2.513	2.503	2.133	2.032
Saudi Arabia	0.679	0.888	0.724	0.714	3.447	3.495	3.439	3.347
Shanghai (China)	0.822	0.858	0.817	0.722	2.933	2.637	2.702	2.817
Singapore	0.805	0.845	0.665	0.659	3.040	2.997	2.797	3.089
Slovak Republic	0.844	0.936	0.744	0.645	3.088	3.045	2.943	2.721
Slovenia	0.792	0.898	0.651	0.678	2.786	2.814	2.940	2.482
South Africa[2]	0.763	0.899	0.675	0.525	3.427	3.449	3.378	3.385
Spain	0.846	0.909	0.707	0.599	3.337	3.348	3.229	2.992
Sweden	0.859	0.932	0.779	0.650	2.816	2.969	2.812	2.751
Chinese Taipei	0.866	0.922	0.709	0.659	3.272	3.230	2.959	3.062
Turkey	0.830	0.890	0.700	0.605	3.254	3.349	3.122	2.873

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G42I	TT3G42J	TT3G42K	TT3G42L	TT3G42I	TT3G42J	TT3G42K	TT3G42L
United Arab Emirates	0.841	0.879	0.695	0.683	3.506	3.382	3.319	3.326
United States	0.864	0.872	0.686	0.651	2.842	2.736	2.728	2.763
Viet Nam	0.743	0.704	0.613	0.557	3.253	2.644	2.879	3.027
ISCED level 1								
Australia[1]	0.860	0.891	0.682	0.663	2.916	2.838	2.883	2.851
Flemish Community (Belgium)	0.837	0.896	0.691	0.609	3.185	3.169	3.274	3.358
Ciudad Autónoma de Buenos Aires (Argentina)	0.818	0.830	0.680	0.558	3.623	3.492	3.481	3.223
Denmark	0.859	0.950	0.818	0.703	3.092	3.141	3.206	3.245
England (United Kingdom)	0.848	0.913	0.687	0.676	3.112	3.054	2.869	3.042
France	0.823	0.886	0.673	0.574	3.323	3.220	3.108	2.805
Japan	0.859	0.921	0.696	0.612	3.216	3.134	2.751	2.470
Korea	0.832	0.936	0.756	0.636	3.271	3.288	3.196	2.955
Netherlands[1]	0.869	0.907	0.663	0.621	3.574	3.571	3.316	3.467
Spain	0.861	0.907	0.694	0.574	3.337	3.348	3.229	2.992
Sweden	0.829	0.921	0.753	0.634	2.816	2.969	2.812	2.751
Chinese Taipei	0.854	0.912	0.679	0.630	3.272	3.230	2.959	3.062
Turkey	0.834	0.875	0.703	0.615	3.254	3.349	3.122	2.873
United Arab Emirates	0.830	0.843	0.689	0.663	3.506	3.382	3.319	3.326
Viet Nam	0.675	0.584	0.526	0.522	3.253	2.644	2.879	3.027
ISCED level 3								
Alberta (Canada)	0.878	0.897	0.672	0.657	2.694	2.614	2.724	2.716
Brazil	0.662	0.861	0.689	0.638	3.362	3.434	3.251	3.065
Croatia	0.788	0.930	0.734	0.647	2.624	2.599	2.448	2.117
Denmark	0.818	0.938	0.767	0.690	2.237	2.347	2.474	2.410
Portugal	0.868	0.882	0.522	0.151	3.599	3.651	3.066	3.226
Slovenia	0.766	0.889	0.620	0.664	2.786	2.814	2.940	2.482
Sweden	0.804	0.905	0.748	0.645	2.816	2.969	2.812	2.751
Chinese Taipei	0.865	0.930	0.726	0.697	3.272	3.230	2.959	3.062
Turkey	0.827	0.873	0.727	0.632	3.254	3.349	3.122	2.873
United Arab Emirates	0.837	0.880	0.707	0.688	3.506	3.382	3.319	3.326
Viet Nam	0.709	0.706	0.577	0.558	3.253	2.644	2.879	3.027
TALIS-PISA link								
Australia	0.842	0.894	0.675	0.639	2.701	2.716	2.719	2.897
Ciudad Autónoma de Buenos Aires (Argentina)	0.808	0.916	0.709	0.608	3.281	3.185	3.007	2.888
Colombia	0.724	0.870	0.743	0.629	3.392	3.368	3.305	2.997
Czech Republic	0.742	0.903	0.713	0.599	2.470	2.568	2.439	2.206
Denmark	0.827	0.961	0.769	0.683	2.490	2.549	2.645	2.717
Georgia	0.725	0.914	0.747	0.762	2.634	2.276	2.194	2.190
Malta	0.770	0.913	0.690	0.681	2.928	2.945	2.824	2.932
Turkey	0.839	0.836	0.731	0.664	3.058	3.183	2.956	2.725
Viet Nam	0.816	0.560	0.753	0.728	3.172	2.519	2.776	2.966

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Professional practices: Teacher co-operation, composite (T3COOP); Exchange and co-ordination among teachers (T3EXCH); Professional collaboration in lessons among teachers (T3COLES)

11.12. Measured items

Table 11.32 presents two subscales and one composite scale developed from the question stem:

- "On average, how often do you do the following in this school?" (TT3G33), which was followed by items regarding interactions with other teachers. These items formed the subscale *Exchange and co-ordination among teachers* (T3EXCH), while items concerning collaboration with other teachers formed the subscale *Professional collaboration in lessons among teachers* (T3COLES).

These two subscales formed the multidimensional scale *Teacher co-operation, composite* (T3COOP).

11.13. Scale reliability

Table 11.33 presents the reliability coefficients (omega for the subscales and stratified Cronbach's alpha for T3COOP) for all populations for each scale. The reliabilities for T3EXCH are generally high (above 0.700), while they are acceptable for T3COLES, that is, mostly above 0.600. The reliabilities for the composite scale T3COOP are also high in all populations. Of note, the coefficients for T3EXCH are slightly lower for the Estonia, France, Netherlands and Viet Nam ISCED level 2 populations, and for the Denmark and Viet Nam ISCED level 1 populations. In contrast, the omega values for T3COLES are lower in considerably more populations.

11.14. Model fits

The subscale T3EXCH performed well for nearly all populations for a majority of the fit indices, with the exception of the Korea ISCED level 1 population, as presented in Table 11.34. Most of the fit indices of subscale T3COLES also performed well for a majority of populations, with the exception of the ISCED level 2 populations in Italy and Shanghai (China), the ISCED level 1 populations of the Netherlands and Viet Nam, and the TALIS-PISA link populations in Denmark and Viet Nam, as presented in Table 11.35.

11.15. Invariance testing

The results from the measurement invariance testing for the subscale T3EXCH appear in Table 11.36 and show that this subscale reached only configural invariance for all ISCED levels. Table 11.37 presents the results for the subscale T3COLES, which reached the metric invariance level for all ISCED populations. Because of the invariance results for the subscales, the composite scale T3COOP was considered configural invariant for all ISCED levels.

11.16. Item parameters

Table 11.38 presents the unstandardised factor loadings for the subscale T3COLES, as it was the only subscale to reach metric invariance.

The standardised factor loadings and unstandardised intercepts for the subscales T3EXCH and T3COLES are set out in Tables 11.39 and 11.40 respectively. The factor loadings for

items TT3G33D, TT3G33E and TT3G33F of subscale T3EXCH are mostly above 0.600, but this is not the case for item TT3G33G, where most of the factor loadings are below 0.600 but still above 0.450. Although most factor loadings for subscale T3COLES are only moderate, they are still above the cut-off criterion for all items.

Table 11.32. Item wording for professional practices scale

T3COOP: Teacher co-operation, composite	
T3EXCH: Exchange and co-ordination among teachers (subscale)	
TT3G33: On average, how often do you do the following in this school?	
Response options: "Never" (1), "Once a year or less" (2), "2-4 times a year" (3), "5-10 times a year" (4), "1-3 times a month" (5), "Once a week or more" (6)	
TT3G33D	Exchange or develop teaching materials with colleagues
TT3G33E	Discuss the learning development of specific students
TT3G33F	Work with other teachers in this school to ensure common standards in evaluations for assessing student progress
TT3G33G	Attend team conferences
T3COLES: Professional collaboration in lessons among teachers (subscale)	
TT3G33: On average, how often do you do the following in this school?	
Response options: "Never" (1), "Once a year or less" (2), "2-4 times a year" (3), "5-10 times a year" (4), "1-3 times a month" (5), "Once a week or more" (6)	
TT3G33A	Teach jointly as a team in the same class
TT3G33B	Provide feedback to other teachers about their practice
TT3G33C	Engage in joint activities across different classes and age groups (e.g. projects)
TT3G33H	Participate in collaborative professional learning

Source: OECD, TALIS 2018 database.

Table 11.33. Reliability coefficients for professional practices scales

Participating countries/economies	T3EXCH	T3COLES	T3COOP
	Omega coefficient[3]		Stratified Cronbach's alpha
ISCED level 2			
Alberta (Canada)	0.771	0.637	0.805
Australia	0.734	0.661	0.786
Austria	0.785	0.638	0.817
Belgium	0.714	0.593	0.770
Flemish Community (Belgium)	0.714	0.642	0.782
Brazil	0.843	0.738	0.862
Bulgaria	0.778	0.570	0.775
Ciudad Autónoma de Buenos Aires (Argentina)	0.815	0.716	0.842
Chile	0.787	0.669	0.823
Colombia	0.794	0.729	0.846
Croatia	0.801	0.621	0.821
Cyprus	0.824	0.736	0.836
Czech Republic	0.792	0.650	0.810
Denmark	0.745	0.638	0.792
England (United Kingdom)	0.724	0.615	0.768
Estonia	0.699	0.663	0.780
Finland	0.745	0.661	0.802
France	0.684	0.594	0.768
Georgia	0.789	0.740	0.853
Hungary	0.760	0.687	0.828
Iceland	0.748	0.621	0.787

Participating countries/economies	T3EXCH	T3COLES	T3COOP
	Omega coefficient[3]		Stratified Cronbach's alpha
Israel	0.832	0.612	0.813
Italy	0.745	0.635	0.796
Japan	0.736	0.651	0.796
Kazakhstan	0.778	0.672	0.822
Korea	0.806	0.759	0.862
Latvia	0.743	0.699	0.816
Lithuania	0.771	0.692	0.825
Malta	0.787	0.712	0.821
Mexico	0.778	0.643	0.814
Netherlands	0.691	0.687	0.783
New Zealand	0.733	0.653	0.789
Norway	0.721	0.563	0.739
Portugal	0.787	0.587	0.788
Romania	0.824	0.697	0.843
Russian Federation	0.781	0.701	0.829
Saudi Arabia	0.867	0.769	0.885
Shanghai (China)	0.850	0.712	0.870
Singapore	0.799	0.585	0.790
Slovak Republic	0.810	0.560	0.807
Slovenia	0.783	0.543	0.784
South Africa[2]	0.839	0.692	0.829
Spain	0.726	0.634	0.760
Sweden	0.731	0.560	0.761
Chinese Taipei	0.796	0.755	0.852
Turkey	0.872	0.766	0.875
United Arab Emirates	0.837	0.771	0.867
United States	0.767	0.638	0.796
Viet Nam	0.686	0.513	0.759
ISCED level 1			
Australia[1]	0.799	0.585	0.794
Flemish Community (Belgium)	0.714	0.591	0.774
Ciudad Autónoma de Buenos Aires (Argentina)	0.799	0.736	0.844
Denmark	0.687	0.576	0.745
England (United Kingdom)	0.738	0.599	0.762
France	0.740	0.539	0.772
Japan	0.753	0.608	0.790
Korea	0.759	0.704	0.818
Netherlands[1]	0.746	0.721	0.814
Spain	0.743	0.642	0.764
Sweden	0.766	0.573	0.785
Chinese Taipei	0.828	0.762	0.868
Turkey	0.863	0.787	0.886
United Arab Emirates	0.843	0.752	0.858
Viet Nam	0.664	0.449	0.742
ISCED level 3			
Alberta (Canada)	0.766	0.656	0.802
Brazil	0.843	0.740	0.866
Croatia	0.834	0.656	0.842
Denmark	0.717	0.621	0.782
Portugal	0.799	0.613	0.804
Slovenia	0.790	0.521	0.799

Participating countries/economies	T3EXCH	T3COLES	T3COOP
	Omega coefficient[3]		Stratified Cronbach's alpha
Sweden	0.709	0.591	0.759
Chinese Taipei	0.821	0.745	0.858
Turkey	0.870	0.745	0.871
United Arab Emirates	0.843	0.760	0.863
Viet Nam	0.733	0.576	0.796
TALIS-PISA link			
Australia	0.771	0.653	0.796
Ciudad Autónoma de Buenos Aires (Argentina)	0.850	0.593	0.807
Colombia	0.787	0.602	0.796
Czech Republic	0.797	0.707	0.824
Denmark	0.734	0.650	0.784
Georgia	0.723	0.651	0.801
Malta	0.799	0.741	0.834
Turkey	0.869	0.651	0.836
Viet Nam	0.712	0.691	0.807

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
3. Omega coefficient was calculated based on unidimensional models for every single subscale of the multidimensional construct.
Source: OECD, TALIS 2018 database.

Table 11.34. CFA model-data fit for scale T3EXCH

Exchange and co-operation among teachers

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Alberta (Canada)	1.000	1.005	0.000	0.008
Australia	0.968	0.903	0.077	0.024
Austria	0.978	0.935	0.069	0.020
Belgium	0.991	0.974	0.040	0.013
Flemish Community (Belgium)	0.999	0.998	0.010	0.008
Brazil	0.990	0.969	0.059	0.017
Bulgaria	0.999	0.997	0.014	0.007
Ciudad Autónoma de Buenos Aires (Argentina)	0.990	0.969	0.053	0.015
Chile	0.997	0.992	0.026	0.011
Colombia	0.988	0.963	0.048	0.018
Croatia	0.992	0.977	0.047	0.015
Cyprus	0.995	0.984	0.036	0.016
Czech Republic	0.999	0.996	0.020	0.008
Denmark	1.000	1.000	0.005	0.007
England (United Kingdom)	0.956	0.869	0.100	0.029
Estonia	0.997	0.990	0.023	0.009
Finland	0.992	0.977	0.042	0.015
France	0.965	0.896	0.091	0.024
Georgia	0.993	0.980	0.039	0.014
Hungary	1.000	1.002	0.000	0.004
Iceland	0.999	0.997	0.018	0.009
Israel	0.991	0.973	0.052	0.014
Italy	0.999	0.996	0.017	0.007
Japan	0.988	0.965	0.054	0.016

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Kazakhstan	0.972	0.916	0.065	0.022
Korea	0.994	0.981	0.042	0.014
Latvia	0.970	0.909	0.079	0.025
Lithuania	0.991	0.974	0.039	0.013
Malta	0.998	0.995	0.022	0.008
Mexico	0.993	0.979	0.038	0.014
Netherlands	0.970	0.911	0.069	0.024
New Zealand	0.998	0.993	0.020	0.009
Norway	0.997	0.991	0.021	0.011
Portugal	1.000	1.000	0.000	0.004
Romania	0.991	0.972	0.049	0.016
Russian Federation	0.975	0.925	0.062	0.024
Saudi Arabia	0.972	0.916	0.100	0.026
Shanghai (China)	0.998	0.993	0.030	0.010
Singapore	0.996	0.989	0.030	0.011
Slovak Republic	0.998	0.993	0.027	0.010
Slovenia	0.998	0.994	0.025	0.008
South Africa[2]	0.998	0.994	0.021	0.011
Spain	0.965	0.896	0.044	0.018
Sweden	0.998	0.995	0.016	0.010
Chinese Taipei	1.000	1.002	0.000	0.003
Turkey	0.996	0.988	0.036	0.010
United Arab Emirates	0.953	0.858	0.097	0.031
United States	0.998	0.995	0.011	0.012
Viet Nam	0.998	0.993	0.016	0.009
ISCED level 1				
Australia[1]	0.987	0.960	0.054	0.017
Flemish Community (Belgium)	1.000	1.000	0.000	0.006
Ciudad Autónoma de Buenos Aires (Argentina)	1.000	0.999	0.010	0.007
Denmark	0.983	0.948	0.050	0.020
England (United Kingdom)	0.950	0.849	0.089	0.028
France	0.993	0.979	0.033	0.012
Japan	1.000	1.003	0.000	0.002
Korea	0.841	0.522	0.222	0.057
Netherlands[1]	0.991	0.973	0.047	0.015
Spain	0.991	0.972	0.023	0.018
Sweden	0.994	0.983	0.033	0.012
Chinese Taipei	0.999	0.996	0.024	0.007
Turkey	0.998	0.994	0.020	0.009
United Arab Emirates	0.983	0.949	0.061	0.017
Viet Nam	0.995	0.984	0.032	0.011
ISCED level 3				
Alberta (Canada)	0.943	0.830	0.122	0.036
Brazil	0.988	0.964	0.054	0.014
Croatia	0.996	0.989	0.039	0.012
Denmark	0.970	0.911	0.079	0.025
Portugal	0.998	0.994	0.024	0.008
Slovenia	0.998	0.994	0.025	0.009
Chinese Taipei	0.998	0.995	0.022	0.008
Turkey	0.997	0.990	0.023	0.011
United Arab Emirates	0.978	0.933	0.070	0.023
Viet Nam	0.999	0.997	0.018	0.007

Participating countries/economies	CFI	TLI	RMSEA	SRMR
TALIS-PISA link				
Australia	0.964	0.891	0.097	0.026
Ciudad Autónoma de Buenos Aires (Argentina)	1.000	1.002	0.000	0.007
Colombia	0.992	0.976	0.036	0.014
Czech Republic	0.988	0.965	0.040	0.014
Denmark	1.000	1.018	0.000	0.008
Georgia	0.984	0.952	0.035	0.024
Malta	1.000	1.004	0.000	0.007
Turkey	0.990	0.969	0.033	0.013
Viet Nam	1.000	1.007	0.000	0.007

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.35. CFA model-data fit for scale T3COLES

Professional collaboration in lessons among teachers

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Alberta (Canada)	0.970	0.911	0.051	0.028
Australia	0.985	0.955	0.044	0.014
Austria	0.989	0.966	0.040	0.015
Belgium	0.987	0.962	0.036	0.015
Flemish Community (Belgium)	0.984	0.953	0.048	0.019
Brazil	0.996	0.989	0.030	0.010
Bulgaria	0.969	0.907	0.048	0.023
Ciudad Autónoma de Buenos Aires (Argentina)	0.946	0.837	0.085	0.022
Chile	1.000	1.004	0.000	0.005
Colombia	0.998	0.994	0.016	0.011
Croatia	0.967	0.901	0.043	0.022
Cyprus	0.972	0.915	0.086	0.027
Czech Republic	0.958	0.873	0.083	0.025
Denmark	0.998	0.995	0.017	0.009
England (United Kingdom)	0.971	0.912	0.057	0.021
Estonia	1.000	0.999	0.007	0.007
Finland	0.962	0.886	0.080	0.022
France	1.000	1.004	0.000	0.005
Georgia	1.000	0.999	0.010	0.007
Hungary	1.000	1.003	0.000	0.004
Iceland	0.993	0.979	0.034	0.012
Israel	0.972	0.915	0.051	0.022
Italy	0.875	0.625	0.163	0.042
Japan	1.000	1.003	0.000	0.004
Kazakhstan	0.996	0.989	0.021	0.011
Korea	0.994	0.983	0.038	0.010
Latvia	0.982	0.946	0.043	0.016
Lithuania	0.967	0.901	0.064	0.025
Malta	0.978	0.935	0.059	0.021
Mexico	0.982	0.946	0.051	0.017
Netherlands	1.000	1.000	0.000	0.009
New Zealand	0.990	0.971	0.032	0.019

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Norway	0.989	0.968	0.026	0.013
Portugal	0.946	0.837	0.083	0.028
Romania	0.998	0.995	0.015	0.008
Russian Federation	0.991	0.972	0.033	0.013
Saudi Arabia	0.972	0.916	0.073	0.027
Shanghai (China)	0.763	0.288	0.269	0.045
Singapore	0.992	0.975	0.031	0.011
Slovak Republic	0.972	0.917	0.051	0.020
Slovenia	0.996	0.988	0.022	0.010
South Africa[2]	0.978	0.978	0.029	0.043
Spain	0.890	0.670	0.096	0.035
Sweden	0.987	0.961	0.033	0.016
Chinese Taipei	0.953	0.859	0.093	0.026
Turkey	1.000	1.000	0.002	0.005
United Arab Emirates	0.999	0.997	0.015	0.006
United States	1.000	1.000	0.000	0.016
Viet Nam	0.941	0.823	0.053	0.023
ISCED level 1				
Australia[1]	0.920	0.920	0.064	0.071
Flemish Community (Belgium)	0.990	0.969	0.037	0.014
Ciudad Autónoma de Buenos Aires (Argentina)	1.000	1.006	0.000	0.002
Denmark	0.999	0.997	0.012	0.009
England (United Kingdom)	0.989	0.966	0.032	0.016
France	1.000	1.002	0.000	0.012
Japan	0.989	0.968	0.035	0.013
Korea	1.000	1.005	0.000	0.003
Netherlands[1]	0.418	0.418	0.119	0.225
Spain	0.992	0.976	0.029	0.012
Sweden	0.955	0.865	0.078	0.026
Chinese Taipei	0.982	0.946	0.066	0.019
Turkey	0.999	0.998	0.009	0.007
United Arab Emirates	0.993	0.978	0.039	0.013
Viet Nam[3]	0.514	-	0.229	0.041
ISCED level 3				
Alberta (Canada)	1.000	1.011	0.000	0.006
Brazil	0.992	0.976	0.035	0.013
Croatia	0.980	0.940	0.049	0.024
Denmark	0.992	0.975	0.029	0.015
Portugal	0.932	0.795	0.091	0.030
Slovenia	0.986	0.957	0.034	0.015
Sweden	0.997	0.990	0.016	0.010
Chinese Taipei	0.953	0.858	0.092	0.028
Turkey	0.989	0.966	0.033	0.013
United Arab Emirates	0.996	0.988	0.026	0.010
Viet Nam	0.986	0.959	0.034	0.015
TALIS-PISA link				
Australia	0.954	0.954	0.055	0.057
Ciudad Autónoma de Buenos Aires (Argentina)	0.885	0.885	0.062	0.114
Colombia	0.881	0.881	0.071	0.129
Czech Republic	0.918	0.918	0.049	0.087
Denmark	0.865	0.865	0.087	0.106
Georgia	0.964	0.964	0.024	0.084

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Malta	0.980	0.980	0.034	0.048
Turkey	0.939	0.939	0.042	0.101
Viet Nam	0.539	0.539	0.082	0.235

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
3. The poor fit of the model affected the TLI calculation, which is not reported.
Source: OECD, TALIS 2018 database.

Table 11.36. Invariance test results for scale T3EXCH

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level of ISCED level 2								
Configural	0.988	0.964	0.050	0.017				
Metric	0.956	0.947	0.061	0.074	0.032	0.017	-0.011	-0.057
Scalar	0.415	0.554	0.177	0.348	0.541	0.393	-0.116	-0.274
Invariance level of ISCED level 1								
Configural	0.984	0.952	0.052	0.020				
Metric	0.944	0.930	0.063	0.083	0.040	0.022	-0.011	-0.063
Scalar	0.390	0.514	0.167	0.297	0.554	0.416	-0.104	-0.214
Invariance level of ISCED level 3								
Configural	0.992	0.976	0.046	0.015				
Metric	0.966	0.957	0.062	0.070	0.026	0.019	-0.016	-0.055
Scalar	0.497	0.595	0.189	0.388	0.469	0.362	-0.127	-0.318

Note: See endnote 34.
Source: OECD, TALIS 2018 database.

Table 11.37. Invariance test results for scale T3COLES

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level of ISCED level 2								
Configural	0.980	0.939	0.052	0.020				
Metric	0.935	0.921	0.059	0.055	0.045	0.018	-0.007	-0.035
Scalar	0.000	0.232	0.185	0.271	0.935	0.689	-0.126	-0.216
Invariance level of ISCED level 1								
Configural	0.987	0.962	0.044	0.017				
Metric	0.945	0.931	0.059	0.051	0.042	0.031	-0.015	-0.034
Scalar	0.000	0.091	0.216	0.246	0.945	0.84	-0.157	-0.195
Invariance level of ISCED level 3								
Configural	0.985	0.955	0.045	0.017				
Metric	0.938	0.921	0.060	0.061	0.047	0.034	-0.015	-0.044
Scalar	0.219	0.371	0.168	0.658	0.719	0.550	-0.108	-0.597

Note: Although the change in TLI slightly exceeded the cut-off criterion, a decision was made to accept the metric level of measurement invariance because the fit indices for the metric model were acceptable and the change in RMSEA met the cut-off criterion.
Source: OECD, TALIS 2018 database.

Table 11.38. Unstandardised factor loadings for T3COLES for all countries for all populations

T3COLES (Metric)	
TT3G33A	0.934
TT3G33B	0.763
TT3G33C	0.853
TT3G33H	0.658

Source: OECD, TALIS 2018 database.

Table 11.39. Standardised factor loadings and unstandardised intercepts for scale T3EXCH

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G33D	TT3G33E	TT3G33F	TT3G33G	TT3G33D	TT3G33E	TT3G33F	TT3G33G
ISCED level 2								
Alberta (Canada)	0.715	0.605	0.775	0.447	4.310	5.057	3.965	3.495
Australia	0.629	0.694	0.696	0.437	5.174	5.209	4.598	4.096
Austria	0.655	0.707	0.760	0.586	4.875	4.920	3.924	4.097
Belgium	0.569	0.562	0.721	0.567	4.268	4.187	3.283	3.847
Flemish Community (Belgium)	0.527	0.609	0.694	0.609	4.530	3.862	3.247	4.036
Brazil	0.628	0.815	0.812	0.661	3.409	4.250	3.782	4.462
Bulgaria	0.608	0.678	0.798	0.493	3.903	4.614	3.939	4.494
Ciudad Autónoma de Buenos Aires (Argentina)	0.727	0.723	0.799	0.542	3.585	4.295	3.568	3.638
Chile	0.643	0.719	0.793	0.413	3.588	3.861	3.356	2.368
Colombia	0.656	0.717	0.784	0.556	3.553	4.139	3.592	3.059
Croatia	0.551	0.722	0.790	0.677	3.400	4.342	3.606	3.718
Cyprus	0.670	0.810	0.802	0.379	4.547	4.709	4.361	3.574
Czech Republic	0.609	0.797	0.737	0.473	3.972	4.968	4.197	4.655
Denmark	0.645	0.743	0.650	0.451	4.564	4.890	3.839	5.021
England (United Kingdom)	0.589	0.718	0.671	0.412	4.819	5.001	4.129	3.310
Estonia	0.454	0.674	0.685	0.502	3.477	4.939	3.983	4.583
Finland	0.610	0.633	0.762	0.455	3.902	5.002	3.757	4.527
France	0.589	0.483	0.678	0.569	3.524	5.070	3.187	4.015
Georgia	0.712	0.750	0.708	0.537	3.705	3.724	3.576	2.795
Hungary	0.454	0.768	0.696	0.587	3.322	3.717	2.817	3.968
Iceland	0.641	0.685	0.713	0.511	3.703	4.841	3.955	4.756
Israel	0.647	0.835	0.792	0.437	4.590	4.724	4.353	3.201
Italy	0.638	0.725	0.680	0.457	4.164	4.864	3.998	4.471
Japan	0.636	0.664	0.735	0.373	4.202	4.177	3.298	4.430
Kazakhstan	0.640	0.748	0.752	0.437	4.663	4.924	4.452	3.347
Korea	0.667	0.615	0.834	0.570	3.208	3.755	3.139	2.259
Latvia	0.605	0.699	0.737	0.382	3.703	4.758	3.979	2.717
Lithuania	0.632	0.782	0.699	0.397	3.467	3.852	3.340	4.421
Malta	0.674	0.741	0.774	0.370	3.916	4.393	3.916	2.710
Mexico	0.588	0.704	0.770	0.590	3.303	4.210	3.737	4.379
Netherlands	0.475	0.646	0.698	0.463	4.098	4.224	3.545	4.581
New Zealand	0.676	0.677	0.669	0.443	4.730	5.105	4.287	3.780
Norway	0.672	0.609	0.704	0.389	4.845	5.487	4.599	5.641
Portugal	0.701	0.694	0.796	0.278	4.446	4.465	4.040	2.234
Romania	0.599	0.762	0.830	0.598	3.541	4.663	4.407	4.300
Russian Federation	0.620	0.704	0.796	0.437	3.524	4.858	4.149	3.097
Saudi Arabia	0.774	0.810	0.854	0.554	3.265	3.810	3.295	2.346

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G33D	TT3G33E	TT3G33F	TT3G33G	TT3G33D	TT3G33E	TT3G33F	TT3G33G
Shanghai (China)	0.676	0.752	0.864	0.607	4.404	3.385	3.873	4.331
Singapore	0.691	0.763	0.762	0.458	4.608	4.702	4.435	4.614
Slovak Republic	0.584	0.780	0.819	0.386	3.996	3.719	3.761	2.117
Slovenia	0.634	0.676	0.760	0.654	4.214	4.863	4.185	4.561
South Africa[2]	0.669	0.740	0.866	0.427	4.143	4.131	4.123	2.941
Spain	0.578	0.585	0.766	0.415	4.056	4.997	4.105	5.093
Sweden	0.597	0.715	0.702	0.353	4.506	5.290	4.399	5.569
Chinese Taipei	0.670	0.680	0.788	0.608	3.248	3.704	3.262	3.705
Turkey	0.582	0.829	0.882	0.628	3.445	4.020	3.814	3.410
United Arab Emirates	0.725	0.821	0.797	0.443	4.621	4.693	4.510	4.662
United States	0.742	0.624	0.725	0.497	4.198	4.869	3.791	3.694
Viet Nam	0.553	0.549	0.635	0.621	4.782	2.901	3.940	3.615
ISCED level 1								
Australia[1]	0.732	0.685	0.786	0.511	5.132	5.426	4.683	4.569
Flemish Community (Belgium)	0.472	0.761	0.622	0.414	4.639	4.039	3.229	4.764
Ciudad Autónoma de Buenos Aires (Argentina)	0.698	0.733	0.771	0.542	3.585	4.295	3.568	3.638
Denmark	0.587	0.707	0.555	0.424	4.586	5.052	3.695	5.355
England (United Kingdom)	0.544	0.743	0.708	0.356	4.819	5.001	4.129	3.310
France	0.714	0.701	0.622	0.405	4.152	5.211	3.561	5.032
Japan	0.680	0.708	0.700	0.426	4.202	4.177	3.298	4.430
Korea	0.665	0.668	0.737	0.514	4.177	4.598	3.423	2.429
Netherlands[1]	0.660	0.710	0.703	0.388	4.320	4.274	3.839	4.762
Spain	0.571	0.586	0.787	0.452	4.690	5.148	4.617	5.426
Sweden	0.622	0.766	0.713	0.377	4.506	5.290	4.399	5.569
Chinese Taipei	0.704	0.730	0.822	0.617	3.248	3.704	3.262	3.705
Turkey	0.654	0.819	0.860	0.624	4.106	3.814	3.751	3.355
United Arab Emirates	0.714	0.825	0.812	0.463	4.621	4.693	4.510	4.662
Viet Nam	0.560	0.520	0.635	0.566	4.782	2.901	3.940	3.615
ISCED level 3								
Alberta (Canada)	0.725	0.587	0.763	0.438	4.310	5.057	3.965	3.495
Brazil	0.630	0.812	0.820	0.641	3.409	4.250	3.782	4.462
Croatia	0.600	0.738	0.836	0.691	3.400	4.342	3.606	3.718
Denmark	0.635	0.675	0.659	0.451	4.356	4.527	3.224	3.889
Portugal	0.720	0.708	0.801	0.292	4.446	4.465	4.040	2.234
Slovenia	0.648	0.637	0.785	0.656	4.214	4.863	4.185	4.561
Sweden	0.604	0.671	0.695	0.304	4.506	5.290	4.399	5.569
Chinese Taipei	0.702	0.749	0.806	0.576	3.248	3.704	3.262	3.705
Turkey	0.593	0.828	0.878	0.632	3.294	3.787	3.649	3.358
United Arab Emirates	0.735	0.826	0.797	0.452	4.621	4.693	4.510	4.662
Viet Nam	0.586	0.616	0.680	0.654	4.782	2.901	3.940	3.615
TALIS-PISA link								
Australia	0.662	0.697	0.751	0.501	5.114	5.204	4.539	4.027
Ciudad Autónoma de Buenos Aires (Argentina)	0.758	0.755	0.834	0.647	3.658	4.377	3.806	3.910
Colombia	0.613	0.738	0.768	0.565	3.555	4.232	3.694	3.071
Czech Republic	0.594	0.779	0.786	0.423	3.762	4.802	3.975	4.617
Denmark	0.623	0.757	0.601	0.426	4.664	4.950	3.889	4.971
Georgia	0.557	0.727	0.662	0.447	3.721	3.810	3.590	2.832
Malta	0.680	0.705	0.813	0.399	3.969	4.469	3.944	2.668
Turkey	0.579	0.838	0.872	0.594	3.388	3.880	3.741	3.390

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G33D	TT3G33E	TT3G33F	TT3G33G	TT3G33D	TT3G33E	TT3G33F	TT3G33G
Viet Nam	0.586	0.553	0.705	0.588	4.737	2.733	3.900	3.515

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection
Source: OECD, TALIS 2018 database.

Table 11.40. Standardised factor loadings and unstandardised intercepts for scale T3COLES

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G33A	TT3G33B	TT3G33C	TT3G33H	TT3G33A	TT3G33B	TT3G33C	TT3G33H
ISCED level 2								
Alberta (Canada)	0.519	0.587	0.583	0.509	2.546	1.979	2.791	3.730
Australia	0.556	0.614	0.608	0.490	2.871	2.687	2.581	4.000
Austria	0.427	0.505	0.691	0.467	4.406	2.013	3.089	2.659
Belgium	0.414	0.553	0.588	0.468	2.501	1.587	2.861	2.081
Flemish Community (Belgium)	0.444	0.615	0.628	0.471	2.333	1.625	2.968	1.938
Brazil	0.642	0.662	0.711	0.481	2.731	1.669	3.055	3.246
Bulgaria	0.558	0.543	0.443	0.417	1.724	2.094	3.291	3.316
Ciudad Autónoma de Buenos Aires (Argentina)	0.583	0.653	0.690	0.510	2.840	1.628	2.497	2.729
Chile	0.515	0.651	0.632	0.457	2.741	1.714	2.545	3.089
Colombia	0.600	0.651	0.698	0.556	2.813	2.076	3.238	2.974
Croatia	0.622	0.553	0.532	0.388	1.604	1.433	2.559	3.041
Cyprus	0.694	0.669	0.658	0.469	1.889	2.205	2.360	2.710
Czech Republic	0.573	0.519	0.668	0.406	1.830	2.338	2.758	3.346
Denmark	0.526	0.503	0.651	0.483	3.677	2.123	3.103	2.984
England (United Kingdom)	0.527	0.530	0.618	0.414	2.177	2.833	2.061	3.491
Estonia	0.489	0.604	0.668	0.464	2.745	2.116	2.893	3.235
Finland	0.462	0.555	0.698	0.468	3.377	1.661	2.849	2.429
France	0.488	0.418	0.588	0.542	2.313	2.390	2.998	2.276
Georgia	0.705	0.638	0.673	0.508	3.358	3.390	3.350	3.345
Hungary	0.495	0.617	0.690	0.511	2.688	2.491	2.908	2.837
Iceland	0.459	0.555	0.632	0.458	2.846	1.922	2.835	3.721
Israel	0.479	0.590	0.597	0.396	2.492	1.946	3.070	3.377
Italy	0.522	0.480	0.632	0.538	4.346	2.470	3.400	2.914
Japan	0.443	0.655	0.571	0.527	4.247	3.295	2.752	2.671
Kazakhstan	0.589	0.606	0.618	0.496	2.735	4.556	3.621	3.654
Korea	0.535	0.765	0.712	0.474	2.787	2.905	2.204	2.778
Latvia	0.519	0.619	0.702	0.512	2.641	2.758	2.935	3.051
Lithuania	0.657	0.603	0.616	0.487	2.357	2.584	2.814	3.180
Malta	0.648	0.681	0.625	0.447	1.806	1.512	2.188	2.772
Mexico	0.489	0.599	0.611	0.502	3.922	1.910	2.841	3.712
Netherlands	0.501	0.590	0.693	0.535	2.056	2.407	2.796	3.347
New Zealand	0.563	0.620	0.574	0.483	2.697	2.774	2.774	4.107
Norway	0.409	0.498	0.599	0.406	3.264	2.258	2.703	4.008
Portugal	0.448	0.526	0.551	0.511	2.581	1.798	2.825	2.301
Romania	0.575	0.610	0.671	0.531	2.314	2.731	3.107	2.827
Russian Federation	0.705	0.510	0.626	0.517	2.113	2.966	2.967	3.284
Saudi Arabia	0.686	0.728	0.695	0.520	2.363	2.550	3.276	3.735
Shanghai (China)	0.641	0.660	0.600	0.554	2.613	4.133	2.995	4.737
Singapore	0.443	0.564	0.574	0.418	3.459	2.647	2.560	4.150
Slovak Republic	0.408	0.518	0.508	0.513	3.523	2.423	2.896	1.620
Slovenia	0.359	0.598	0.520	0.315	2.444	1.788	2.881	3.283

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G33A	TT3G33B	TT3G33C	TT3G33H	TT3G33A	TT3G33B	TT3G33C	TT3G33H
South Africa[2]	0.672	0.653	0.637	0.505	2.164	2.531	2.459	2.808
Spain	0.498	0.636	0.586	0.407	2.436	1.375	2.381	3.066
Sweden	0.459	0.488	0.542	0.467	3.602	2.371	2.604	4.153
Chinese Taipei	0.679	0.731	0.667	0.472	1.991	2.482	2.210	3.259
Turkey	0.657	0.629	0.765	0.548	2.769	2.175	2.580	3.497
United Arab Emirates	0.644	0.685	0.747	0.579	2.892	3.328	3.458	4.362
United States	0.492	0.619	0.604	0.443	2.405	2.017	2.286	3.717
Viet Nam	0.431	0.560	0.416	0.365	1.984	4.913	2.768	3.375
ISCED level 1								
Australia[1]	0.543	0.588	0.586	0.548	3.510	2.655	3.601	4.590
Flemish Community (Belgium)	0.398	0.569	0.608	0.406	3.823	1.610	3.402	2.424
Ciudad Autónoma de Buenos Aires (Argentina)	0.623	0.645	0.708	0.548	2.840	1.628	2.497	2.729
Denmark	0.477	0.451	0.595	0.455	3.999	2.214	3.251	2.992
England (United Kingdom)	0.508	0.569	0.569	0.398	2.489	2.604	2.937	3.943
France	0.429	0.375	0.538	0.522	2.214	2.590	3.655	2.856
Japan	0.396	0.679	0.473	0.428	4.542	3.806	3.683	3.279
Korea	0.466	0.750	0.622	0.393	2.878	2.971	2.641	3.071
Netherlands[1]	0.480	0.472	0.458	0.417	1.460	2.074	3.126	3.616
Spain	0.548	0.558	0.614	0.482	2.436	1.375	2.381	3.066
Sweden	0.480	0.478	0.548	0.490	4.161	2.498	3.233	4.395
Chinese Taipei	0.650	0.730	0.695	0.531	1.991	2.482	2.210	3.259
Turkey	0.686	0.637	0.787	0.578	2.769	2.175	2.580	3.497
United Arab Emirates	0.636	0.664	0.725	0.555	2.892	3.328	3.458	4.362
Viet Nam	0.334	0.539	0.356	0.342	2.293	5.038	3.068	4.075
ISCED level 3								
Alberta (Canada)	0.582	0.597	0.595	0.475	2.200	1.939	2.418	3.895
Brazil	0.664	0.684	0.685	0.465	2.731	1.669	3.055	3.246
Croatia	0.643	0.556	0.572	0.457	1.619	1.767	2.361	2.873
Denmark	0.548	0.473	0.601	0.512	2.823	2.020	2.584	2.970
Portugal	0.473	0.547	0.577	0.521	2.581	1.798	2.825	2.301
Slovenia	0.404	0.563	0.490	0.320	2.385	1.596	2.663	2.848
Sweden	0.504	0.544	0.543	0.459	3.345	2.278	2.706	3.742
Chinese Taipei	0.632	0.746	0.641	0.491	1.991	2.482	2.210	3.259
Turkey	0.622	0.643	0.737	0.530	2.769	2.175	2.580	3.497
United Arab Emirates	0.640	0.671	0.740	0.561	2.892	3.328	3.458	4.362
Viet Nam	0.501	0.560	0.525	0.399	2.076	4.663	2.560	3.102
TALIS-PISA link								
Australia	0.582	0.620	0.639	0.505	2.661	2.645	2.538	4.023
Ciudad Autónoma de Buenos Aires (Argentina)	0.593	0.656	0.643	0.538	2.931	1.836	2.613	2.867
Colombia	0.588	0.654	0.687	0.556	2.831	2.015	3.283	2.995
Czech Republic	0.570	0.554	0.664	0.420	1.926	2.253	2.637	3.295
Denmark	0.563	0.491	0.673	0.522	3.693	2.220	3.316	3.028
Georgia	0.647	0.603	0.658	0.493	3.420	3.587	3.438	3.456
Malta	0.645	0.657	0.681	0.469	1.889	1.599	2.172	2.814
Turkey	0.631	0.620	0.725	0.530	2.768	2.045	2.534	3.507
Viet Nam	0.469	0.545	0.466			4.738	2.574	3.291

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Feedback and development: Effective professional development (T3EFFPD); Needs for professional development in subject matter and pedagogy (T3PDPED); Needs for professional development for teaching for diversity (T3PDIV); Professional development barriers (T3PDBAR)

11.17. Measured items

Four scales were composed of the following questions that gathered information about teacher feedback and development.

- "Thinking of the professional development activity that had the greatest positive impact on your teaching during the last 12 months, did it have any of the following characteristics?" (TT3G26). The question contained items about certain characteristics of professional development activities that together made up the scale *Effective professional development* (T3EFFPD).
- "For each of the areas listed below, please indicate the extent to which you currently need professional development" (TT3G27). This question was followed by items concerning teaching subjects and pedagogy that formed the scale *Needs for* professional *development in subject matter and pedagogy* (T3PDPED) as well as items about teaching in diverse classrooms that formed the scale *Needs for professional development for teaching and diversity* (T3PDIV).
- "How strongly do you agree or disagree that the following present barriers to your participation in professional development?" (TT3G28). This question contained items regarding challenges to participating in professional development that formed the scale *Professional development barriers* (T3PDBAR).

These scales are presented in detail in Table 11.41.

11.18. Model improvements

Two scales included improvements. A correlation between items TT3G27A and TT3G27B was added for T3PDPED, and items D and G were removed from T3PDBAR. In addition, a correlation between items TT3G28E and TT3G28F was added for T3PDBAR.

11.19. Scale reliability

Table 11.42 presents the reliability coefficients (omega for T3PDPED, T3PDIV and T3PDBAR, and Cronbach's alpha for T3EFFPD because it has dichotomous response options) for all populations for each scale. The reliabilities for T3EFFPD in many populations are between 0.450 and 0.600, suggesting overall weak reliability.

Scales T3PDPED and T3PDIV have high reliabilities in almost all populations, while the reliabilities for T3PDBAR are higher than 0.600 in most populations, indicating poor but acceptable reliability.

11.20. Model fits

Model fit indices for scale T3EFFPD are presented in Table 11.43, which shows that most populations exhibited acceptable fit, with notable exceptions, specifically the Belgium and Bulgaria ISCED level 2 populations.

Table 11.44 presents the fit indices for T3PDPED. The overall model fit was acceptable in all populations except for Finland, the Flemish Community (Belgium) and Netherlands

ISCED level 2 populations. Model fit was also poor for the Flemish Community (Belgium) ISCED level 1 population and the Czech Republic and Georgia TALIS-PISA link populations.

The model fit results for the scale T3PDIV presented in Table 11.45 suggest a perfect model fit for most populations, as this scale was measured by just three items. However, model fit was poor for the Netherlands ISCED level 1 population and the Columbia, Turkey and Viet Nam TALIS-PISA link populations.

The results for the scale T3PDBAR presented in Table 11.46 exhibit acceptable fit for many populations. However, compared to other *Feedback and development* scales, the model fit for this scale was poor for the following populations: Bulgaria, Columbia, Cyprus, Denmark, Malta, Norway and Saudi Arabia ISCED level 2; Denmark ISCED level 1; Brazil ISCED level 3; and Columbia TALIS-PISA link.

11.21. Invariance testing

Table 11.47 presents the results from the invariance testing analyses for scale T3EFFPD. Because the scale was based on items with categorical response options, it has no metric model. The procedure applied to this scale provides a good example of the analytic considerations that determine the variance level of a scale.

As the data in Table 11.47 show, no scale met the cut-off criteria for scalar invariance. However, recall that the invariance testing examined cross-ISCED level invariance within each country with populations in either ISCED levels 1 and 3 or both of these levels. Scale T3EFFPD proved to be scalar invariant for all of those countries and because CFI, TLI and RMSEA showed an acceptable fit for the scalar model for ISCED levels 1 and 3, T3EFFPD was considered scalar invariant for those two populations. However, the TLI was not acceptable for ISCED level 2, which means the scale was deemed only configural invariant for ISCED level 2.

Table 11.48 presents the results for scale T3PDPED. Metric invariance was established for all ISCED levels because both the TLI and RMSEA improved from the configural to the metric models. T3PDIV also reached metric invariance for all ISCED levels. As evident in Table 11.49, the configural models were perfect and the metric models had acceptable fit indices. The scale T3PDBAR reached configural invariance for all ISCED levels, as shown in Table 11.50.

11.22. Item parameters

Table 11.51 presents the unstandardised item parameters for scales T3PDPED and T3PDIV, which are metric invariant for ISCED level 2.

The standardised factor loadings and unstandardised intercepts for scales T3EFFPD, T3PDPED, T3PDIV and T3PDBAR appear in Tables 11.52, 11.53, 11.54 and 11.55 respectively. Most factor loadings for the items in T3EFFPD and T3PDIV are above 0.450, suggesting at least moderately strong relationships. Almost all factor loadings for items in T3PDPED are above 0.600, suggesting strong relationships. Many of the factor loadings for items TT3G28A, TT3G28E and TT3G28F in the T3PDBAR scale are lower than 0.450, indicating a weak but still sufficient relationship between these items and the scale. Because, in many cases, the loadings above 0.450 in these items are still below 0.600, they suggest, at best, a moderate relationship between the items and the latent construct.

Table 11.41. Item wording for feedback and development scales

T3EFFPD: Effective professional development	
TT3G26: Thinking of the professional development activity that had the greatest positive impact on your teaching during the last 12 months, did it have any of the following characteristics?	
Response options: "Yes" (1) and "No" (2).	
TT3G26A*	It built on my prior knowledge.
TT3G26B*	It adapted to my personal development needs
TT3G26C*	It had a coherent structure
TT3G26D*	It appropriately focused on content needed to teach my subjects
T3PDPED: Needs for professional development in subject matter and pedagogy	
TT3G27: For each of the areas listed below, please indicate the extent to which you currently need professional development.	
Response options: "No need at present" (1), "Low level of need (2)", "Moderate level of need" (3), "High level of need" (4).	
TT3G27A	Knowledge and understanding of my subject field(s)
TT3G27B	Pedagogical competencies in teaching my subject field(s)
TT3G27C	Knowledge of the curriculum
TT3G27D	Student assessment practices
TT3G27F	Student behaviour and classroom management
T3PDIV: Needs for professional development for teaching for diversity	
TT3G27: For each of the areas listed below, please indicate the extent to which you currently need professional development.	
Response options: "No need at present" (1), "Low level of need (2)", "Moderate level of need" (3), "High level of need" (4).	
TT3G27H	Approaches to individualised learning
TT3G27I	Teaching students with special needs
TT3G27J	Teaching in a multicultural or multilingual setting
T3PDBAR: Professional development barriers	
TT3G28: How strongly do you agree or disagree that the following present barriers to your participation in professional development?	
Response options: "Strongly disagree" (1), "Disagree" (2), "Agree" (3), "Strongly agree" (4).	
TT3G28A	I do not have the pre-requisites (e.g. qualifications, experience, seniority)
TT3G28B	Professional development is too expensive
TT3G28C	There is a lack of employer support
TT3G28D[1]	Professional development conflicts with my work schedule
TT3G28E	I do not have time because of family responsibilities
TT3G28F	There is no relevant professional development offered
TT3G28G[1]	There are no incentives for participating in professional development

* Items were reverse coded.
1. Item was deleted and is not included in any results presented for this scale.
Source: OECD, TALIS 2018 database.

Table 11.42. Reliability coefficients for feedback and development scales

Participating countries/economies	T3EFFPD	T3PDPED	T3PDIV	T3PDBAR
		Cronbach's alpha		Omega coefficient
ISCED level 2				
Alberta (Canada)	0.450	0.846	0.762	0.687
Australia	0.430	0.834	0.834	0.694
Austria	0.471	0.736	0.755	0.659
Belgium	0.426	0.773	0.796	0.623
Flemish Community (Belgium)	0.529	0.839	0.808	0.615
Brazil	0.456	0.884	0.745	0.714
Bulgaria	0.643	0.908	0.773	0.619

Participating countries/economies	T3EFFPD	T3PDPED Cronbach's alpha	T3PDIV	T3PDBAR Omega coefficient
Ciudad Autónoma de Buenos Aires (Argentina)	0.581	0.817	0.767	0.624
Chile	0.562	0.850	0.805	0.692
Colombia	0.617	0.887	0.797	0.621
Croatia	0.513	0.865	0.872	0.663
Cyprus	0.548	0.856	0.781	0.671
Czech Republic	0.546	0.799	0.828	0.602
Denmark	0.499	0.774	0.755	0.607
England (United Kingdom)	0.520	0.814	0.821	0.707
Estonia	0.518	0.841	0.729	0.699
Finland	0.490	0.789	0.835	0.714
France	0.451	0.774	0.837	0.696
Georgia	0.643	0.903	0.764	0.764
Hungary	0.539	0.854	0.711	0.663
Iceland	0.555	0.773	0.901	0.674
Israel	0.528	0.880	0.748	0.691
Italy	0.532	0.821	0.865	0.594
Japan	0.538	0.789	0.783	0.774
Kazakhstan	0.582	0.908	0.702	0.707
Korea	0.624	0.908	0.904	0.741
Latvia	0.445	0.861	0.736	0.679
Lithuania	0.530	0.852	0.691	0.648
Malta	0.487	0.790	0.857	0.651
Mexico	0.513	0.891	0.773	0.746
Netherlands	0.471	0.764	0.674	0.731
New Zealand	0.428	0.861	0.794	0.667
Norway	0.485	0.776	0.814	0.757
Portugal	0.448	0.806	0.753	0.666
Romania	0.686	0.906	0.817	0.575
Russian Federation	0.494	0.925	0.760	0.661
Saudi Arabia	0.674	0.937	0.757	0.746
Shanghai (China)	0.550	0.927	0.796	0.878
Singapore	0.534	0.872	0.723	0.721
Slovak Republic	0.583	0.843	0.826	0.561
Slovenia	0.504	0.846	0.746	0.610
South Africa[2]	0.506	0.865	0.704	0.635
Spain	0.554	0.826	0.799	0.548
Sweden	0.560	0.819	0.901	0.801
Chinese Taipei	0.608	0.912	0.824	0.759
Turkey	0.652	0.904	0.899	0.762
United Arab Emirates	0.585	0.887	0.805	0.743
United States	0.521	0.856	0.839	0.654
Viet Nam	0.410	0.899	0.669	0.778
ISCED level 1				
Australia[1]	0.487	0.891	0.832	0.699
Flemish Community (Belgium)	0.506	0.835	0.764	0.637
Ciudad Autónoma de Buenos Aires (Argentina)	0.532	0.846	0.762	0.623
Denmark	0.532	0.766	0.734	0.497
England (United Kingdom)	0.509	0.859	0.801	0.746
France	0.482	0.733	0.799	0.686
Japan	0.566	0.797	0.832	0.766
Korea	0.579	0.916	0.848	0.746

Participating countries/economies	T3EFFPD	T3PDPED Cronbach's alpha	T3PDIV	T3PDBAR Omega coefficient
Netherlands[1]	0.399	0.845	0.787	0.748
Spain	0.515	0.843	0.803	0.598
Sweden	0.525	0.796	0.857	0.821
Chinese Taipei	0.563	0.910	0.824	0.733
Turkey	0.713	0.914	0.910	0.769
United Arab Emirates	0.603	0.899	0.815	0.753
Viet Nam	0.533	0.918	0.656	0.803
ISCED level 3				
Alberta (Canada)	0.438	0.850	0.799	0.664
Brazil	0.454	0.884	0.759	0.707
Croatia	0.584	0.867	0.808	0.634
Denmark	0.479	0.789	0.812	0.638
Portugal	0.495	0.810	0.755	0.630
Slovenia	0.469	0.854	0.781	0.607
Sweden	0.574	0.805	0.887	0.819
Chinese Taipei	0.637	0.899	0.835	0.734
Turkey	0.704	0.893	0.863	0.755
United Arab Emirates	0.620	0.884	0.774	0.776
Viet Nam	0.459	0.893	0.696	0.757
TALIS-PISA link				
Australia	0.411	0.869	0.869	0.728
Ciudad Autónoma de Buenos Aires (Argentina)	0.567	0.846	0.745	0.656
Colombia	0.584	0.884	0.843	0.602
Czech Republic	0.610	0.837	0.806	0.648
Denmark	0.529	0.835	0.748	0.927
Georgia	0.640	0.824	0.711	0.760
Malta	0.489	0.837	0.826	0.692
Turkey	0.652	0.891	0.814	0.717
Viet Nam	0.312	0.939	0.723	0.746

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.43. CFA model-data fit for scale T3EFFPD

Effective professional development

Participating countries/economies	CFI	TLI	RMSEA	WRMR
ISCED level 2				
Alberta (Canada)	1.000	1.031	0.000	0.206
Australia	0.977	0.931	0.042	0.988
Austria	1.000	0.999	0.006	0.399
Belgium	0.820	0.460	0.125	3.402
Flemish Community (Belgium)	0.964	0.891	0.072	1.504
Brazil	0.990	0.969	0.029	0.509
Bulgaria	0.975	0.925	0.081	1.401
Ciudad Autónoma de Buenos Aires (Argentina)	0.990	0.971	0.034	0.514
Chile	0.984	0.952	0.045	0.767
Colombia	0.983	0.948	0.044	0.622
Croatia	0.972	0.915	0.054	1.252
Cyprus	1.000	1.006	0.000	0.280

Participating countries/economies	CFI	TLI	RMSEA	WRMR
Czech Republic	0.996	0.988	0.026	0.601
Denmark	0.984	0.953	0.046	0.682
England (United Kingdom)	0.984	0.953	0.045	0.830
Estonia	0.993	0.979	0.032	0.713
Finland	0.999	0.998	0.007	0.398
France	0.965	0.896	0.046	0.731
Georgia	0.995	0.986	0.036	0.675
Hungary	0.984	0.952	0.046	0.827
Iceland	0.994	0.981	0.038	0.458
Israel	0.984	0.952	0.046	0.975
Italy	0.998	0.993	0.019	0.510
Japan	1.000	1.000	0.000	0.415
Kazakhstan	0.978	0.933	0.049	1.427
Korea	0.995	0.985	0.036	0.812
Latvia	0.953	0.860	0.053	0.887
Lithuania	0.996	0.988	0.020	0.612
Malta	0.985	0.956	0.047	0.724
Mexico	0.981	0.944	0.045	0.844
Netherlands	0.997	0.991	0.017	0.529
New Zealand	0.992	0.977	0.022	0.514
Norway	0.994	0.982	0.023	0.681
Portugal	0.988	0.963	0.034	0.778
Romania	0.992	0.977	0.046	0.825
Russian Federation	0.995	0.986	0.015	0.514
Saudi Arabia	0.998	0.995	0.024	0.410
Shanghai (China)	0.996	0.987	0.026	0.670
Singapore	0.994	0.982	0.027	0.763
Slovak Republic	0.994	0.982	0.033	0.692
Slovenia	0.981	0.944	0.051	0.900
South Africa[2]	1.000	1.006	0.000	0.336
Spain	0.981	0.942	0.036	1.003
Sweden	1.000	1.009	0.000	0.162
Chinese Taipei	0.994	0.982	0.037	0.919
Turkey	1.000	1.003	0.000	0.210
United Arab Emirates	1.000	1.000	0.004	0.386
United States	0.999	0.998	0.005	0.330
Viet Nam	0.990	0.970	0.021	0.531
ISCED level 1				
Australia[1]	0.996	0.989	0.019	0.556
Flemish Community (Belgium)	0.992	0.977	0.028	0.573
Ciudad Autónoma de Buenos Aires (Argentina)	0.984	0.952	0.045	0.933
Denmark	1.000	1.015	0.000	0.140
England (United Kingdom)	0.973	0.918	0.057	0.946
France	1.000	1.013	0.000	0.353
Japan	0.996	0.987	0.030	0.791
Korea	0.990	0.970	0.044	1.073
Netherlands[1]	1.000	1.043	0.000	0.113
Spain	0.998	0.993	0.013	0.570
Sweden	0.957	0.870	0.067	0.913
Chinese Taipei	0.976	0.928	0.070	1.604
Turkey	0.993	0.978	0.041	0.656
United Arab Emirates	0.997	0.990	0.023	0.693

Participating countries/economies	CFI	TLI	RMSEA	WRMR
Viet Nam	0.977	0.930	0.057	1.138
ISCED level 3				
Alberta (Canada)	1.000	1.001	0.000	0.371
Brazil	0.996	0.988	0.015	0.446
Croatia	0.992	0.977	0.037	0.714
Denmark	0.991	0.974	0.030	0.574
Portugal	1.000	1.007	0.000	0.229
Slovenia	0.978	0.933	0.048	0.894
Sweden	0.995	0.985	0.029	0.564
Chinese Taipei	0.995	0.986	0.035	0.547
Turkey	1.000	1.001	0.000	0.250
United Arab Emirates	0.998	0.994	0.018	0.527
Viet Nam	1.000	1.005	0.000	0.320
TALIS-PISA link				
Australia	0.974	0.922	0.039	0.828
Ciudad Autónoma de Buenos Aires (Argentina)	0.998	0.995	0.015	0.433
Colombia	1.000	1.009	0.000	0.192
Czech Republic	0.993	0.979	0.036	0.707
Denmark	1.000	1.004	0.000	0.362
Georgia	0.993	0.979	0.035	0.593
Malta	0.982	0.947	0.051	0.587
Turkey	0.999	0.998	0.009	0.412
Viet Nam	1.000	1.046	0.000	0.227

1. Data from participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection
Source: OECD, TALIS 2018 database.

Table 11.44. CFA model-data fit for scale T3PDPED

Needs for professional development in subject matter and pedagogy

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Alberta (Canada)	0.967	0.918	0.084	0.027
Australia	0.960	0.901	0.091	0.029
Austria	0.953	0.884	0.091	0.034
Belgium	0.912	0.780	0.119	0.041
Flemish Community (Belgium)	0.878	0.696	0.158	0.074
Brazil	0.982	0.956	0.070	0.021
Bulgaria	0.963	0.907	0.121	0.028
Ciudad Autónoma de Buenos Aires (Argentina)	0.984	0.959	0.056	0.019
Chile	0.991	0.977	0.051	0.015
Colombia	0.992	0.980	0.042	0.013
Croatia	0.934	0.835	0.130	0.040
Cyprus	0.971	0.927	0.078	0.025
Czech Republic	0.979	0.948	0.068	0.024
Denmark	0.978	0.945	0.075	0.024
England (United Kingdom)	0.918	0.795	0.140	0.036
Estonia	0.976	0.939	0.091	0.023
Finland	0.898	0.746	0.170	0.061
France	0.948	0.871	0.102	0.035
Georgia	0.995	0.987	0.048	0.012

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Hungary	0.937	0.843	0.154	0.037
Iceland	0.986	0.965	0.071	0.028
Israel	0.977	0.942	0.086	0.021
Italy	0.979	0.948	0.078	0.023
Japan	0.984	0.960	0.063	0.021
Kazakhstan	0.996	0.991	0.039	0.010
Korea	0.972	0.931	0.084	0.018
Latvia	0.972	0.931	0.089	0.023
Lithuania	0.979	0.948	0.080	0.022
Malta	0.944	0.860	0.121	0.035
Mexico	0.982	0.956	0.085	0.019
Netherlands	0.804	0.509	0.154	0.053
New Zealand	0.997	0.991	0.032	0.011
Norway	0.990	0.975	0.045	0.016
Portugal	0.956	0.889	0.109	0.031
Romania	0.974	0.935	0.098	0.022
Russian Federation	0.989	0.972	0.051	0.013
Saudi Arabia	0.976	0.940	0.078	0.024
Shanghai (China)	0.964	0.909	0.115	0.027
Singapore	0.959	0.897	0.113	0.027
Slovak Republic	0.988	0.969	0.062	0.018
Slovenia	0.962	0.906	0.118	0.030
South Africa[2]	0.910	0.900	0.102	0.169
Spain	0.934	0.836	0.090	0.030
Sweden	0.980	0.951	0.066	0.021
Chinese Taipei	0.953	0.882	0.133	0.033
Turkey	0.980	0.951	0.076	0.020
United Arab Emirates	0.971	0.927	0.088	0.022
United States	0.932	0.830	0.086	0.035
Viet Nam	0.978	0.944	0.067	0.023
ISCED level 1				
Australia[1]	0.973	0.970	0.057	0.130
Flemish Community (Belgium)	0.893	0.732	0.164	0.058
Ciudad Autónoma de Buenos Aires (Argentina)	0.964	0.911	0.085	0.030
Denmark	0.959	0.898	0.104	0.030
England (United Kingdom)	0.988	0.970	0.058	0.014
France	0.935	0.838	0.111	0.039
Japan	0.985	0.963	0.072	0.022
Korea	0.968	0.920	0.105	0.018
Netherlands[1]	0.851	0.835	0.120	0.184
Spain	0.980	0.951	0.057	0.020
Sweden	0.958	0.895	0.106	0.031
Chinese Taipei	0.955	0.888	0.133	0.031
Turkey	0.993	0.981	0.036	0.011
United Arab Emirates	0.986	0.964	0.061	0.017
Viet Nam	0.982	0.954	0.058	0.017
ISCED level 3				
Alberta (Canada)	0.969	0.922	0.091	0.026
Brazil	0.989	0.974	0.051	0.015
Croatia	0.937	0.841	0.130	0.034
Denmark	0.910	0.774	0.128	0.041
Portugal	0.970	0.924	0.084	0.030

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Slovenia	0.980	0.950	0.080	0.023
Sweden	0.963	0.908	0.086	0.028
Chinese Taipei	0.956	0.891	0.124	0.038
Turkey	0.972	0.930	0.058	0.020
United Arab Emirates	0.958	0.896	0.100	0.028
Viet Nam	0.963	0.908	0.078	0.026
TALIS-PISA link				
Australia	0.907	0.897	0.093	0.141
Ciudad Autónoma de Buenos Aires (Argentina)	0.923	0.914	0.066	0.114
Colombia	0.979	0.976	0.058	0.094
Czech Republic	0.893	0.882	0.091	0.122
Denmark	0.953	0.948	0.058	0.156
Georgia	0.884	0.871	0.095	0.222
Malta	0.985	0.983	0.047	0.051
Turkey	0.954	0.948	0.052	0.076
Viet Nam	0.967	0.964	0.045	0.523

1. Data from participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.45. CFA model-data fit for scale T3PDIV

Needs for professional development for teaching for diversity

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
South Africa[2]	0.925	0.925	0.070	0.076
ISCED level 1				
Australia[1]	0.970	0.970	0.060	0.090
Netherlands[1]	0.854	0.854	0.124	0.180
TALIS-PISA link				
Australia	0.971	0.971	0.062	0.077
Ciudad Autónoma de Buenos Aires (Argentina)	0.939	0.939	0.069	0.088
Colombia	0.897	0.897	0.094	0.223
Czech Republic	0.963	0.963	0.051	0.074
Denmark	0.908	0.908	0.074	0.095
Georgia	0.995	0.995	0.016	0.056
Malta	0.974	0.974	0.075	0.105
Turkey	0.886	0.886	0.085	0.160
Viet Nam	0.886	0.886	0.063	0.091

1. Data from participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.46. CFA model-data fit for the scale T3PDBAR

Professional development barriers

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Alberta (Canada)	0.992	0.979	0.022	0.019
Australia	0.988	0.969	0.029	0.016

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Austria	0.994	0.985	0.017	0.010
Belgium	0.968	0.919	0.044	0.019
Flemish Community (Belgium)	0.942	0.854	0.062	0.024
Brazil	0.913	0.781	0.088	0.037
Bulgaria	0.851	0.627	0.095	0.043
Ciudad Autónoma de Buenos Aires (Argentina)	0.956	0.889	0.047	0.024
Chile	0.965	0.912	0.063	0.024
Colombia	0.892	0.731	0.064	0.044
Croatia	0.977	0.942	0.038	0.019
Cyprus	0.868	0.671	0.115	0.037
Czech Republic	0.983	0.958	0.031	0.015
Denmark	0.796	0.490	0.104	0.054
England (United Kingdom)	0.973	0.933	0.053	0.023
Estonia	0.957	0.892	0.064	0.028
Finland	0.984	0.960	0.038	0.019
France	0.997	0.992	0.017	0.010
Georgia	0.984	0.960	0.042	0.018
Hungary	0.979	0.946	0.042	0.020
Iceland	0.949	0.873	0.059	0.026
Israel	0.976	0.939	0.043	0.023
Italy	0.987	0.967	0.027	0.013
Japan	0.978	0.946	0.053	0.024
Kazakhstan	0.995	0.987	0.018	0.014
Korea	0.965	0.911	0.062	0.027
Latvia	0.996	0.990	0.017	0.011
Lithuania	0.963	0.908	0.050	0.026
Malta	0.871	0.679	0.109	0.035
Mexico	0.965	0.913	0.064	0.025
Netherlands	0.913	0.783	0.070	0.040
New Zealand	0.970	0.926	0.043	0.025
Norway	0.878	0.696	0.083	0.047
Portugal	0.945	0.864	0.071	0.023
Romania	0.950	0.876	0.047	0.027
Russian Federation	0.955	0.887	0.038	0.021
Saudi Arabia	0.883	0.707	0.117	0.046
Shanghai (China)	0.911	0.777	0.145	0.048
Singapore	0.976	0.939	0.045	0.020
Slovak Republic	0.924	0.810	0.057	0.028
Slovenia	0.970	0.924	0.044	0.021
South Africa[2]	0.951	0.877	0.050	0.025
Spain	0.903	0.758	0.049	0.026
Sweden	0.963	0.907	0.047	0.028
Chinese Taipei	0.944	0.860	0.084	0.029
Turkey	0.983	0.957	0.041	0.019
United Arab Emirates	0.957	0.891	0.068	0.025
United States	0.977	0.943	0.022	0.025
Viet Nam	0.984	0.960	0.040	0.018
ISCED level 1				
Australia[1]	0.963	0.908	0.058	0.024
Flemish Community (Belgium)	0.956	0.889	0.058	0.023
Ciudad Autónoma de Buenos Aires (Argentina)	0.993	0.982	0.020	0.014
Denmark	0.856	0.641	0.061	0.032

Participating countries/economies	CFI	TLI	RMSEA	SRMR
England (United Kingdom)	0.975	0.937	0.051	0.023
France	0.933	0.832	0.069	0.030
Japan	0.960	0.899	0.070	0.031
Korea	0.973	0.933	0.051	0.023
Netherlands[1]	0.969	0.922	0.056	0.028
Spain	0.956	0.891	0.039	0.018
Sweden	0.968	0.920	0.041	0.024
Chinese Taipei	0.944	0.859	0.074	0.029
Turkey	0.925	0.812	0.070	0.034
United Arab Emirates	0.958	0.894	0.069	0.024
Viet Nam	0.979	0.947	0.065	0.022
ISCED level 3				
Alberta (Canada)	0.951	0.878	0.063	0.024
Brazil	0.887	0.719	0.088	0.042
Croatia	0.940	0.850	0.062	0.027
Denmark	0.980	0.950	0.030	0.021
Portugal	0.933	0.832	0.067	0.026
Slovenia	0.972	0.929	0.042	0.020
Sweden	0.991	0.977	0.024	0.015
Chinese Taipei	0.985	0.962	0.040	0.018
Turkey	0.968	0.919	0.041	0.029
United Arab Emirates	0.969	0.923	0.063	0.023
Viet Nam	0.990	0.974	0.038	0.016
TALIS-PISA link				
Australia	0.970	0.926	0.060	0.021
Ciudad Autónoma de Buenos Aires (Argentina)	0.998	0.995	0.011	0.015
Colombia	0.789	0.474	0.097	0.054
Czech Republic	0.991	0.977	0.021	0.014
Denmark[3]	-	-	-	0.050
Georgia	0.928	0.819	0.049	0.029
Malta	0.940	0.849	0.086	0.029
Turkey	0.953	0.884	0.042	0.032
Viet Nam	0.971	0.928	0.046	0.026

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
3. As the correction factor for this country/economy was negative, only the SRMR is reported.
Source: OECD, TALIS 2018 database.

Table 11.47. Invariance test results for scale T3EFFPD

	CFI	TLI	RMSEA	WRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ WRMR
Invariance level of ISCED level 2								
Configural	0.987	0.960	0.042	6.114				
Scalar	0.916	0.873	0.076	15.700	0.071	0.087	-0.034	-9.586
Invariance level of ISCED level 1								
Configural	0.989	0.968	0.039	3.160				
Scalar	0.941	0.907	0.067	7.988	0.048	0.061	-0.028	-4.828
Invariance level of ISCED level 3								
Configural	0.998	0.993	0.019	1.688				
Scalar	0.966	0.946	0.053	5.248	0.032	0.047	-0.034	-3.56

Source: OECD, TALIS 2018 database.

Table 11.48. Invariance test results for scale T3PDPED

	CFI	TLI	RMSEA	WRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level of ISCED level 2								
Configural	0.968	0.920	0.092	0.029				
Metric	0.948	0.934	0.083	0.066	0.020	-0.014	0.009	-0.037
Scalar	0.860	0.882	0.112	0.117	0.088	0.052	-0.029	-0.051
Invariance level of ISCED level 1								
Configural	0.975	0.938	0.082	0.026				
Metric	0.965	0.955	0.070	0.056	0.010	-0.017	0.012	-0.030
Scalar	0.889	0.903	0.103	0.111	0.076	0.052	-0.033	-0.055
Invariance level of ISCED level 3								
Configural	0.965	0.912	0.090	0.027				
Metric	0.949	0.934	0.078	0.059	0.016	-0.022	0.012	-0.032
Scalar	0.870	0.884	0.104	0.107	0.079	0.050	-0.026	-0.048

Note: See endnote 34.
Source: OECD, TALIS 2018 database.

Table 11.49. Invariance test results for scale T3PDIV

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level of ISCED level 2								
Configural	1.000	1.000	0.000	0.001				
Metric	0.964	0.945	0.074	0.071	0.036	0.055	-0.074	-0.070
Scalar	0.681	0.756	0.156	0.153	0.283	0.189	-0.082	-0.082
Invariance level of ISCED level 1								
Configural	1.000	1.000	0.000	0.000				
Metric	0.978	0.964	0.062	0.060	0.022	0.036	-0.062	-0.060
Scalar	0.731	0.781	0.152	0.126	0.247	0.183	-0.090	-0.066
Invariance level of ISCED level 3								
Configural	1.000	1.000	0.000	0.000				
Metric	0.980	0.968	0.057	0.052	0.020	0.032	-0.057	-0.052
Scalar	0.675	0.732	0.164	0.199	0.305	0.236	-0.107	-0.147

Note: See endnote 34.
Source: OECD, TALIS 2018 database.

Table 11.50. Invariance test results for scale T3PDBAR

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level of ISCED level 2								
Configural	0.957	0.893	0.057	0.027				
Metric	0.897	0.869	0.063	0.060	0.060	0.024	-0.006	-0.033
Scalar	0.407	0.499	0.123	0.147	0.490	0.370	-0.060	-0.087
Invariance level of ISCED level 1								
Configural	0.961	0.901	0.059	0.025				
Metric	0.916	0.890	0.063	0.057	0.045	0.011	-0.004	-0.032
Scalar	0.475	0.538	0.128	0.134	0.441	0.352	-0.065	-0.077
Invariance level of ISCED level 3								
Configural	0.967	0.918	0.054	0.025				
Metric	0.914	0.887	0.064	0.059	0.053	0.031	-0.010	-0.034
Scalar	0.649	0.689	0.105	0.127	0.265	0.198	-0.041	-0.068

Source: OECD, TALIS 2018 database.

Table 11.51. Unstandardised factor loadings for T3PDPED and T3PDIV for all countries for all populations

T3PDPED (Metric)		T3PDIV (Metric)	
TT3G27A	0.651	TT3G27H	0.629
TT3G27B	0.684	TT3G27I	0.792
TT3G27C	0.707	TT3G27J	0.615
TT3G27D	0.688		
TT3G27F	0.622		

Source: OECD, TALIS 2018 database.

Table 11.52. Standardised factor loadings and unstandardised intercepts for scale T3EFFPD

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G26A	TT3G26B	TT3G26A	TT3G26B	TT3G26A	TT3G26B	TT3G26A	TT3G26B
ISCED level 2								
Alberta (Canada)	0.732	0.539	0.760	0.555	-1.986	-0.893	-0.927	-0.832
Australia	0.824	0.620	0.609	0.541	-1.953	-0.587	-0.983	-0.631
Austria	0.593	0.734	0.702	0.557	-1.347	-1.505	-1.033	-0.414
Belgium	0.474	0.757	0.464	0.535	-0.865	-0.945	-0.498	-0.255
Flemish Community (Belgium)	0.480	0.796	0.691	0.598	-1.986	-0.893	-0.927	-0.832
Brazil	0.470	0.363	0.893	0.621	-1.986	-0.893	-0.927	-0.832
Bulgaria	0.596	0.784	0.850	0.615	-0.286	-0.562	-0.205	-0.590
Ciudad Autónoma de Buenos Aires (Argentina)	0.588	0.672	0.996	0.585	-1.986	-0.893	-0.927	-0.832
Chile	0.657	0.646	0.839	0.668	-1.217	-1.325	-1.302	-0.995
Colombia	0.883	0.789	0.769	0.655	-1.504	-1.075	-1.551	-0.937
Croatia	0.600	0.605	0.714	0.720	-1.986	-0.893	-0.927	-0.832
Cyprus	0.522	0.569	0.761	0.761	-1.575	-0.604	-0.722	-0.665
Czech Republic	0.610	0.636	0.805	0.590	-1.119	-0.351	-1.052	-0.638
Denmark	0.594	0.508	0.806	0.628	-1.986	-0.893	-0.927	-0.832
England (United Kingdom)	0.895	0.465	0.737	0.540	-1.986	-0.893	-0.927	-0.832
Estonia	0.436	0.706	0.798	0.710	-1.475	-1.333	-1.256	-0.806
Finland	0.498	0.667	0.719	0.664	-1.626	-1.262	-0.754	-0.410
France	0.297	0.661	0.859	0.316	-1.986	-0.893	-0.927	-0.832

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G26A	TT3G26B	TT3G26A	TT3G26B	TT3G26A	TT3G26B	TT3G26A	TT3G26B
Georgia	0.784	0.811	0.831	0.803	-1.562	-1.670	-1.084	-0.829
Hungary	0.666	0.592	0.763	0.677	-1.242	-0.752	-1.242	-0.482
Iceland	0.568	0.759	0.648	0.768	-1.830	0.016	-0.873	-0.347
Israel	0.515	0.755	0.637	0.736	-1.036	-1.290	-1.005	-0.525
Italy	0.701	0.675	0.742	0.587	-1.579	-0.893	-0.742	-0.263
Japan	0.588	0.651	0.755	0.631	-1.986	-0.893	-0.927	-0.832
Kazakhstan	0.665	0.760	0.783	0.678	-1.462	-0.898	-1.181	-1.256
Korea	0.599	0.944	0.583	0.844	-1.986	-0.893	-0.927	-0.832
Latvia	0.350	0.580	0.762	0.539	-1.960	-0.601	-0.304	-0.589
Lithuania	0.653	0.714	0.809	0.666	-1.837	-1.352	-0.292	-0.412
Malta	0.614	0.691	0.664	0.555	-1.818	-0.695	-0.479	-0.270
Mexico	0.440	0.694	0.815	0.628	-1.058	-1.198	-1.146	-0.881
Netherlands	0.536	0.688	0.731	0.603	-1.695	-1.319	-0.128	-0.432
New Zealand	0.637	0.464	0.586	0.683	-1.776	-0.206	-0.796	-0.547
Norway	0.575	0.617	0.673	0.545	-1.451	-0.387	-0.548	-0.745
Portugal	0.333	0.770	0.842	0.534	-1.986	-0.893	-0.927	-0.832
Romania	0.795	0.792	0.789	0.746	-1.122	-1.017	-0.713	-0.570
Russian Federation	0.463	0.668	0.673	0.624	-1.641	-0.754	-0.556	-0.726
Saudi Arabia	0.743	0.884	0.861	0.763	-1.841	-1.195	-0.888	-0.972
Shanghai (China)	0.672	0.716	0.898	0.669	-1.720	-1.686	-1.074	-1.539
Singapore	0.693	0.691	0.764	0.618	-1.787	-1.053	-0.875	-0.867
Slovak Republic	0.593	0.671	0.797	0.617	-1.152	-0.427	-0.286	-0.714
Slovenia	0.692	0.608	0.697	0.567	-1.986	-0.893	-0.927	-0.832
South Africa[2]	0.675	0.646	0.689	0.822	-2.092	-1.183	-1.123	-1.392
Spain	0.455	0.672	0.963	0.461	-1.986	-0.893	-0.927	-0.832
Sweden	0.807	0.472	0.712	0.682	-1.986	-0.893	-0.927	-0.832
Chinese Taipei	0.576	0.784	0.792	0.784	-1.986	-0.893	-0.927	-0.832
Turkey	0.653	0.779	0.972	0.650	-1.986	-0.893	-0.927	-0.832
United Arab Emirates	0.559	0.777	0.857	0.666	-1.986	-0.893	-0.927	-0.832
United States	0.564	0.796	0.625	0.625	-1.809	-0.663	-0.769	-0.579
Viet Nam	0.583	0.463	0.717	0.895	-1.986	-0.893	-0.927	-0.832
ISCED level 1								
Australia[1]	0.738	0.619	0.651	0.483	-2.015	-0.595	-0.886	-0.605
Flemish Community (Belgium)	0.532	0.767	0.743	0.547	-1.986	-0.893	-0.927	-0.832
Ciudad Autónoma de Buenos Aires (Argentina)	0.682	0.645	0.994	0.625	-1.986	-0.893	-0.927	-0.832
Denmark	0.624	0.572	0.722	0.679	-1.986	-0.893	-0.927	-0.832
England (United Kingdom)	0.803	0.444	0.869	0.658	-1.986	-0.893	-0.927	-0.832
France	0.330	0.602	0.948	0.330	-1.986	-0.893	-0.927	-0.832
Japan	0.620	0.667	0.727	0.752	-1.986	-0.893	-0.927	-0.832
Korea	0.633	0.909	0.553	0.828	-1.986	-0.893	-0.927	-0.832
Netherlands[1]	0.426	0.463	0.748	0.632	-1.967	-1.470	-0.374	-0.713
Spain	0.479	0.706	0.927	0.477	-1.986	-0.893	-0.927	-0.832
Sweden	0.671	0.425	0.863	0.630	-1.986	-0.893	-0.927	-0.832
Chinese Taipei	0.645	0.813	0.792	0.681	-1.986	-0.893	-0.927	-0.832
Turkey	0.754	0.870	0.984	0.708	-1.986	-0.893	-0.927	-0.832
United Arab Emirates	0.556	0.801	0.864	0.709	-1.986	-0.893	-0.927	-0.832
Viet Nam	0.710	0.570	0.857	0.977	-1.986	-0.893	-0.927	-0.832
ISCED level 3								
Alberta (Canada)	0.848	0.544	0.686	0.491	-1.986	-0.893	-0.927	-0.832
Brazil	0.451	0.371	0.947	0.615	-1.986	-0.893	-0.927	-0.832

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G26A	TT3G26B	TT3G26A	TT3G26B	TT3G26A	TT3G26B	TT3G26A	TT3G26B
Croatia	0.547	0.636	0.945	0.681	-1.986	-0.893	-0.927	-0.832
Denmark	0.470	0.537	0.789	0.575	-1.986	-0.893	-0.927	-0.832
Portugal	0.362	0.766	0.867	0.602	-1.986	-0.893	-0.927	-0.832
Slovenia	0.695	0.522	0.720	0.514	-1.986	-0.893	-0.927	-0.832
Sweden	0.684	0.589	0.726	0.755	-1.986	-0.893	-0.927	-0.832
Chinese Taipei	0.723	0.870	0.725	0.779	-1.986	-0.893	-0.927	-0.832
Turkey	0.708	0.833	0.925	0.712	-1.986	-0.893	-0.927	-0.832
United Arab Emirates	0.583	0.801	0.892	0.690	-1.986	-0.893	-0.927	-0.832
Viet Nam	0.627	0.489	0.696	0.892	-1.986	-0.893	-0.927	-0.832
TALIS-PISA link								
Australia	0.745	0.576	0.798	0.649	-2.176	-0.878	-0.994	-0.946
Ciudad Autónoma de Buenos Aires (Argentina)	0.524	0.858	0.707	0.612	-1.499	-0.877	-0.996	-0.700
Colombia	0.802	0.684	0.841	0.647	-1.542	-1.172	-1.515	-1.108
Czech Republic	0.704	0.654	0.819	0.692	-1.199	-0.343	-0.961	-0.712
Denmark	0.631	0.821	0.616	0.528	-1.493	-0.417	-0.313	-0.718
Georgia	0.897	0.862	0.810	0.805	-1.819	-1.767	-1.155	-0.912
Malta	0.661	0.721	0.635	0.517	-1.680	-0.613	-0.342	-0.316
Turkey	0.573	0.794	0.808	0.831	-1.318	-1.026	-1.021	-0.616
Viet Nam	0.384	0.530	0.734	0.621	-1.943	-0.945	-1.317	-2.000

1. Data from participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.53. Standardised factor loadings and unstandardised intercepts for scale T3PDPED

Participating countries/economies	Standardised factor loadings					Unstandardised intercepts				
	TT3G27A	TT3G27B	TT3G27C	TT3G27D	TT3G27F	TT3G27A	TT3G27B	TT3G27C	TT3G27D	TT3G27F
ISCED level 2										
Alberta (Canada)	0.733	0.775	0.808	0.714	0.614	2.011	2.031	1.879	2.356	1.949
Australia	0.719	0.754	0.758	0.738	0.607	2.020	2.088	2.112	2.295	1.998
Austria	0.600	0.655	0.667	0.594	0.517	2.006	2.164	1.808	2.244	2.411
Belgium	0.664	0.702	0.680	0.629	0.532	1.865	2.041	1.891	2.359	2.127
Flemish Community (Belgium)	0.758	0.727	0.776	0.610	0.542	1.866	2.050	1.722	2.358	2.281
Brazil	0.771	0.823	0.824	0.803	0.682	2.288	2.242	2.158	2.307	2.538
Bulgaria	0.820	0.862	0.854	0.846	0.735	2.341	2.349	2.103	2.414	2.663
Ciudad Autónoma de Buenos Aires (Argentina)	0.686	0.739	0.724	0.706	0.607	1.897	1.994	1.837	2.033	2.165
Chile	0.736	0.787	0.785	0.742	0.643	2.107	2.252	2.174	2.479	2.460
Colombia	0.736	0.810	0.828	0.827	0.734	2.537	2.753	2.603	2.759	2.757
Croatia	0.727	0.795	0.785	0.784	0.664	2.245	2.491	2.079	2.556	2.683
Cyprus	0.754	0.762	0.795	0.763	0.635	1.573	1.858	1.710	2.018	2.098
Czech Republic	0.584	0.687	0.741	0.727	0.584	2.338	2.174	1.838	2.166	2.511
Denmark	0.591	0.672	0.710	0.678	0.619	2.332	2.250	1.836	2.233	2.054
England (United Kingdom)	0.677	0.744	0.730	0.689	0.608	1.814	1.831	1.857	2.044	1.770
Estonia	0.672	0.747	0.791	0.775	0.647	2.358	2.351	2.300	2.495	2.584
Finland	0.631	0.706	0.719	0.695	0.581	2.194	2.128	2.388	2.612	2.238
France	0.634	0.686	0.697	0.653	0.526	1.961	2.342	1.862	2.530	2.246
Georgia	0.760	0.802	0.861	0.858	0.770	2.559	2.661	2.611	2.655	2.517

Participating countries/economies	Standardised factor loadings					Unstandardised intercepts				
	TT3G27A	TT3G27B	TT3G27C	TT3G27D	TT3G27F	TT3G27A	TT3G27B	TT3G27C	TT3G27D	TT3G27F
Hungary	0.753	0.766	0.791	0.740	0.665	2.106	2.245	1.752	2.139	2.390
Iceland	0.602	0.638	0.723	0.726	0.559	2.447	2.385	2.479	2.818	2.625
Israel	0.761	0.812	0.825	0.802	0.693	2.386	2.497	2.153	2.423	2.457
Italy	0.662	0.710	0.768	0.749	0.607	2.231	2.436	2.147	2.411	2.504
Japan	0.701	0.745	0.647	0.723	0.610	3.492	3.552	3.065	3.334	3.352
Kazakhstan	0.802	0.838	0.867	0.844	0.759	2.744	2.765	2.743	2.872	2.631
Korea	0.802	0.840	0.855	0.852	0.756	2.739	2.867	2.705	2.853	2.908
Latvia	0.735	0.787	0.778	0.807	0.686	2.300	2.346	2.477	2.510	2.599
Lithuania	0.716	0.789	0.798	0.752	0.632	2.571	2.610	2.404	2.749	2.657
Malta	0.687	0.733	0.717	0.652	0.582	1.831	2.055	2.062	2.541	2.271
Mexico	0.794	0.837	0.780	0.817	0.718	2.191	2.435	2.270	2.330	2.327
Netherlands	0.578	0.662	0.706	0.582	0.580	2.312	2.206	2.096	2.403	2.298
New Zealand	0.729	0.758	0.833	0.751	0.626	2.020	2.072	1.923	2.216	1.973
Norway	0.620	0.677	0.674	0.717	0.599	2.497	2.570	2.429	2.689	2.479
Portugal	0.657	0.735	0.720	0.722	0.587	2.466	2.519	2.132	2.565	2.711
Romania	0.796	0.846	0.862	0.848	0.737	2.089	2.283	2.155	2.353	2.546
Russian Federation	0.821	0.853	0.893	0.872	0.807	2.405	2.437	2.168	2.257	2.210
Saudi Arabia	0.857	0.899	0.919	0.835	0.783	1.932	1.878	1.840	2.101	2.042
Shanghai (China)	0.843	0.884	0.902	0.841	0.745	2.941	3.052	2.956	3.037	2.939
Singapore	0.772	0.802	0.829	0.743	0.622	2.252	2.518	2.293	2.681	2.321
Slovak Republic	0.668	0.757	0.743	0.805	0.663	2.408	2.413	2.378	2.429	2.611
Slovenia	0.722	0.774	0.809	0.740	0.601	1.837	1.977	1.720	2.116	2.498
South Africa[2]	0.790	0.808	0.863	0.867	0.693	2.185	2.269	2.165	2.261	2.429
Spain	0.691	0.732	0.745	0.715	0.604	1.983	2.344	2.051	2.412	2.485
Sweden	0.632	0.712	0.780	0.735	0.613	2.113	2.131	1.983	2.333	2.138
Chinese Taipei	0.844	0.836	0.893	0.802	0.701	2.673	2.805	2.641	2.624	2.772
Turkey	0.812	0.839	0.829	0.825	0.741	1.609	1.723	1.657	1.737	1.703
United Arab Emirates	0.800	0.814	0.834	0.789	0.708	1.668	1.845	1.738	1.998	1.833
United States	0.765	0.780	0.819	0.688	0.606	1.805	1.934	1.869	2.153	1.978
Viet Nam	0.832	0.854	0.831	0.801	0.721	3.749	3.728	3.657	3.617	3.608
ISCED level 1										
Australia[1]	0.782	0.801	0.813	0.739	0.633	1.989	2.018	2.040	2.296	2.025
Flemish Community (Belgium)	0.760	0.705	0.814	0.590	0.513	1.866	2.050	1.722	2.358	2.281
Ciudad Autónoma de Buenos Aires (Argentina)	0.704	0.777	0.766	0.766	0.610	1.897	1.994	1.837	2.033	2.165
Denmark	0.601	0.670	0.713	0.670	0.573	2.330	2.241	1.824	2.280	2.211
England (United Kingdom)	0.759	0.773	0.829	0.714	0.680	1.814	1.831	1.857	2.044	1.770
France	0.622	0.646	0.666	0.622	0.483	1.961	2.342	1.862	2.530	2.246
Japan	0.715	0.752	0.652	0.730	0.631	3.492	3.552	3.065	3.334	3.352
Korea	0.838	0.858	0.874	0.853	0.749	2.739	2.867	2.705	2.853	2.908
Netherlands[1]	0.638	0.666	0.708	0.656	0.570	2.313	2.177	2.292	2.175	2.463
Spain	0.720	0.772	0.765	0.741	0.646	1.983	2.344	2.051	2.412	2.485
Sweden	0.657	0.713	0.742	0.676	0.609	2.113	2.131	1.983	2.333	2.138
Chinese Taipei	0.834	0.845	0.889	0.822	0.687	2.673	2.805	2.641	2.624	2.772
Turkey	0.845	0.856	0.839	0.849	0.776	1.609	1.723	1.657	1.737	1.703
United Arab Emirates	0.817	0.830	0.854	0.802	0.720	1.668	1.845	1.738	1.998	1.833
Viet Nam	0.848	0.886	0.847	0.841	0.758	3.749	3.728	3.657	3.617	3.608
ISCED level 3										
Alberta (Canada)	0.723	0.775	0.815	0.703	0.629	2.011	2.031	1.879	2.356	1.949

Participating countries/economies	Standardised factor loadings					Unstandardised intercepts				
	TT3G27A	TT3G27B	TT3G27C	TT3G27D	TT3G27F	TT3G27A	TT3G27B	TT3G27C	TT3G27D	TT3G27F
Brazil	0.772	0.815	0.829	0.811	0.693	2.288	2.242	2.158	2.307	2.538
Croatia	0.705	0.806	0.799	0.791	0.667	2.245	2.491	2.079	2.556	2.683
Denmark	0.614	0.697	0.626	0.709	0.648	2.114	2.149	2.183	2.099	1.998
Portugal	0.658	0.747	0.715	0.732	0.579	2.466	2.519	2.132	2.565	2.711
Slovenia	0.675	0.756	0.815	0.792	0.622	2.024	2.071	1.732	1.967	2.381
Sweden	0.597	0.689	0.754	0.721	0.622	2.113	2.131	1.983	2.333	2.138
Chinese Taipei	0.816	0.838	0.871	0.785	0.683	2.673	2.805	2.641	2.624	2.772
Turkey	0.784	0.826	0.816	0.813	0.755	1.609	1.723	1.657	1.737	1.703
United Arab Emirates	0.804	0.797	0.839	0.755	0.687	1.668	1.845	1.738	1.998	1.833
Viet Nam	0.819	0.835	0.830	0.795	0.718	3.749	3.728	3.657	3.617	3.608
TALIS-PISA link										
Australia	0.714	0.768	0.740	0.736	0.608	1.982	2.043	2.116	2.249	1.978
Ciudad Autónoma de Buenos Aires (Argentina)	0.654	0.753	0.727	0.749	0.641	1.835	2.048	1.818	2.056	2.138
Colombia	0.770	0.826	0.851	0.836	0.762	2.520	2.717	2.542	2.726	2.681
Czech Republic	0.587	0.714	0.732	0.754	0.615	2.444	2.194	1.863	2.111	2.399
Denmark	0.582	0.658	0.729	0.685	0.611	2.244	2.175	1.804	2.196	2.030
Georgia	0.753	0.808	0.847	0.832	0.749	2.524	2.607	2.515	2.615	2.465
Malta	0.716	0.751	0.756	0.699	0.629	1.791	2.036	1.970	2.403	2.126
Turkey	0.782	0.824	0.795	0.780	0.751	1.620	1.709	1.604	1.726	1.646
Viet Nam	0.822	0.861	0.841	0.813	0.746	3.712	3.696	3.629	3.576	3.566

1. Data from participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.54. Standardised factor loadings and unstandardised intercepts for scale T3PDIV

Participating countries/economies	Standardised factor loadings			Unstandardised intercepts		
	TT3G27H	TT3G27I	TT3G27J	TT3G27H	TT3G27I	TT3G27J
ISCED level 2						
Alberta (Canada)	0.704	0.793	0.588	2.355	2.483	2.247
Australia	0.726	0.874	0.623	2.424	2.515	2.123
Austria	0.654	0.792	0.627	2.483	2.278	2.152
Belgium	0.670	0.842	0.633	2.318	2.535	1.972
Flemish Community (Belgium)	0.648	0.853	0.666	2.165	2.411	1.914
Brazil	0.593	0.805	0.591	2.504	3.350	3.080
Bulgaria	0.652	0.817	0.628	2.515	2.803	2.586
Ciudad Autónoma de Buenos Aires (Argentina)	0.660	0.808	0.624	2.272	2.886	2.532
Chile	0.703	0.850	0.595	2.583	3.010	2.817
Colombia	0.639	0.851	0.627	2.863	3.378	3.196
Croatia	0.769	0.913	0.518	2.891	3.052	2.243
Cyprus	0.694	0.801	0.679	2.237	2.670	2.455
Czech Republic	0.725	0.869	0.612	2.340	2.536	1.918
Denmark	0.657	0.795	0.612	2.186	2.592	2.109
England (United Kingdom)	0.706	0.865	0.621	2.074	2.230	1.935
Estonia	0.617	0.783	0.578	2.401	2.888	2.260
Finland	0.737	0.875	0.624	2.383	2.493	2.115
France	0.708	0.887	0.539	2.748	2.972	2.122
Georgia	0.673	0.793	0.646	2.636	2.511	2.120
Hungary	0.652	0.757	0.525	2.297	2.626	1.919

Participating countries/economies	Standardised factor loadings			Unstandardised intercepts		
	TT3G27H	TT3G27I	TT3G27J	TT3G27H	TT3G27I	TT3G27J
Iceland	0.744	0.935	0.673	2.576	2.729	2.705
Israel	0.648	0.787	0.618	2.102	2.590	2.196
Italy	0.740	0.907	0.586	2.453	2.671	2.507
Japan	0.702	0.832	0.532	3.344	3.345	2.700
Kazakhstan	0.621	0.735	0.600	2.651	2.403	2.381
Korea	0.688	0.935	0.787	2.809	2.460	2.529
Latvia	0.675	0.764	0.598	2.668	2.498	2.109
Lithuania	0.637	0.730	0.538	2.744	2.656	1.991
Malta	0.693	0.901	0.670	2.408	2.731	2.600
Mexico	0.610	0.838	0.562	2.581	3.326	3.108
Netherlands	0.543	0.727	0.591	2.684	2.466	1.878
New Zealand	0.725	0.795	0.714	2.422	2.496	2.266
Norway	0.717	0.856	0.606	2.240	2.670	2.326
Portugal	0.636	0.813	0.538	2.690	3.065	2.789
Romania	0.689	0.861	0.634	2.708	2.946	2.644
Russian Federation	0.642	0.811	0.591	2.285	2.386	2.073
Saudi Arabia	0.663	0.769	0.683	2.106	2.454	2.439
Shanghai (China)	0.738	0.820	0.630	3.087	2.685	2.556
Singapore	0.648	0.750	0.611	2.643	2.744	2.137
Slovak Republic	0.728	0.867	0.614	2.540	2.837	2.149
Slovenia	0.650	0.807	0.510	2.286	2.774	2.158
South Africa[2]	0.643	0.716	0.619	2.507	2.902	2.479
Spain	0.678	0.848	0.600	2.601	2.964	2.656
Sweden	0.806	0.932	0.627	2.339	2.578	2.281
Chinese Taipei	0.726	0.857	0.666	2.716	2.586	2.485
Turkey	0.764	0.933	0.637	2.094	2.422	2.464
United Arab Emirates	0.736	0.821	0.680	2.025	2.433	2.056
United States	0.726	0.877	0.655	2.289	2.332	2.110
Viet Nam	0.664	0.692	0.488	3.178	2.690	2.259
ISCED level 1						
Australia[1]	0.695	0.851	0.605	2.321	2.445	2.085
Flemish Community (Belgium)	0.641	0.819	0.575	2.165	2.411	1.914
Ciudad Autónoma de Buenos Aires (Argentina)	0.638	0.813	0.603	2.272	2.886	2.532
Denmark	0.663	0.770	0.584	2.239	2.790	2.178
England (United Kingdom)	0.722	0.840	0.588	1.963	2.205	1.922
France	0.697	0.856	0.475	2.748	2.972	2.122
Japan	0.715	0.882	0.525	3.344	3.345	2.700
Korea	0.699	0.884	0.719	2.809	2.460	2.529
Netherlands[1]	0.616	0.761	0.557	2.634	2.799	1.891
Spain	0.689	0.849	0.601	2.601	2.964	2.656
Sweden	0.749	0.898	0.591	2.339	2.578	2.281
Chinese Taipei	0.742	0.855	0.660	2.716	2.586	2.485
Turkey	0.781	0.941	0.662	2.094	2.422	2.464
United Arab Emirates	0.738	0.834	0.692	2.025	2.433	2.056
Viet Nam	0.668	0.680	0.443	3.339	3.032	2.349
ISCED level 3						
Alberta (Canada)	0.695	0.839	0.631	2.355	2.483	2.247
Brazil	0.589	0.818	0.608	2.504	3.350	3.080
Croatia	0.742	0.842	0.592	2.891	3.052	2.243
Denmark	0.659	0.846	0.712	2.048	2.092	1.897
Portugal	0.641	0.807	0.586	2.690	3.065	2.789

Participating countries/economies	Standardised factor loadings			Unstandardised intercepts		
	TT3G27H	TT3G27I	TT3G27J	TT3G27H	TT3G27I	TT3G27J
Slovenia	0.678	0.828	0.589	2.286	2.774	2.158
Sweden	0.777	0.920	0.663	2.339	2.578	2.281
Chinese Taipei	0.723	0.873	0.657	2.716	2.586	2.485
Turkey	0.744	0.901	0.647	2.094	2.422	2.464
United Arab Emirates	0.700	0.795	0.655	2.025	2.433	2.056
Viet Nam	0.678	0.711	0.539	3.078	2.488	2.264
TALIS-PISA link						
Australia	0.737	0.897	0.641	2.385	2.420	2.131
Ciudad Autónoma de Buenos Aires (Argentina)	0.663	0.826	0.612	2.352	2.936	2.506
Colombia	0.610	0.840	0.612	2.832	3.401	3.183
Czech Republic	0.711	0.845	0.620	2.254	2.431	1.865
Denmark	0.619	0.763	0.596	2.117	2.475	1.977
Georgia	0.671	0.771	0.623	2.648	2.474	2.047
Malta	0.727	0.896	0.675	2.424	2.699	2.541
Turkey	0.744	0.917	0.667	2.035	2.341	2.364
Viet Nam	0.672	0.750	0.548	3.081	2.564	2.295

1. Data from participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.55. Standardised factor loadings and unstandardised intercepts for scale T3PDBAR

Participating countries/economies	Standardised factor loadings					Unstandardised intercepts				
	TT3G28A	TT3G28B	TT3G28C	TT3G28E	TT3G28F	TT3G28A	TT3G28B	TT3G28C	TT3G28E	TT3G28F
ISCED level 2										
Alberta (Canada)	0.329	0.641	0.737	0.256	0.341	1.449	2.290	1.869	2.293	2.182
Australia	0.381	0.670	0.702	0.305	0.442	1.509	2.322	1.983	2.094	1.965
Austria	0.329	0.752	0.552	0.240	0.128	1.237	1.525	1.496	1.856	2.450
Belgium	0.480	0.658	0.541	0.335	0.261	1.556	2.000	1.844	2.258	2.268
Flemish Community (Belgium)	0.345	0.539	0.664	0.308	0.405	1.394	1.947	1.827	2.132	2.134
Brazil	0.163	0.544	0.768	0.294	0.583	1.388	2.552	2.841	2.057	2.378
Bulgaria	0.464	0.416	0.658	0.391	0.451	1.486	2.602	1.697	1.958	2.297
Ciudad Autónoma de Buenos Aires (Argentina)	0.320	0.621	0.616	0.251	0.455	1.603	2.388	2.264	2.593	2.423
Chile	0.172	0.547	0.685	0.331	0.682	1.669	3.055	2.771	2.493	2.747
Colombia	0.233	0.629	0.642	0.214	0.403	1.653	3.053	2.814	2.004	2.354
Croatia	0.322	0.694	0.635	0.302	0.407	1.348	2.197	1.904	2.016	2.273
Cyprus	0.337	0.566	0.692	0.368	0.529	1.512	2.242	2.344	2.520	2.392
Czech Republic	0.375	0.646	0.567	0.303	0.271	1.456	2.103	1.834	2.209	2.050
Denmark	0.228	0.568	0.702	0.051	0.195	1.441	2.487	1.920	1.902	2.273
England (United Kingdom)	0.294	0.551	0.763	0.267	0.554	1.553	2.565	2.107	2.111	2.133
Estonia	0.340	0.707	0.650	0.394	0.495	1.446	2.120	1.780	1.999	2.141
Finland	0.212	0.735	0.733	0.103	0.303	1.308	2.195	2.040	2.193	2.320
France	0.465	0.741	0.633	0.293	0.224	1.528	1.906	1.744	2.303	2.255
Georgia	0.549	0.682	0.689	0.524	0.648	1.653	2.078	1.820	1.966	2.040
Hungary	0.217	0.723	0.624	0.321	0.293	1.329	2.612	1.846	2.049	2.137
Iceland	0.236	0.763	0.510	0.346	0.359	1.352	2.200	1.763	2.359	2.331
Israel	0.459	0.694	0.682	0.314	0.302	1.376	1.798	1.897	2.477	2.046

Participating countries/economies	Standardised factor loadings					Unstandardised intercepts				
	TT3G28A	TT3G28B	TT3G28C	TT3G28E	TT3G28F	TT3G28A	TT3G28B	TT3G28C	TT3G28E	TT3G28F
Italy	0.348	0.558	0.645	0.214	0.339	1.716	2.529	2.248	2.275	2.398
Japan	0.486	0.787	0.729	0.363	0.440	2.119	2.670	2.619	2.869	2.282
Kazakhstan	0.435	0.627	0.695	0.510	0.496	1.843	2.239	2.226	2.336	2.036
Korea	0.428	0.779	0.660	0.395	0.383	2.302	2.625	2.869	2.807	2.341
Latvia	0.393	0.624	0.629	0.494	0.510	1.417	2.227	1.752	1.980	1.998
Lithuania	0.337	0.617	0.614	0.432	0.463	1.330	2.504	1.979	1.800	2.367
Malta	0.358	0.689	0.584	0.370	0.365	1.536	2.060	2.142	2.628	2.221
Mexico	0.250	0.609	0.790	0.334	0.603	1.945	2.607	2.830	2.113	2.574
Netherlands	0.284	0.594	0.753	0.243	0.650	1.456	1.959	2.055	1.964	2.197
New Zealand	0.336	0.633	0.689	0.300	0.427	1.534	2.364	2.020	2.123	2.259
Norway	0.197	0.844	0.606	0.047	0.059	1.513	2.320	2.109	2.049	1.886
Portugal	0.195	0.704	0.639	0.319	0.398	1.509	2.744	3.221	2.526	2.736
Romania	0.352	0.542	0.593	0.344	0.371	1.620	2.850	1.956	2.244	2.048
Russian Federation	0.305	0.624	0.612	0.477	0.509	1.739	2.255	2.064	2.349	2.049
Saudi Arabia	0.410	0.639	0.725	0.482	0.637	1.969	2.445	2.896	2.574	2.787
Shanghai (China)	0.502	0.672	0.896	0.533	0.800	1.882	2.059	2.074	2.290	2.107
Singapore	0.521	0.700	0.685	0.305	0.469	1.822	2.021	2.028	2.346	2.064
Slovak Republic	0.368	0.633	0.440	0.377	0.229	1.499	2.341	1.774	2.260	2.361
Slovenia	0.309	0.640	0.608	0.237	0.334	1.325	2.388	1.857	2.093	2.187
South Africa[2]	0.348	0.580	0.625	0.401	0.487	1.712	2.313	2.510	2.006	2.157
Spain	0.364	0.599	0.501	0.225	0.338	1.428	2.280	2.086	2.643	2.575
Sweden	0.061	0.496	0.883	0.056	0.372	1.278	2.411	2.125	1.731	2.245
Chinese Taipei	0.561	0.798	0.617	0.343	0.428	1.850	2.186	2.154	2.615	2.353
Turkey	0.237	0.640	0.812	0.302	0.556	1.497	2.317	2.567	2.216	2.512
United Arab Emirates	0.329	0.603	0.763	0.460	0.618	1.416	2.264	2.154	2.135	2.162
United States	0.384	0.643	0.641	0.291	0.460	1.530	2.203	1.898	2.331	2.081
Viet Nam	0.491	0.738	0.728	0.550	0.610	1.859	2.220	2.316	2.052	2.109
ISCED level 1										
Australia[1]	0.398	0.624	0.724	0.342	0.466	1.605	2.474	2.009	2.114	1.950
Flemish Community (Belgium)	0.356	0.513	0.687	0.325	0.465	1.381	2.171	1.842	2.109	1.942
Ciudad Autónoma de Buenos Aires (Argentina)	0.302	0.602	0.624	0.256	0.486	1.760	2.620	2.243	2.731	2.384
Denmark	0.189	0.505	0.605	0.047	0.174	1.482	2.602	2.007	1.836	2.281
England (United Kingdom)	0.311	0.578	0.795	0.278	0.604	1.553	2.565	2.107	2.111	2.133
France	0.464	0.746	0.577	0.315	0.240	1.668	2.006	2.188	2.519	2.427
Japan	0.480	0.771	0.729	0.361	0.436	2.119	2.670	2.619	2.869	2.282
Korea	0.415	0.793	0.652	0.391	0.374	2.302	2.625	2.869	2.807	2.341
Netherlands[1]	0.340	0.604	0.775	0.251	0.643	1.502	2.112	2.029	2.074	2.133
Spain	0.381	0.619	0.574	0.241	0.371	1.523	2.426	1.923	2.614	2.330
Sweden	0.063	0.479	0.897	0.052	0.374	1.278	2.411	2.125	1.731	2.245
Chinese Taipei	0.541	0.766	0.620	0.329	0.420	1.850	2.186	2.154	2.615	2.353
Turkey	0.229	0.634	0.821	0.300	0.572	1.497	2.317	2.567	2.216	2.512
United Arab Emirates	0.324	0.606	0.781	0.450	0.622	1.416	2.264	2.154	2.135	2.162
Viet Nam	0.511	0.753	0.767	0.569	0.646	1.859	2.220	2.316	2.052	2.109
ISCED level 3										
Alberta (Canada)	0.335	0.646	0.701	0.254	0.328	1.449	2.290	1.869	2.293	2.182
Brazil	0.154	0.548	0.767	0.290	0.564	1.388	2.552	2.841	2.057	2.378
Croatia	0.325	0.674	0.597	0.304	0.378	1.348	2.197	1.904	2.016	2.273
Denmark	0.251	0.636	0.702	0.053	0.202	1.316	2.131	1.880	1.828	2.128

Participating countries/economies	Standardised factor loadings					Unstandardised intercepts				
	TT3G28A	TT3G28B	TT3G28C	TT3G28E	TT3G28F	TT3G28A	TT3G28B	TT3G28C	TT3G28E	TT3G28F
Portugal	0.186	0.674	0.607	0.314	0.377	1.509	2.744	3.221	2.526	2.736
Slovenia	0.347	0.640	0.603	0.249	0.301	1.251	2.204	1.886	2.011	2.462
Sweden	0.072	0.511	0.895	0.057	0.385	1.278	2.411	2.125	1.731	2.245
Chinese Taipei	0.556	0.771	0.589	0.346	0.438	1.850	2.186	2.154	2.615	2.353
Turkey	0.230	0.651	0.802	0.299	0.553	1.497	2.317	2.567	2.216	2.512
United Arab Emirates	0.359	0.629	0.801	0.483	0.644	1.416	2.264	2.154	2.135	2.162
Viet Nam	0.475	0.684	0.733	0.507	0.607	1.859	2.220	2.316	2.052	2.109
TALIS-PISA link										
Australia	0.377	0.699	0.751	0.275	0.416	1.526	2.325	2.037	2.175	2.063
Ciudad Autónoma de Buenos Aires (Argentina)	0.230	0.579	0.648	0.281	0.598	1.578	2.484	2.282	2.593	2.421
Colombia	0.233	0.592	0.654	0.167	0.370	1.631	3.107	2.801	2.092	2.352
Czech Republic	0.365	0.674	0.625	0.382	0.260	1.452	2.140	1.877	2.190	2.078
Denmark	0.160	0.427	0.953	-0.023	0.107	1.428	2.461	1.991	1.866	2.214
Georgia	0.542	0.589	0.755	0.530	0.600	1.598	2.065	1.780	1.908	1.949
Malta	0.359	0.756	0.590	0.392	0.300	1.481	2.052	2.074	2.630	2.298
Turkey	0.252	0.567	0.771	0.363	0.550	1.456	2.289	2.492	2.183	2.438
Viet Nam	0.460	0.729	0.692	0.434	0.581	1.859	2.250	2.350	2.051	2.119

1. Data from participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Self-efficacy: Teacher self-efficacy, composite (T3SELF); Self-efficacy in classroom management (T3SECLS); Self-efficacy in instruction (T3SEINS); Self-efficacy in student engagement (T3SEENG)

11.23. Measured items

Three subscales and one composite scale measuring teacher self-efficacy were developed from the following question stem:

- "In your teaching, to what extent can you do the following?" (TT3G34). The question contained items on managing student behaviour, which were used to form the subscale *Self-efficacy in classroom management* (T3SECLS), items on flexible instruction strategies, used to form the subscale *Self-efficacy in instruction* (T3SEINS), and items on engaging students in the lessons, used for the subscale *Self-efficacy in student engagement* (T3SEENG).

These three subscales, presented in Table 11.56, formed the multidimensional scale *Teacher self-efficacy, composite* (T3SELF).

11.24. Model improvements

Subscale T3SECLS was improved by adding a correlation between items TT3G34D and TT3G34I, and the subscale T3SEENG by adding a correlation between items TT3G34A and TT3G34B.

11.25. Scale reliability

Table 11.57 presents the reliability coefficients (omega for the subscales, stratified Cronbach's alpha for T3SELF) for all populations for each scale. In general, as evident

from the table, the subscales T3SECLS, T3SEINS and T3SEENG have high reliabilities for most populations. The reliability coefficients are slightly lower (below 0.700), however, in the Netherlands ISCED level 2 population for the scale T3SEINS, while some of the omega values for scale T3SEENG are below 0.700 for several populations: Austria, the Czech Republic, the Netherlands and Norway for ISCED level 2; and Denmark and Sweden for ISCED level 3.

11.26. Model fits

The model fit indices for the subscales T3SECLS, T3SEINS and T3SEENG are presented in Tables 11.58, 11.59 and 11.60 respectively. All populations exhibit an acceptable fit for both T3SECLS and T3SEINS, with the exception of the Columbia TALIS-PISA link population. The fit indices for T3SEENG are acceptable for all populations except the Netherlands ISCED level 1 and the TALIS-PISA link populations in Columbia and Viet Nam.

11.27. Invariance testing

Tables 11.61, 11.62 and 11.63 present the invariance results for the subscales T3SECLS, T3SEINS and T3SEENG respectively. All three subscales reached metric invariance for all ISCED levels. Because, for T3SEENG, the configural model shows an almost perfect fit and the metric model fit is good, the criteria for establishing metric invariance were relaxed slightly. In such instances, when the model fit of the liberal model is almost perfect, it is common that the more restrictive model causes changes in the fit indices, resulting in model rejection. Therefore, the absolute fit of the more restrictive (i.e. metric) model should be considered as an evaluation criterion. Accordingly, the invariance level of T3SELF is considered as metric for all ISCED levels.

11.28. Item parameters

Table 11.64 presents the unstandardised factor loadings for the self-efficacy subscales. Because T3SELF was computed as an average of the subscales, there are no item parameters for this scale.

The standardised factor loadings and unstandardised intercepts for the self-efficacy subscales are presented in Tables 11.65, 11.66 and 11.67 for T3SECLS, T3SEINS and T3SEENG respectively. The factor loadings of items in subscale T3SECLS are high for all items for almost all populations. The same is true for subscale T3SEINS, with the exception of item TT3G34C, which has the most factor loadings between 0.450 and 0.600, and subscale T3SEENG, with the exception of item TT3G34G, which has a number of populations with factor loadings between 0.450 and 0.600.

Table 11.56. Item wording for teacher self-efficacy scales

T3SELF: Teacher self-efficacy, composite	
T3SECLS: Self-efficacy in classroom management (subscale)	
TT3G34: In your teaching, to what extent can you do the following?	
Response options: "Not at all" (1), "To some extent" (2), "Quite a bit" (3), "A lot" (4).	
TT2G34D	Control disruptive behaviour in the classroom
TT2G34F	Make my expectations about student behaviour clear
TT2G34H	Get students to follow classroom rules
TT2G34I	Calm a student who is disruptive or noisy
T3SEINS: Self-efficacy in instruction (subscale)	
TT3G34: In your teaching, to what extent can you do the following?	
Response options: "Not at all" (1), "To some extent" (2), "Quite a bit" (3), "A lot" (4).	
TT2G34C	Craft good questions for students
TT2G34J	Use a variety of assessment strategies
TT2G34K	Provide an alternative explanation, for example when students are confused
TT2G34L	Vary instructional strategies in my classroom
T3SEENG: Self-efficacy in student engagement (subscale)	
TT3G34: In your teaching, to what extent can you do the following?	
Response options: "Not at all" (1), "To some extent" (2), "Quite a bit" (3), "A lot" (4).	
TT2G34A	Get students to believe they can do well in school work
TT2G34B	Help students value learning
TT2G34E	Motivate students who show low interest in school work
TT2G34G	Help students think critically

Source: OECD, TALIS 2018 database.

Table 11.57. Reliability coefficients for teacher self-efficacy scales

Participating countries/economies	T3SECLS	T3SEINS	T3SEENG	T3SELF
		Omega coefficient[3]		Stratified Cronbach's alpha
ISCED level 2				
Alberta (Canada)	0.854	0.797	0.767	0.902
Australia	0.846	0.787	0.776	0.904
Austria	0.801	0.745	0.664	0.868
Belgium	0.856	0.762	0.759	0.898
Flemish Community (Belgium)	0.859	0.726	0.762	0.891
Brazil	0.837	0.826	0.797	0.920
Bulgaria	0.757	0.789	0.717	0.881
Ciudad Autónoma de Buenos Aires (Argentina)	0.845	0.783	0.738	0.899
Chile	0.861	0.826	0.776	0.921
Colombia	0.812	0.771	0.774	0.902
Croatia	0.848	0.789	0.748	0.902
Cyprus	0.852	0.819	0.796	0.922
Czech Republic	0.803	0.711	0.697	0.868
Denmark	0.805	0.753	0.711	0.881
England (United Kingdom)	0.856	0.778	0.773	0.905
Estonia	0.764	0.771	0.734	0.885
Finland	0.874	0.792	0.766	0.913
France	0.839	0.734	0.731	0.887
Georgia	0.812	0.830	0.760	0.917
Hungary	0.806	0.728	0.721	0.878

Participating countries/economies	T3SECLS	T3SEINS Omega coefficient[3]	T3SEENG	T3SELF Stratified Cronbach's alpha
Iceland	0.803	0.794	0.748	0.897
Israel	0.880	0.823	0.797	0.926
Italy	0.781	0.778	0.729	0.890
Japan	0.876	0.797	0.724	0.913
Kazakhstan	0.792	0.801	0.729	0.901
Korea	0.884	0.874	0.801	0.941
Latvia	0.801	0.773	0.746	0.884
Lithuania	0.850	0.801	0.723	0.903
Malta	0.837	0.801	0.805	0.915
Mexico	0.815	0.787	0.728	0.896
Netherlands	0.812	0.682	0.684	0.860
New Zealand	0.843	0.774	0.776	0.904
Norway	0.814	0.706	0.642	0.856
Portugal	0.870	0.717	0.702	0.888
Romania	0.826	0.837	0.799	0.920
Russian Federation	0.843	0.841	0.762	0.919
Saudi Arabia	0.874	0.884	0.834	0.944
Shanghai (China)	0.945	0.910	0.882	0.965
Singapore	0.854	0.835	0.810	0.927
Slovak Republic	0.817	0.781	0.733	0.899
Slovenia	0.814	0.752	0.746	0.886
South Africa[2]	0.837	0.805	0.796	0.920
Spain	0.848	0.759	0.753	0.898
Sweden	0.837	0.787	0.731	0.896
Chinese Taipei	0.885	0.839	0.771	0.925
Turkey	0.882	0.826	0.814	0.933
United Arab Emirates	0.857	0.852	0.812	0.932
United States	0.845	0.821	0.801	0.911
Viet Nam	0.743	0.787	0.709	0.888
ISCED level 1				
Australia[1]	0.856	0.826	0.781	0.916
Flemish Community (Belgium)	0.848	0.753	0.728	0.891
Ciudad Autónoma de Buenos Aires (Argentina)	0.828	0.797	0.729	0.901
Denmark	0.817	0.719	0.706	0.882
England (United Kingdom)	0.834	0.806	0.773	0.909
France	0.803	0.736	0.711	0.882
Japan	0.865	0.832	0.762	0.923
Korea	0.904	0.874	0.810	0.945
Netherlands[1]	0.869	0.796	0.806	0.912
Spain	0.845	0.796	0.766	0.910
Sweden	0.845	0.783	0.736	0.902
Chinese Taipei	0.878	0.852	0.783	0.930
Turkey	0.867	0.854	0.821	0.938
United Arab Emirates	0.845	0.861	0.805	0.932
Viet Nam	0.757	0.792	0.704	0.893
ISCED level 3				
Alberta (Canada)	0.845	0.769	0.773	0.898
Brazil	0.834	0.817	0.794	0.918
Croatia	0.843	0.769	0.759	0.900
Denmark	0.817	0.719	0.689	0.873

Participating countries/economies	T3SECLS	T3SEINS Omega coefficient[3]	T3SEENG	T3SELF Stratified Cronbach's alpha
Portugal	0.826	0.711	0.707	0.879
Slovenia	0.797	0.762	0.728	0.880
Sweden	0.837	0.764	0.672	0.882
Chinese Taipei	0.870	0.839	0.767	0.921
Turkey	0.869	0.826	0.799	0.928
United Arab Emirates	0.856	0.845	0.797	0.929
Viet Nam	0.785	0.797	0.704	0.896
TALIS-PISA link				
Australia	0.828	0.797	0.755	0.902
Ciudad Autónoma de Buenos Aires (Argentina)	0.852	0.814	0.780	0.913
Colombia	0.904	0.869	0.843	0.938
Czech Republic	0.824	0.764	0.746	0.890
Denmark	0.865	0.806	0.808	0.915
Georgia	0.817	0.808	0.750	0.911
Malta	0.808	0.774	0.729	0.896
Turkey	0.859	0.812	0.764	0.918
Viet Nam	0.841	0.803	0.824	0.918

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.58. CFA model-data fit for scale T3SECLS

Self-efficacy in classroom management

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Alberta (Canada)	0.999	0.996	0.016	0.005
Australia	1.000	1.001	0.000	0.002
Austria	0.999	0.995	0.026	0.005
Belgium	0.999	0.992	0.035	0.004
Flemish Community (Belgium)	1.000	1.000	0.001	0.002
Brazil	0.998	0.985	0.040	0.007
Bulgaria	0.999	0.996	0.020	0.005
Ciudad Autónoma de Buenos Aires (Argentina)	0.996	0.976	0.065	0.012
Chile	1.000	1.003	0.000	0.001
Colombia	0.993	0.955	0.047	0.010
Croatia	0.998	0.987	0.050	0.008
Cyprus	0.989	0.933	0.089	0.016
Czech Republic	0.997	0.984	0.048	0.008
Denmark	0.998	0.991	0.034	0.008
England (United Kingdom)	1.000	1.001	0.000	0.002
Estonia	0.999	0.995	0.023	0.004
Finland	0.996	0.979	0.064	0.008
France	1.000	1.000	0.006	0.003
Georgia	0.993	0.955	0.062	0.014
Hungary	0.997	0.979	0.050	0.008
Iceland	1.000	0.997	0.021	0.005
Israel	1.000	0.998	0.014	0.003
Italy	0.990	0.943	0.072	0.015

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Japan	0.992	0.954	0.090	0.011
Kazakhstan	0.983	0.896	0.072	0.020
Korea	0.998	0.985	0.053	0.006
Latvia	0.999	0.992	0.025	0.006
Lithuania	0.981	0.884	0.110	0.015
Malta	0.999	0.996	0.022	0.005
Mexico	1.000	1.001	0.000	0.002
Netherlands	1.000	1.003	0.000	0.000
New Zealand	0.996	0.976	0.047	0.009
Norway	1.000	0.999	0.011	0.003
Portugal	0.996	0.974	0.064	0.012
Romania	0.994	0.964	0.056	0.009
Russian Federation	0.969	0.812	0.110	0.033
Saudi Arabia	0.975	0.851	0.127	0.028
Shanghai (China)	0.983	0.900	0.137	0.017
Singapore	0.998	0.987	0.039	0.007
Slovak Republic	0.994	0.964	0.075	0.012
Slovenia	0.992	0.950	0.083	0.013
South Africa[2]	0.994	0.993	0.021	0.073
Spain	1.000	1.001	0.000	0.002
Sweden	1.000	1.003	0.000	0.002
Chinese Taipei	0.992	0.954	0.077	0.012
Turkey	0.996	0.973	0.056	0.012
United Arab Emirates	0.997	0.985	0.036	0.008
United States	0.993	0.958	0.056	0.013
Viet Nam	0.968	0.806	0.104	0.022
ISCED level 1				
Australia[1]	0.991	0.989	0.036	0.133
Flemish Community (Belgium)	1.000	1.000	0.000	0.003
Ciudad Autónoma de Buenos Aires (Argentina)	0.995	0.973	0.048	0.011
Denmark	0.997	0.984	0.042	0.007
England (United Kingdom)	0.999	0.992	0.029	0.005
France	0.997	0.983	0.037	0.009
Japan	0.993	0.959	0.083	0.012
Korea	0.995	0.971	0.069	0.010
Netherlands[1]	0.953	0.944	0.086	0.455
Spain	0.999	0.996	0.018	0.004
Sweden	0.997	0.984	0.045	0.008
Chinese Taipei	0.992	0.954	0.082	0.012
Turkey	0.995	0.967	0.041	0.008
United Arab Emirates	0.996	0.976	0.040	0.011
Viet Nam	0.988	0.930	0.073	0.012
ISCED level 3				
Alberta (Canada)	1.000	1.001	0.000	0.004
Brazil	1.000	1.003	0.000	0.001
Croatia	0.994	0.966	0.058	0.009
Denmark	0.999	0.995	0.021	0.006
Portugal	0.993	0.957	0.053	0.011
Slovenia	0.991	0.948	0.081	0.015
Sweden	0.999	0.997	0.018	0.004
Chinese Taipei	0.998	0.985	0.048	0.008
Turkey	0.993	0.959	0.049	0.012

Participating countries/economies	CFI	TLI	RMSEA	SRMR
United Arab Emirates	0.993	0.960	0.054	0.011
Viet Nam	0.985	0.910	0.083	0.018
TALIS-PISA link				
Australia	0.983	0.979	0.044	0.099
Ciudad Autónoma de Buenos Aires (Argentina)	0.985	0.982	0.041	0.099
Colombia	0.782	0.739	0.108	0.969
Czech Republic	0.994	0.993	0.028	0.080
Denmark	0.971	0.965	0.042	0.317
Georgia	0.962	0.954	0.045	0.146
Malta	0.940	0.928	0.104	0.138
Turkey	0.998	0.998	0.020	0.067
Viet Nam	0.969	0.963	0.077	0.401

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.59. CFA model-data fit for scale T3SEINS

Self-efficacy in instruction

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Alberta (Canada)	0.978	0.934	0.082	0.023
Australia	0.995	0.984	0.035	0.012
Austria	0.997	0.992	0.026	0.009
Belgium	0.973	0.920	0.082	0.023
Flemish Community (Belgium)	0.962	0.885	0.086	0.024
Brazil	0.990	0.970	0.058	0.016
Bulgaria	0.987	0.962	0.061	0.018
Ciudad Autónoma de Buenos Aires (Argentina)	0.997	0.991	0.041	0.011
Chile	0.995	0.986	0.037	0.012
Colombia	0.994	0.983	0.032	0.013
Croatia	0.996	0.989	0.028	0.008
Cyprus	0.982	0.945	0.086	0.017
Czech Republic	1.000	1.001	0.000	0.005
Denmark	1.000	1.000	0.000	0.006
England (United Kingdom)	0.967	0.900	0.101	0.027
Estonia	1.000	1.001	0.000	0.004
Finland	0.990	0.971	0.058	0.016
France	0.941	0.824	0.128	0.028
Georgia	0.991	0.974	0.049	0.016
Hungary	0.992	0.977	0.041	0.013
Iceland	0.985	0.955	0.076	0.019
Israel	0.956	0.867	0.116	0.028
Italy	0.985	0.955	0.072	0.019
Japan	0.995	0.986	0.042	0.012
Kazakhstan	0.994	0.982	0.031	0.012
Korea	0.984	0.952	0.094	0.017
Latvia	1.000	1.004	0.000	0.003
Lithuania	0.993	0.980	0.045	0.013
Malta	0.993	0.978	0.051	0.015
Mexico	0.994	0.982	0.044	0.011

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Netherlands	0.975	0.924	0.061	0.021
New Zealand	0.988	0.963	0.057	0.017
Norway	0.996	0.987	0.032	0.010
Portugal	0.995	0.985	0.032	0.012
Romania	0.988	0.964	0.056	0.014
Russian Federation	0.998	0.995	0.017	0.009
Saudi Arabia	0.986	0.957	0.072	0.019
Shanghai (China)	1.000	1.000	0.005	0.003
Singapore	0.988	0.964	0.069	0.015
Slovak Republic	1.000	1.003	0.000	0.002
Slovenia	0.984	0.952	0.069	0.019
South Africa[2]	0.993	0.993	0.020	0.070
Spain	0.986	0.959	0.041	0.017
Sweden	0.988	0.965	0.059	0.016
Chinese Taipei	0.990	0.970	0.067	0.016
Turkey	0.992	0.977	0.049	0.013
United Arab Emirates	0.994	0.983	0.038	0.011
United States	0.902	0.706	0.141	0.028
Viet Nam	1.000	1.001	0.000	0.004
ISCED level 1				
Australia[1]	0.989	0.989	0.034	0.055
Flemish Community (Belgium)	0.955	0.866	0.112	0.027
Ciudad Autónoma de Buenos Aires (Argentina)	0.979	0.938	0.078	0.024
Denmark	0.984	0.952	0.056	0.018
England (United Kingdom)	0.989	0.966	0.047	0.020
France	0.960	0.881	0.095	0.027
Japan	0.995	0.986	0.045	0.012
Korea	0.987	0.962	0.077	0.017
Netherlands[1]	0.966	0.966	0.054	0.191
Spain	0.993	0.979	0.032	0.013
Sweden	0.988	0.963	0.061	0.016
Chinese Taipei	0.995	0.986	0.043	0.010
Turkey	1.000	1.005	0.000	0.002
United Arab Emirates	0.992	0.977	0.044	0.012
Viet Nam	1.000	0.999	0.011	0.005
ISCED level 3				
Alberta (Canada)	0.942	0.826	0.115	0.031
Brazil	0.990	0.971	0.049	0.018
Croatia	0.989	0.966	0.056	0.015
Denmark	0.995	0.984	0.033	0.013
Portugal	0.998	0.993	0.020	0.009
Slovenia	0.991	0.973	0.052	0.013
Sweden	0.978	0.933	0.070	0.025
Chinese Taipei	0.984	0.951	0.086	0.019
Turkey	0.996	0.989	0.025	0.011
United Arab Emirates	0.995	0.985	0.033	0.012
Viet Nam	0.999	0.996	0.020	0.007
TALIS-PISA link				
Australia	0.980	0.980	0.049	0.047
Ciudad Autónoma de Buenos Aires (Argentina)	0.963	0.963	0.047	0.240
Colombia	0.566	0.566	0.125	0.961
Czech Republic	0.957	0.957	0.043	0.157

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Denmark	0.995	0.995	0.027	0.144
Georgia	0.984	0.984	0.028	0.089
Malta	0.954	0.954	0.079	0.131
Turkey	0.991	0.991	0.033	0.188
Viet Nam	0.946	0.946	0.046	0.178

1. Data from participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.60. CFA model-data fit for scale T3SEENG

Self-efficacy in student engagement

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Alberta (Canada)	0.984	0.901	0.100	0.013
Australia	1.000	1.000	0.000	0.002
Austria	0.994	0.963	0.049	0.011
Belgium	1.000	1.002	0.000	0.000
Flemish Community (Belgium)	1.000	1.001	0.000	0.002
Brazil	1.000	1.001	0.000	0.003
Bulgaria	0.999	0.997	0.015	0.005
Ciudad Autónoma de Buenos Aires (Argentina)	1.000	1.006	0.000	0.002
Chile	1.000	1.003	0.000	0.001
Colombia	1.000	1.000	0.000	0.003
Croatia	1.000	1.001	0.000	0.002
Cyprus	0.998	0.990	0.032	0.006
Czech Republic	1.000	1.001	0.000	0.002
Denmark	0.996	0.976	0.044	0.008
England (United Kingdom)	1.000	0.998	0.023	0.003
Estonia	1.000	1.002	0.000	0.002
Finland	1.000	1.002	0.000	0.001
France	1.000	1.001	0.000	0.002
Georgia	0.998	0.990	0.030	0.006
Hungary	1.000	1.001	0.000	0.002
Iceland	0.997	0.980	0.058	0.008
Israel	1.000	0.999	0.015	0.004
Italy	1.000	0.998	0.016	0.004
Japan	1.000	0.999	0.008	0.003
Kazakhstan	0.999	0.996	0.014	0.005
Korea	0.999	0.995	0.027	0.004
Latvia	0.996	0.977	0.050	0.012
Lithuania	0.999	0.991	0.031	0.007
Malta	0.999	0.995	0.037	0.006
Mexico	1.000	1.003	0.000	0.002
Netherlands	0.995	0.972	0.053	0.012
New Zealand	1.000	1.002	0.000	0.002
Norway	0.999	0.993	0.024	0.006
Portugal	0.999	0.993	0.023	0.005
Romania	1.000	1.001	0.000	0.002

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Russian Federation	0.992	0.950	0.059	0.012
Saudi Arabia	1.000	1.001	0.000	0.002
Shanghai (China)	1.000	1.001	0.000	0.001
Singapore	0.999	0.992	0.040	0.005
Slovak Republic	1.000	1.001	0.000	0.003
Slovenia	0.999	0.994	0.031	0.005
South Africa[2]	0.990	0.988	0.034	0.184
Spain	0.996	0.974	0.043	0.008
Sweden	0.996	0.978	0.048	0.009
Chinese Taipei	1.000	1.001	0.000	0.001
Turkey	1.000	1.001	0.000	0.001
United Arab Emirates	0.996	0.978	0.041	0.007
United States	1.000	1.000	0.000	0.003
Viet Nam	0.999	0.992	0.022	0.006
ISCED level 1				
Australia[1]	0.991	0.989	0.045	0.053
Flemish Community (Belgium)	0.993	0.957	0.070	0.014
Ciudad Autónoma de Buenos Aires (Argentina)	1.000	1.005	0.000	0.002
Denmark	1.000	1.001	0.000	0.003
England (United Kingdom)	0.997	0.980	0.051	0.007
France	0.998	0.987	0.032	0.009
Japan	1.000	1.001	0.000	0.002
Korea	1.000	1.002	0.000	0.001
Netherlands[1]	0.850	0.821	0.114	0.477
Spain	1.000	1.002	0.000	0.000
Sweden	0.998	0.988	0.038	0.007
Chinese Taipei	1.000	1.002	0.000	0.000
Turkey	0.998	0.987	0.029	0.007
United Arab Emirates	1.000	1.001	0.000	0.001
Viet Nam	0.990	0.937	0.073	0.013
ISCED level 3				
Alberta (Canada)	0.999	0.992	0.041	0.008
Brazil	1.000	1.002	0.000	0.002
Croatia	1.000	1.003	0.000	0.000
Denmark	1.000	1.007	0.000	0.002
Portugal	1.000	1.001	0.000	0.002
Slovenia	0.999	0.993	0.028	0.006
Sweden	0.996	0.979	0.040	0.007
Chinese Taipei	1.000	0.999	0.014	0.003
Turkey	0.999	0.995	0.019	0.004
United Arab Emirates	0.998	0.987	0.032	0.006
Viet Nam	0.999	0.996	0.018	0.004
TALIS-PISA link				
Australia	0.985	0.982	0.057	0.143
Ciudad Autónoma de Buenos Aires (Argentina)	0.960	0.952	0.057	0.189
Colombia	0.832	0.799	0.099	0.660
Czech Republic	0.989	0.987	0.029	0.092
Denmark	0.920	0.904	0.104	0.336

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Georgia	0.991	0.989	0.022	0.091
Malta	0.992	0.990	0.043	0.120
Turkey	0.996	0.995	0.022	0.096
Viet Nam	0.881	0.857	0.105	0.499

1. Data from participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.61. Invariance test results for scale T3SECLS

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level of ISCED level 2								
Configural	0.994	0.966	0.062	0.012				
Metric	0.986	0.979	0.049	0.065	0.008	-0.013	0.013	-0.053
Scalar	0.894	0.907	0.103	0.105	0.092	0.072	-0.054	-0.040
Invariance level of ISCED level 1								
Configural	0.996	0.975	0.050	0.009				
Metric	0.989	0.982	0.043	0.070	0.007	-0.007	0.007	-0.061
Scalar	0.922	0.928	0.085	0.122	0.067	0.054	-0.042	-0.052
Invariance level of ISCED level 3								
Configural	0.995	0.968	0.054	0.011				
Metric	0.988	0.981	0.042	0.057	0.007	-0.013	0.012	-0.046
Scalar	0.907	0.914	0.089	0.094	0.081	0.067	-0.047	-0.037

Note: See endnote 34.
Source: OECD, TALIS 2018 database.

Table 11.62. Invariance test results for scale T3SEINS

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level of ISCED level 2								
Configural	0.990	0.970	0.054	0.015				
Metric	0.978	0.974	0.050	0.072	0.012	-0.004	0.004	-0.057
Scalar	0.864	0.896	0.099	0.127	0.114	0.078	-0.049	-0.055
Invariance level of ISCED level 1								
Configural	0.991	0.973	0.049	0.015				
Metric	0.979	0.973	0.049	0.077	0.012	0.000	0.000	-0.062
Scalar	0.882	0.906	0.092	0.157	0.097	0.067	-0.043	-0.080
Invariance Level of ISCED level 3								
Configural	0.992	0.976	0.045	0.015				
Metric	0.981	0.976	0.045	0.072	0.011	0.000	0.000	-0.057
Scalar	0.895	0.916	0.085	0.121	0.086	0.060	-0.040	-0.049

Note: See endnote 34.
Source: OECD, TALIS 2018 database.

Table 11.63. Invariance test results for scale T3SEENG

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level of ISCED level 2								
Configural	0.999	0.993	0.027	0.006				
Metric	0.991	0.986	0.039	0.051	0.008	0.007	-0.012	-0.045
Scalar	0.875	0.891	0.110	0.113	0.116	0.095	-0.071	-0.062
Invariance level of ISCED level 1								
Configural	0.999	0.993	0.027	0.006				
Metric	0.986	0.978	0.048	0.074	0.013	0.015	-0.021	-0.068
Scalar	0.868	0.878	0.112	0.155	0.118	0.100	-0.064	-0.081
Invariance level of ISCED level 3								
Configural	0.999	0.996	0.021	0.004				
Metric	0.991	0.985	0.040	0.057	0.008	0.011	-0.019	-0.053
Scalar	0.880	0.888	0.110	0.117	0.111	0.097	-0.070	-0.060

Note: See endnote 34.
Source: OECD, TALIS 2018 database.

Table 11.64. Unstandardised factor loadings for T3SECLS, T3SEINS and T3SEENG for all countries for all populations

T3SECLS (Metric)		T3SEINS (Metric)		T3SEENG (Metric)	
TT2G34D	0.510	TT2G34C	0.367	TT2G34A	0.432
TT2G34F	0.394	TT2G34J	0.485	TT2G34B	0.476
TT2G34H	0.529	TT2G34K	0.432	TT2G34E	0.527
TT2G34I	0.535	TT2G34L	0.520	TT2G34G	0.443

Source: OECD, TALIS 2018 database.

Table 11.65. Standardised factor loadings and unstandardised intercepts for scale T3SECLS

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT2G34D	TT2G34F	TT2G34H	TT2G34I	TT2G34D	TT2G34F	TT2G34H	TT2G34I
ISCED level 2								
Alberta (Canada)	0.772	0.659	0.845	0.761	3.319	3.546	3.362	3.197
Australia	0.742	0.695	0.848	0.752	3.221	3.519	3.347	3.165
Austria	0.713	0.571	0.772	0.747	3.183	3.427	3.171	3.117
Belgium	0.757	0.674	0.852	0.799	3.211	3.432	3.332	3.252
Flemish Community (Belgium)	0.765	0.666	0.853	0.799	3.408	3.550	3.502	3.435
Brazil	0.737	0.665	0.806	0.773	3.296	3.493	3.357	3.285
Bulgaria	0.578	0.602	0.787	0.626	3.220	3.647	3.609	3.274
Ciudad Autónoma de Buenos Aires (Argentina)	0.745	0.622	0.797	0.783	3.269	3.533	3.367	3.257
Chile	0.762	0.661	0.848	0.769	3.265	3.452	3.305	3.164
Colombia	0.746	0.604	0.762	0.715	3.754	3.748	3.696	3.680
Croatia	0.759	0.674	0.832	0.801	3.140	3.349	3.096	3.159
Cyprus	0.772	0.657	0.829	0.767	3.455	3.612	3.472	3.356
Czech Republic	0.706	0.573	0.786	0.753	3.208	3.029	3.110	3.171
Denmark	0.720	0.634	0.733	0.749	3.540	3.708	3.384	3.540
England (United Kingdom)	0.740	0.699	0.869	0.725	3.327	3.630	3.478	3.233
Estonia	0.658	0.607	0.753	0.673	3.085	3.269	3.182	2.967
Finland	0.784	0.678	0.874	0.803	3.175	3.369	3.165	3.037
France	0.734	0.647	0.844	0.767	2.923	3.332	3.250	3.014

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT2G34D	TT2G34F	TT2G34H	TT2G34I	TT2G34D	TT2G34F	TT2G34H	TT2G34I
Georgia	0.696	0.625	0.793	0.738	3.284	3.442	3.471	3.301
Hungary	0.706	0.694	0.774	0.754	3.422	3.727	3.520	3.468
Iceland	0.714	0.567	0.781	0.758	3.301	3.283	3.307	3.186
Israel	0.781	0.692	0.859	0.823	3.211	3.465	3.262	3.168
Italy	0.715	0.532	0.767	0.730	3.306	3.315	3.422	3.222
Japan	0.792	0.609	0.863	0.840	2.748	2.730	2.722	2.698
Kazakhstan	0.646	0.554	0.752	0.725	2.962	3.103	3.276	3.163
Korea	0.823	0.659	0.868	0.844	3.094	3.072	3.139	3.035
Latvia	0.704	0.614	0.791	0.710	3.174	3.391	3.331	3.081
Lithuania	0.762	0.604	0.830	0.798	3.181	3.014	3.182	3.149
Malta	0.734	0.649	0.828	0.759	3.234	3.460	3.354	3.187
Mexico	0.709	0.574	0.796	0.730	3.305	3.283	3.307	3.192
Netherlands	0.742	0.671	0.784	0.706	3.434	3.641	3.398	3.377
New Zealand	0.747	0.682	0.833	0.755	3.259	3.508	3.321	3.182
Norway	0.724	0.591	0.805	0.762	2.991	3.217	3.041	3.001
Portugal	0.774	0.570	0.834	0.817	3.532	3.620	3.534	3.437
Romania	0.747	0.638	0.778	0.789	3.389	3.447	3.356	3.379
Russian Federation	0.641	0.561	0.831	0.808	3.162	3.322	3.575	3.475
Saudi Arabia	0.756	0.508	0.803	0.814	3.457	3.202	3.601	3.592
Shanghai (China)	0.861	0.724	0.925	0.918	3.384	3.439	3.442	3.415
Singapore	0.744	0.690	0.857	0.771	3.164	3.414	3.283	3.102
Slovak Republic	0.697	0.628	0.808	0.760	3.063	3.327	3.255	3.111
Slovenia	0.707	0.599	0.789	0.768	3.179	3.468	3.140	3.160
South Africa[2]	0.718	0.627	0.850	0.773	3.522	3.625	3.604	3.563
Spain	0.762	0.602	0.828	0.776	3.074	3.270	3.107	2.965
Sweden	0.760	0.616	0.827	0.755	3.170	3.272	3.200	3.145
Chinese Taipei	0.795	0.650	0.883	0.829	3.175	3.277	3.291	3.196
Turkey	0.791	0.626	0.847	0.831	3.359	3.299	3.410	3.314
United Arab Emirates	0.748	0.666	0.847	0.776	3.531	3.651	3.634	3.541
United States	0.758	0.660	0.845	0.747	3.224	3.473	3.309	3.124
Viet Nam	0.613	0.500	0.766	0.619	3.496	3.462	3.692	3.450
ISCED level 1								
Australia[1]	0.719	0.699	0.850	0.701	3.413	3.668	3.554	3.349
Flemish Community (Belgium)	0.724	0.643	0.853	0.773	3.408	3.550	3.502	3.435
Ciudad Autónoma de Buenos Aires (Argentina)	0.723	0.596	0.784	0.762	3.269	3.533	3.367	3.257
Denmark	0.731	0.662	0.761	0.729	3.483	3.716	3.411	3.464
England (United Kingdom)	0.682	0.740	0.846	0.669	3.327	3.630	3.478	3.233
France	0.696	0.595	0.812	0.743	2.923	3.332	3.250	3.014
Japan	0.783	0.600	0.843	0.826	2.748	2.730	2.722	2.698
Korea	0.842	0.677	0.892	0.852	3.094	3.072	3.139	3.035
Netherlands[1]	0.703	0.705	0.783	0.689	3.508	3.780	3.624	3.486
Spain	0.755	0.607	0.830	0.767	3.074	3.270	3.107	2.965
Sweden	0.761	0.630	0.830	0.784	3.170	3.272	3.200	3.145
Chinese Taipei	0.782	0.665	0.873	0.823	3.175	3.277	3.291	3.196
Turkey	0.777	0.640	0.842	0.813	3.359	3.299	3.410	3.314
United Arab Emirates	0.715	0.659	0.849	0.753	3.531	3.651	3.634	3.541
Viet Nam	0.641	0.536	0.780	0.607	3.496	3.462	3.692	3.450
ISCED level 3								
Alberta (Canada)	0.739	0.691	0.853	0.731	3.319	3.546	3.362	3.197
Brazil	0.731	0.651	0.801	0.766	3.296	3.493	3.357	3.285

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT2G34D	TT2G34F	TT2G34H	TT2G34I	TT2G34D	TT2G34F	TT2G34H	TT2G34I
Croatia	0.762	0.641	0.820	0.790	3.140	3.349	3.096	3.159
Denmark	0.749	0.606	0.746	0.758	3.464	3.537	3.251	3.518
Portugal	0.735	0.557	0.807	0.771	3.532	3.620	3.534	3.437
Slovenia	0.678	0.588	0.783	0.748	3.179	3.468	3.140	3.160
Sweden	0.764	0.617	0.812	0.764	3.170	3.272	3.200	3.145
Chinese Taipei	0.781	0.648	0.863	0.815	3.175	3.277	3.291	3.196
Turkey	0.788	0.610	0.812	0.813	3.359	3.299	3.410	3.314
United Arab Emirates	0.748	0.667	0.846	0.776	3.531	3.651	3.634	3.541
Viet Nam	0.678	0.548	0.786	0.683	3.496	3.462	3.692	3.450
TALIS-PISA link								
Australia	0.747	0.686	0.829	0.753	3.252	3.520	3.366	3.168
Ciudad Autónoma de Buenos Aires (Argentina)	0.735	0.618	0.793	0.797	3.254	3.507	3.302	3.210
Colombia	0.695	0.558	0.740	0.708	3.750	3.769	3.739	3.729
Czech Republic	0.735	0.598	0.823	0.799	3.155	2.993	3.134	3.188
Denmark	0.740	0.661	0.728	0.734	3.566	3.705	3.407	3.516
Georgia	0.644	0.601	0.793	0.738	3.265	3.434	3.471	3.317
Malta	0.741	0.650	0.826	0.761	3.242	3.418	3.312	3.123
Turkey	0.777	0.625	0.818	0.819	3.324	3.249	3.350	3.268
Viet Nam	0.670	0.516	0.759	0.648	3.434	3.402	3.649	3.422

1. Data from participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.66. Standardised factor loadings and unstandardised intercepts for scale T3SEINS

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT2G34C	TT2G34J	TT2G34K	TT2G34L	TT2G34C	TT2G34J	TT2G34K	TT2G34L
ISCED level 2								
Alberta (Canada)	0.549	0.713	0.730	0.758	3.262	3.266	3.544	3.326
Australia	0.537	0.668	0.719	0.765	3.228	3.203	3.507	3.282
Austria	0.523	0.605	0.667	0.732	3.099	2.843	3.336	3.142
Belgium	0.521	0.642	0.688	0.742	3.234	2.899	3.434	3.138
Flemish Community (Belgium)	0.499	0.595	0.658	0.708	3.439	2.976	3.551	3.349
Brazil	0.624	0.740	0.750	0.785	3.428	3.268	3.476	3.304
Bulgaria	0.529	0.718	0.699	0.754	3.104	3.375	3.570	3.269
Ciudad Autónoma de Buenos Aires (Argentina)	0.545	0.687	0.726	0.735	3.346	3.295	3.597	3.438
Chile	0.571	0.709	0.757	0.809	3.256	3.260	3.482	3.325
Colombia	0.532	0.682	0.706	0.725	3.672	3.657	3.812	3.667
Croatia	0.582	0.710	0.684	0.756	3.097	2.994	3.411	3.076
Cyprus	0.609	0.696	0.759	0.788	3.460	3.304	3.603	3.346
Czech Republic	0.498	0.630	0.606	0.686	2.978	2.937	3.262	3.142
Denmark	0.531	0.600	0.699	0.730	3.401	3.015	3.557	3.407
England (United Kingdom)	0.544	0.681	0.725	0.727	3.463	3.311	3.552	3.322
Estonia	0.523	0.683	0.662	0.758	3.006	2.901	3.113	2.999
Finland	0.604	0.715	0.667	0.760	3.409	2.968	3.121	3.161
France	0.504	0.665	0.663	0.678	2.971	2.966	3.287	2.847
Georgia	0.607	0.758	0.713	0.809	3.454	3.296	3.433	3.350
Hungary	0.551	0.547	0.674	0.702	3.629	3.088	3.653	3.549

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT2G34C	TT2G34J	TT2G34K	TT2G34L	TT2G34C	TT2G34J	TT2G34K	TT2G34L
Iceland	0.601	0.692	0.722	0.748	3.479	3.258	3.355	3.217
Israel	0.605	0.713	0.767	0.784	3.317	3.035	3.414	3.160
Italy	0.571	0.659	0.707	0.747	3.254	3.158	3.540	3.348
Japan	0.603	0.708	0.703	0.762	2.543	2.283	2.733	2.547
Kazakhstan	0.575	0.724	0.696	0.775	3.306	3.274	3.247	3.124
Korea	0.664	0.810	0.777	0.854	3.144	2.973	3.261	3.108
Latvia	0.549	0.684	0.649	0.758	3.292	3.207	3.245	3.307
Lithuania	0.553	0.714	0.699	0.785	3.210	3.231	3.384	3.286
Malta	0.580	0.646	0.730	0.791	3.370	3.034	3.533	3.289
Mexico	0.539	0.685	0.696	0.769	3.173	3.110	3.396	3.206
Netherlands	0.491	0.583	0.626	0.632	3.395	3.072	3.579	3.193
New Zealand	0.539	0.638	0.689	0.766	3.208	3.103	3.472	3.304
Norway	0.546	0.610	0.623	0.654	2.817	2.882	3.076	2.830
Portugal	0.471	0.638	0.686	0.634	3.573	3.596	3.789	3.482
Romania	0.604	0.770	0.760	0.797	3.394	3.365	3.629	3.411
Russian Federation	0.609	0.759	0.754	0.819	3.478	3.454	3.553	3.437
Saudi Arabia	0.673	0.834	0.784	0.860	3.579	3.363	3.495	3.361
Shanghai (China)	0.699	0.802	0.840	0.911	3.302	3.175	3.376	3.330
Singapore	0.612	0.755	0.734	0.817	3.199	3.011	3.355	3.102
Slovak Republic	0.574	0.694	0.664	0.758	3.181	3.013	3.162	3.200
Slovenia	0.552	0.683	0.625	0.721	3.158	3.209	3.327	3.028
South Africa[2]	0.613	0.752	0.746	0.742	3.512	3.535	3.670	3.454
Spain	0.533	0.663	0.685	0.720	3.194	3.124	3.471	3.228
Sweden	0.539	0.711	0.687	0.759	3.048	3.117	3.379	3.196
Chinese Taipei	0.611	0.741	0.738	0.829	2.964	2.874	3.179	2.970
Turkey	0.619	0.732	0.740	0.799	3.345	3.190	3.458	3.211
United Arab Emirates	0.590	0.764	0.778	0.836	3.529	3.526	3.671	3.591
United States	0.567	0.722	0.727	0.808	3.219	3.118	3.458	3.284
Viet Nam	0.600	0.694	0.692	0.749	3.525	3.211	3.359	3.244
ISCED level 1								
Australia[1]	0.575	0.701	0.746	0.818	3.309	3.285	3.513	3.445
Flemish Community (Belgium)	0.520	0.590	0.697	0.739	3.439	2.976	3.551	3.349
Ciudad Autónoma de Buenos Aires (Argentina)	0.545	0.642	0.738	0.784	3.346	3.295	3.597	3.438
Denmark	0.505	0.553	0.651	0.714	3.369	2.961	3.563	3.461
England (United Kingdom)	0.582	0.682	0.735	0.786	3.463	3.311	3.552	3.322
France	0.537	0.660	0.646	0.688	2.892	2.675	3.126	2.879
Japan	0.635	0.751	0.731	0.804	2.543	2.283	2.733	2.547
Korea	0.650	0.772	0.801	0.866	3.144	2.973	3.261	3.108
Netherlands[1]	0.539	0.623	0.675	0.704	3.347	3.132	3.559	3.346
Spain	0.556	0.673	0.729	0.772	3.194	3.124	3.471	3.228
Sweden	0.535	0.690	0.692	0.761	3.048	3.117	3.379	3.196
Chinese Taipei	0.625	0.749	0.747	0.850	2.964	2.874	3.179	2.970
Turkey	0.647	0.763	0.764	0.835	3.345	3.190	3.458	3.211
United Arab Emirates	0.582	0.748	0.790	0.856	3.529	3.526	3.671	3.591
Viet Nam	0.633	0.709	0.677	0.753	3.525	3.211	3.359	3.244
ISCED level 3								
Alberta (Canada)	0.518	0.688	0.695	0.729	3.262	3.266	3.544	3.326
Brazil	0.624	0.718	0.732	0.786	3.428	3.268	3.476	3.304
Croatia	0.569	0.699	0.672	0.723	3.097	2.994	3.411	3.076

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT2G34C	TT2G34J	TT2G34K	TT2G34L	TT2G34C	TT2G34J	TT2G34K	TT2G34L
Denmark	0.549	0.566	0.656	0.688	3.583	3.043	3.633	3.463
Portugal	0.468	0.628	0.673	0.641	3.573	3.596	3.789	3.482
Slovenia	0.551	0.704	0.638	0.721	3.158	3.209	3.327	3.028
Sweden	0.527	0.683	0.662	0.737	3.048	3.117	3.379	3.196
Chinese Taipei	0.612	0.747	0.734	0.830	2.964	2.874	3.179	2.970
Turkey	0.609	0.744	0.734	0.797	3.345	3.190	3.458	3.211
United Arab Emirates	0.580	0.746	0.769	0.830	3.529	3.526	3.671	3.591
Viet Nam	0.611	0.706	0.687	0.769	3.525	3.211	3.359	3.244
TALIS-PISA link								
Australia	0.567	0.712	0.725	0.774	3.239	3.233	3.497	3.292
Ciudad Autónoma de Buenos Aires (Argentina)	0.533	0.646	0.705	0.721	3.371	3.306	3.596	3.417
Colombia	0.468	0.629	0.682	0.664	3.694	3.677	3.824	3.689
Czech Republic	0.512	0.624	0.597	0.677	2.973	2.941	3.262	3.118
Denmark	0.555	0.621	0.704	0.753	3.489	3.012	3.562	3.427
Georgia	0.615	0.737	0.683	0.783	3.467	3.333	3.423	3.403
Malta	0.587	0.658	0.751	0.783	3.368	2.984	3.474	3.251
Turkey	0.636	0.775	0.758	0.830	3.288	3.089	3.397	3.116
Viet Nam	0.599	0.692	0.662	0.748	3.494	3.151	3.343	3.219

1. Data from participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.67. Standardised factor loadings and unstandardised intercepts for scale T3SEENG

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT2G34A	TT2G34B	TT2G34E	TT2G34G	TT2G34A	TT2G34B	TT2G34E	TT2G34G
ISCED level 2								
Alberta (Canada)	0.691	0.728	0.721	0.671	3.294	3.191	2.871	3.214
Australia	0.685	0.725	0.750	0.668	3.307	3.198	2.899	3.086
Austria	0.560	0.604	0.642	0.541	3.187	3.376	2.724	3.187
Belgium	0.661	0.699	0.745	0.630	3.175	3.015	2.772	3.056
Flemish Community (Belgium)	0.684	0.682	0.739	0.638	3.403	3.197	2.986	3.180
Brazil	0.721	0.766	0.723	0.705	3.446	3.467	3.224	3.457
Bulgaria	0.640	0.699	0.645	0.563	3.322	3.399	2.926	3.129
Ciudad Autónoma de Buenos Aires (Argentina)	0.667	0.677	0.660	0.662	3.347	3.336	3.083	3.464
Chile	0.669	0.731	0.732	0.685	3.279	3.308	3.166	3.296
Colombia	0.680	0.748	0.660	0.682	3.688	3.705	3.614	3.704
Croatia	0.652	0.688	0.727	0.621	2.748	2.521	2.552	2.913
Cyprus	0.695	0.750	0.737	0.690	3.439	3.430	3.230	3.418
Czech Republic	0.586	0.629	0.698	0.576	2.822	2.663	2.433	2.770
Denmark	0.645	0.671	0.660	0.574	3.597	3.448	3.000	3.313
England (United Kingdom)	0.690	0.723	0.758	0.653	3.411	3.284	3.003	3.118
Estonia	0.623	0.697	0.711	0.593	3.204	3.240	3.005	3.073
Finland	0.673	0.723	0.734	0.671	3.233	3.138	2.829	3.017
France	0.638	0.657	0.725	0.609	2.955	2.867	2.555	2.954
Georgia	0.658	0.711	0.710	0.644	3.350	3.362	3.043	3.321
Hungary	0.642	0.655	0.693	0.588	3.344	3.181	3.076	3.258
Iceland	0.644	0.689	0.732	0.652	3.296	3.141	2.932	2.973

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT2G34A	TT2G34B	TT2G34E	TT2G34G	TT2G34A	TT2G34B	TT2G34E	TT2G34G
Israel	0.714	0.742	0.777	0.645	3.422	3.267	3.100	3.117
Italy	0.651	0.681	0.676	0.588	3.408	3.332	3.181	3.366
Japan	0.652	0.680	0.712	0.525	2.251	2.339	2.304	2.080
Kazakhstan	0.528	0.663	0.705	0.625	2.872	3.214	3.129	3.211
Korea	0.703	0.767	0.766	0.713	3.221	3.197	2.830	2.978
Latvia	0.677	0.673	0.697	0.632	3.209	3.032	2.862	3.098
Lithuania	0.641	0.663	0.674	0.635	3.217	3.105	2.788	2.965
Malta	0.702	0.754	0.782	0.698	3.395	3.332	3.088	3.212
Mexico	0.629	0.694	0.651	0.631	3.324	3.323	3.124	3.264
Netherlands	0.599	0.629	0.648	0.561	3.520	3.169	2.905	3.187
New Zealand	0.700	0.734	0.733	0.660	3.367	3.266	2.966	3.116
Norway	0.547	0.590	0.658	0.492	2.806	2.562	2.336	2.745
Portugal	0.583	0.692	0.648	0.563	3.643	3.722	3.441	3.573
Romania	0.689	0.750	0.771	0.693	3.185	3.136	3.006	3.188
Russian Federation	0.624	0.682	0.761	0.646	3.305	3.178	3.074	3.248
Saudi Arabia	0.725	0.790	0.830	0.633	3.517	3.528	3.472	3.225
Shanghai (China)	0.769	0.814	0.886	0.768	3.253	3.201	3.193	3.208
Singapore	0.704	0.758	0.792	0.696	3.309	3.253	2.998	3.033
Slovak Republic	0.615	0.673	0.709	0.656	3.091	3.054	2.892	3.031
Slovenia	0.636	0.659	0.720	0.673	3.012	2.986	2.837	3.192
South Africa[2]	0.748	0.784	0.790	0.746	3.606	3.587	3.507	3.528
Spain	0.642	0.709	0.724	0.645	2.985	2.995	2.697	3.099
Sweden	0.678	0.662	0.686	0.585	3.292	2.957	2.801	2.993
Chinese Taipei	0.679	0.738	0.759	0.608	3.062	3.122	2.918	2.871
Turkey	0.715	0.753	0.789	0.718	3.282	3.321	3.187	3.256
United Arab Emirates	0.710	0.769	0.770	0.689	3.621	3.646	3.522	3.505
United States	0.709	0.724	0.783	0.705	3.229	3.068	2.862	3.101
Viet Nam	0.594	0.687	0.678	0.514	3.561	3.688	3.528	3.292
ISCED level 1								
Australia[1]	0.732	0.770	0.746	0.645	3.548	3.508	3.177	3.096
Flemish Community (Belgium)	0.657	0.685	0.681	0.582	3.403	3.197	2.986	3.180
Ciudad Autónoma de Buenos Aires (Argentina)	0.639	0.705	0.644	0.630	3.574	3.582	3.356	3.528
Denmark	0.653	0.686	0.662	0.537	3.627	3.532	3.093	3.177
England (United Kingdom)	0.732	0.754	0.732	0.611	3.680	3.619	3.326	3.225
France	0.612	0.665	0.697	0.570	3.098	3.149	2.697	2.774
Japan	0.669	0.707	0.761	0.571	2.251	2.339	2.304	2.080
Korea	0.730	0.782	0.770	0.708	3.221	3.197	2.830	2.978
Netherlands[1]	0.616	0.588	0.623	0.535	3.716	3.373	3.197	3.321
Spain	0.655	0.727	0.732	0.655	3.268	3.317	3.129	3.209
Sweden	0.697	0.668	0.693	0.568	3.412	3.125	2.951	2.854
Chinese Taipei	0.681	0.740	0.778	0.601	3.062	3.122	2.918	2.871
Turkey	0.720	0.774	0.788	0.716	3.282	3.321	3.187	3.256
United Arab Emirates	0.704	0.775	0.766	0.652	3.621	3.646	3.522	3.505
Viet Nam	0.588	0.705	0.659	0.493	3.561	3.688	3.528	3.292
ISCED level 3								
Alberta (Canada)	0.711	0.723	0.725	0.671	3.294	3.191	2.871	3.214
Brazil	0.718	0.764	0.724	0.694	3.446	3.467	3.224	3.457
Croatia	0.660	0.707	0.726	0.627	2.748	2.521	2.552	2.913
Denmark	0.622	0.667	0.630	0.556	3.570	3.444	2.909	3.343

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT2G34A	TT2G34B	TT2G34E	TT2G34G	TT2G34A	TT2G34B	TT2G34E	TT2G34G
Portugal	0.591	0.704	0.650	0.579	3.643	3.722	3.441	3.573
Slovenia	0.615	0.651	0.720	0.622	3.012	2.986	2.837	3.192
Sweden	0.622	0.611	0.634	0.543	3.234	2.938	2.741	3.009
Chinese Taipei	0.669	0.729	0.759	0.593	3.062	3.122	2.918	2.871
Turkey	0.686	0.722	0.794	0.690	3.282	3.321	3.187	3.256
United Arab Emirates	0.683	0.767	0.761	0.664	3.621	3.646	3.522	3.505
Viet Nam	0.599	0.681	0.680	0.549	3.561	3.688	3.528	3.292
TALIS-PISA link								
Australia	0.704	0.747	0.766	0.689	3.283	3.171	2.869	3.114
Ciudad Autónoma de Buenos Aires (Argentina)	0.616	0.671	0.688	0.638	3.368	3.368	3.129	3.511
Colombia	0.621	0.679	0.618	0.626	3.681	3.708	3.654	3.708
Czech Republic	0.589	0.647	0.701	0.571	2.784	2.665	2.419	2.735
Denmark	0.669	0.677	0.643	0.581	3.646	3.509	3.003	3.345
Georgia	0.600	0.656	0.694	0.632	3.293	3.326	3.019	3.396
Malta	0.660	0.723	0.769	0.656	3.424	3.353	3.130	3.179
Turkey	0.677	0.718	0.781	0.693	3.214	3.289	3.166	3.238
Viet Nam	0.602	0.694	0.678	0.525	3.535	3.666	3.513	3.258

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Job satisfaction: Job satisfaction, composite (T3JOBSA); Job satisfaction with work environment (T3JSENV); Job satisfaction with profession (T3JSPRO); Satisfaction with target class autonomy (T3SATAT).

11.29. Measured items

Two subscales and one composite scale measuring teacher job satisfaction were derived from this question stem:

- "We would like to know how you generally feel about your job. How strongly do you agree or disagree with the following statements?" (TT3G53). The items about the school following this question were used to form the subscale *Job satisfaction with work environment* (T3JSENV), while the items on the teaching profession were used to form the subscale *Job satisfaction with profession* (T3JSPRO).

These two subscales formed the multidimensional scale *Job satisfaction, composite* (T3JOBSA).

An additional scale related to job satisfaction was developed from the following question stem:

- "How strongly do you agree or disagree that you have control over the following areas of your planning and teaching in this <target class>?" (TT3G40). The question's items on teachers' freedom to make decisions were used for the scale *Satisfaction with target class autonomy* (T3SATAT).

The scales are presented in Table 11.68.

11.30. Model improvements

Two correlations were added as model improvements: between items TT3G53D and TT3G53F for subscale T3JSPRO, and between items TT3G40E and TT3G40D for scale T3SATAT.

11.31. Scale reliability

Table 11.69, which presents the coefficients (omega for the scale and subscales, stratified Cronbach's alpha for T3JOBSA) for all populations for each scale, show high reliabilities for all populations for both the scale and the subscales. A few exceptions can be found for the subscale T3JSPRO. Here, omega is moderate for the Mexico and Viet Nam ISCED level 2 populations and low for the Lithuania ISCED level 2 population.

11.32. Model fits

Table 11.70 presents the model fit for subscale T3JSENV. Most populations exhibit acceptable fit, with the exception of the South Africa ISCED level 2 and Georgia TALIS-PISA link populations. The same is true for subscale T3JSPRO, with the exception of the TALIS-PISA link populations in Columbia, Georgia and Viet Nam, and for the scale T3SATAT, with the exceptions of the Portugal ISCED level 2, the Netherlands and the Flemish Community (Belgium) ISCED level 1, Portugal ISCED level 3, and Australia TALIS-PISA link populations, as observed in Tables 11.71 and 11.72 respectively.

11.33. Invariance testing

The invariance results for subscales T3JSENV, T3JSPRO and the T3SATAT scale presented in Tables 11.73, 11.74, and 11.75 respectively, show metric invariance for all ISCED levels for the subscales and the scale. In the case of T3JSPRO, the configural model is near perfect for ISECD levels 2 and 3, and the metric model is acceptable, resulting in metric invariant models. Because both subscales are metric invariant for all ISCED levels, T3JOBSA is also metric invariant for all levels.

11.34. Item parameters

Table 11.76 presents the unstandardised factor loadings for the job satisfaction subscales and T3SATAT. The standardised factor loadings and unstandardised intercepts for the job satisfaction subscales T3JSENV and T3JSPRO are presented in Tables 11.77 and 11.78 respectively, and for the scale T3SATAT in Table 11.79.

The factor loadings for items TT3G53E and TT3G53G from subscale T3JSENV are above 0.600 in all populations, while most of those for items TT3G53C and TT3G53J are between 0.450 and 0.600. The factor loadings of the items making up T3JSPRO are above 0.450 for all populations except the ISCED level 2 population in Mexico for item TT3G53A and for the ISCED level 2 population in Lithuania, for items TT3G53D and TT3G53F.

The factor loadings of items in subscale T3SATAT are mostly above 0.600. Factor loadings below 0.450 can be observed not only for item TT3G40A for the ISCED level 2 populations in Bulgaria and Portugal, the ISCED level 3 population in Portugal and the TALIS-PISA link population in Malta but also for item TT3G40D for the ISCED level 3 population in Sweden.

Table 11.68. Item wording for job satisfaction scales

T3JOBSA: Job satisfaction, composite	
T3JSENV: Job satisfaction with work environment (subscale)	
TT3G53: We would like to know how you generally feel about your job. How strongly do you agree or disagree with the following statements?	
Response options: "Strongly disagree" (1), "Disagree" (2), "Agree" (3), "Strongly agree" (4).	
TT3G53C*	I would like to change to another school if that were possible
TT3G53E	I enjoy working at this school
TT3G53G	I would recommend this school as a good place to work
TT3G53J	All in all, I am satisfied with my job
T3JSPRO: Job satisfaction with profession (subscale)	
TT3G53: We would like to know how you generally feel about your job. How strongly do you agree or disagree with the following statements?	
Response options: "Strongly disagree" (1), "Disagree" (2), "Agree" (3), "Strongly agree" (4).	
TT3G53A	The advantages of being a teacher clearly outweigh the disadvantages
TT3G53B	If I could decide again, I would still choose to work as a teacher.
TT3G53D*	I regret that I decided to become a teacher
TT3G53F*	I wonder whether it would have been better to choose another profession
T3SATAT: Satisfaction with target class autonomy	
TT3G40: How strongly do you agree or disagree that you have control over the following areas of your planning and teaching in this <target class>?	
Response options: "Strongly disagree" (1), "Disagree" (2), "Agree" (3), "Strongly agree" (4).	
TT3G40A	Determining course content
TT3G40B	Selecting teaching methods
TT3G40C	Assessing students' learning
TT3G40D	Disciplining students
TT3G40E	Determining the amount of homework to be assigned

* Items were reverse coded.
Source: OECD, TALIS 2018 database.

Table 11.69. Reliability coefficients for job satisfaction scales

Participating countries/economies	T3JSENV	T3JSPRO	T3SATAT	T3JOBSA
	Omega coefficient[3]			Stratified Cronbach's alpha
ISCED level 2				
Alberta (Canada)	0.869	0.943	0.885	0.934
Australia	0.880	0.920	0.797	0.932
Austria	0.839	0.815	0.815	0.880
Belgium	0.870	0.845	0.823	0.903
Flemish Community (Belgium)	0.878	0.857	0.841	0.911
Brazil	0.797	0.815	0.882	0.863
Bulgaria	0.814	0.924	0.810	0.917
Ciudad Autónoma de Buenos Aires (Argentina)	0.796	0.801	0.914	0.857
Chile	0.778	0.810	0.885	0.847
Colombia	0.814	0.760	0.848	0.860
Croatia	0.861	0.874	0.835	0.914
Cyprus	0.848	0.918	0.845	0.919
Czech Republic	0.826	0.882	0.865	0.902
Denmark	0.845	0.889	0.895	0.912
England (United Kingdom)	0.882	0.906	0.815	0.931
Estonia	0.806	0.826	0.874	0.876

Participating countries/economies	T3JSENV	T3JSPRO Omega coefficient[3]	T3SATAT	T3JOBSA Stratified Cronbach's alpha
Finland	0.834	0.912	0.872	0.921
France	0.850	0.830	0.865	0.887
Georgia	0.743	0.801	0.887	0.849
Hungary	0.843	0.885	0.861	0.904
Iceland	0.837	0.861	0.856	0.890
Israel	0.882	0.837	0.850	0.907
Italy	0.845	0.841	0.904	0.887
Japan	0.769	0.801	0.867	0.859
Kazakhstan	0.745	0.709	0.837	0.813
Korea	0.843	0.874	0.920	0.907
Latvia	0.776	0.774	0.857	0.843
Lithuania	0.835	0.599	0.891	0.836
Malta	0.832	0.863	0.832	0.897
Mexico	0.750	0.642	0.830	0.794
Netherlands	0.826	0.810	0.821	0.879
New Zealand	0.872	0.865	0.821	0.909
Norway	0.854	0.885	0.865	0.913
Portugal	0.859	0.843	0.767	0.889
Romania	0.834	0.814	0.904	0.877
Russian Federation	0.790	0.803	0.884	0.867
Saudi Arabia	0.803	0.810	0.891	0.870
Shanghai (China)	0.792	0.824	0.937	0.882
Singapore	0.872	0.870	0.843	0.913
Slovak Republic	0.803	0.843	0.882	0.884
Slovenia	0.799	0.865	0.808	0.895
South Africa[2]	0.762	0.701	0.837	0.818
Spain	0.839	0.891	0.848	0.908
Sweden	0.846	0.876	0.846	0.905
Chinese Taipei	0.835	0.837	0.951	0.888
Turkey	0.861	0.863	0.901	0.899
United Arab Emirates	0.846	0.841	0.867	0.891
United States[4]	0.891	-	0.884	-
Viet Nam	0.771	0.699	0.914	0.832
ISCED level 1				
Australia[1]	0.874	0.895	0.817	0.920
Flemish Community (Belgium)	0.867	0.865	0.773	0.906
Ciudad Autónoma de Buenos Aires (Argentina)	0.792	0.810	0.918	0.857
Denmark	0.854	0.903	0.884	0.919
England (United Kingdom)	0.897	0.947	0.839	0.948
France	0.870	0.801	0.819	0.882
Japan	0.767	0.814	0.859	0.864
Korea	0.856	0.863	0.895	0.908
Netherlands[1]	0.865	0.846	0.815	0.900
Spain	0.846	0.854	0.846	0.892
Sweden	0.832	0.869	0.859	0.897
Chinese Taipei	0.824	0.834	0.939	0.880
Turkey	0.856	0.843	0.897	0.891
United Arab Emirates	0.861	0.852	0.870	0.898
Viet Nam	0.819	0.702	0.887	0.855
ISCED level 3				

Participating countries/economies	T3JSENV	T3JSPRO Omega coefficient[3]	T3SATAT	T3JOBSA Stratified Cronbach's alpha
Alberta (Canada)	0.893	0.910	0.880	0.932
Brazil	0.828	0.841	0.869	0.880
Croatia	0.856	0.889	0.839	0.916
Denmark	0.850	0.891	0.834	0.917
Portugal	0.882	0.845	0.773	0.897
Slovenia	0.806	0.852	0.834	0.891
Sweden	0.848	0.901	0.832	0.914
Chinese Taipei	0.850	0.783	0.941	0.880
Turkey	0.859	0.850	0.882	0.894
United Arab Emirates	0.850	0.863	0.856	0.902
Viet Nam	0.839	0.773	0.889	0.877
TALIS-PISA link				
Australia	0.872	0.880	0.814	0.916
Ciudad Autónoma de Buenos Aires (Argentina)	0.846	0.916	0.884	0.915
Colombia	0.806	0.876	0.856	0.889
Czech Republic	0.859	0.899	0.895	0.918
Denmark	0.865	0.872	0.863	0.911
Georgia	0.815	0.834	0.901	0.882
Malta	0.848	0.854	0.806	0.896
Turkey	0.817	0.805	0.848	0.860
Viet Nam	0.865	0.857	0.906	0.911

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
3. Omega coefficient was calculated based on unidimensional models for every single subscale of the multidimensional construct.
4. These participating countries'/economies' reliability coefficient estimation failed in the final scale model due to a negative residual variance for one or more items that could not be corrected; when this occurs for a subscale of a multidimensional scale, the multidimensional scale reliability coefficient is also missing; these countries/economies have untrustworthy scale scores for the corresponding ISCED level.
Source: OECD, TALIS 2018 database.

Table 11.70. CFA model-data fit for scale T3JSENV

Job satisfaction with work environment

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Alberta (Canada)	0.997	0.992	0.026	0.011
Australia	0.995	0.984	0.039	0.009
Austria	0.992	0.975	0.049	0.014
Belgium	0.997	0.991	0.035	0.009
Flemish Community (Belgium)	0.995	0.986	0.045	0.011
Brazil	0.995	0.985	0.029	0.010
Bulgaria	0.994	0.981	0.037	0.013
Ciudad Autónoma de Buenos Aires (Argentina)	0.956	0.867	0.068	0.020
Chile	0.997	0.991	0.025	0.010
Colombia	0.942	0.826	0.073	0.023
Croatia	0.988	0.965	0.064	0.018
Cyprus	0.991	0.973	0.055	0.015
Czech Republic	0.972	0.916	0.096	0.025
Denmark	0.983	0.950	0.070	0.017

Participating countries/economies	CFI	TLI	RMSEA	SRMR
England (United Kingdom)	0.995	0.984	0.057	0.012
Estonia	0.977	0.931	0.075	0.020
Finland	0.937	0.811	0.174	0.035
France	0.994	0.983	0.048	0.012
Georgia	0.992	0.977	0.034	0.012
Hungary	0.998	0.995	0.028	0.009
Iceland	0.993	0.980	0.038	0.013
Israel	0.983	0.949	0.081	0.020
Italy	0.988	0.965	0.071	0.016
Japan	0.937	0.812	0.139	0.034
Kazakhstan	0.992	0.975	0.030	0.012
Korea	0.984	0.953	0.076	0.020
Latvia	0.972	0.916	0.064	0.027
Lithuania	0.988	0.964	0.063	0.017
Malta	0.987	0.961	0.057	0.019
Mexico	0.986	0.958	0.043	0.019
Netherlands	0.957	0.872	0.104	0.029
New Zealand	0.999	0.996	0.026	0.007
Norway	0.999	0.998	0.014	0.007
Portugal	0.999	0.998	0.014	0.006
Romania	0.999	0.996	0.017	0.007
Russian Federation	0.998	0.995	0.014	0.010
Saudi Arabia	0.941	0.822	0.114	0.038
Shanghai (China)	1.000	1.001	0.000	0.005
Singapore	0.985	0.955	0.082	0.019
Slovak Republic	0.968	0.905	0.080	0.026
Slovenia	0.933	0.799	0.143	0.037
South Africa[2]	0.897	0.897	0.087	0.236
Spain	0.987	0.961	0.051	0.018
Sweden	0.999	0.998	0.012	0.009
Chinese Taipei	0.996	0.988	0.035	0.012
Turkey	0.988	0.965	0.053	0.018
United Arab Emirates	0.985	0.954	0.062	0.021
United States	0.997	0.991	0.023	0.008
Viet Nam	0.988	0.965	0.039	0.015
ISCED level 1				
Australia[1]	0.977	0.977	0.052	0.167
Flemish Community (Belgium)	0.992	0.977	0.046	0.014
Ciudad Autónoma de Buenos Aires (Argentina)	0.944	0.831	0.097	0.029
Denmark	0.993	0.979	0.045	0.013
England (United Kingdom)	0.988	0.964	0.073	0.015
France	0.999	0.998	0.013	0.007
Japan	0.904	0.712	0.147	0.042
Korea	0.958	0.874	0.120	0.028
Netherlands[1]	0.914	0.914	0.088	0.246
Spain	0.972	0.916	0.065	0.023
Sweden	0.996	0.987	0.029	0.012
Chinese Taipei	0.995	0.986	0.034	0.010
Turkey	0.984	0.951	0.047	0.021
United Arab Emirates	0.977	0.931	0.077	0.018
Viet Nam	0.991	0.974	0.035	0.012
ISCED level 3				

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Alberta (Canada)	0.999	0.996	0.034	0.011
Brazil	0.985	0.956	0.051	0.016
Croatia	0.975	0.925	0.096	0.022
Denmark	0.996	0.988	0.036	0.012
Portugal	1.000	1.000	0.000	0.005
Slovenia	0.945	0.835	0.120	0.030
Sweden	0.984	0.953	0.061	0.020
Chinese Taipei	0.995	0.984	0.051	0.012
Turkey	0.992	0.976	0.036	0.016
United Arab Emirates	0.980	0.940	0.072	0.019
Viet Nam	0.998	0.995	0.018	0.008
TALIS-PISA link				
Australia	0.982	0.982	0.052	0.115
Ciudad Autónoma de Buenos Aires (Argentina)	0.978	0.978	0.043	0.246
Colombia	0.986	0.986	0.020	0.103
Czech Republic	0.956	0.956	0.054	0.165
Denmark	0.976	0.976	0.042	0.146
Georgia	0.761	0.761	0.090	0.313
Malta	0.968	0.968	0.054	0.112
Turkey	0.962	0.962	0.051	0.196
Viet Nam	0.950	0.950	0.047	0.171

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.71. CFA model-data fit for scale T3JSPRO

Job satisfaction with profession

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Alberta (Canada)	0.996	0.977	0.051	0.008
Australia	0.996	0.974	0.060	0.008
Austria	0.997	0.984	0.036	0.006
Belgium	1.000	1.002	0.000	0.001
Flemish Community (Belgium)	1.000	1.003	0.000	0.000
Brazil	1.000	1.000	0.006	0.003
Bulgaria	0.993	0.960	0.075	0.011
Ciudad Autónoma de Buenos Aires (Argentina)	0.993	0.958	0.036	0.009
Chile	0.993	0.960	0.064	0.010
Colombia	1.000	1.013	0.000	0.004
Croatia	1.000	1.005	0.000	0.001
Cyprus	1.000	1.003	0.000	0.002
Czech Republic	1.000	1.001	0.000	0.001
Denmark	1.000	1.000	0.001	0.003
England (United Kingdom)	1.000	1.003	0.000	0.001
Estonia	1.000	1.003	0.000	0.000
Finland	0.993	0.958	0.078	0.010
France	0.999	0.997	0.019	0.003
Georgia	0.998	0.990	0.024	0.006
Hungary	0.999	0.993	0.035	0.006
Iceland	1.000	1.004	0.000	0.003

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Israel	1.000	1.004	0.000	0.001
Italy	1.000	1.002	0.000	0.001
Japan	0.995	0.972	0.067	0.009
Kazakhstan	1.000	1.003	0.000	0.001
Korea	0.993	0.960	0.078	0.012
Latvia	1.000	1.001	0.000	0.007
Lithuania	1.000	1.003	0.000	0.002
Malta	0.996	0.977	0.064	0.009
Mexico	1.000	1.008	0.000	0.002
Netherlands	1.000	1.005	0.000	0.002
New Zealand	1.000	1.004	0.000	0.001
Norway	0.997	0.985	0.039	0.006
Portugal	1.000	0.999	0.013	0.002
Romania	0.999	0.997	0.014	0.004
Russian Federation	0.991	0.947	0.055	0.011
Saudi Arabia	1.000	1.004	0.000	0.001
Shanghai (China)	1.000	1.002	0.000	0.002
Singapore	1.000	0.999	0.012	0.003
Slovak Republic	0.999	0.995	0.021	0.005
Slovenia	1.000	1.003	0.000	0.002
South Africa[2]	0.948	0.937	0.058	0.072
Spain	0.999	0.996	0.015	0.004
Sweden	0.995	0.971	0.063	0.010
Chinese Taipei	0.996	0.975	0.046	0.010
Turkey	1.000	1.001	0.000	0.002
United Arab Emirates	0.999	0.993	0.024	0.005
United States	0.996	0.979	0.035	0.006
Viet Nam	0.996	0.978	0.031	0.008
ISCED level 1				
Australia[1]	0.984	0.981	0.044	0.088
Flemish Community (Belgium)	0.997	0.983	0.043	0.009
Ciudad Autónoma de Buenos Aires (Argentina)	1.000	1.007	0.000	0.001
Denmark	1.000	1.004	0.000	0.000
England (United Kingdom)	1.000	1.001	0.000	0.003
France	0.996	0.978	0.037	0.007
Japan	0.997	0.982	0.048	0.008
Korea	0.952	0.712	0.166	0.023
Netherlands[1]	0.992	0.990	0.035	0.070
Spain	1.000	1.004	0.000	0.001
Sweden	1.000	1.003	0.000	0.000
Chinese Taipei	1.000	1.004	0.000	0.001
Turkey	0.986	0.916	0.060	0.015
United Arab Emirates	1.000	1.002	0.000	0.000
Viet Nam	0.993	0.956	0.044	0.013
ISCED level 3				
Alberta (Canada)	1.000	1.004	0.000	0.002
Brazil	1.000	1.005	0.000	0.000
Croatia	1.000	1.002	0.000	0.002
Denmark	0.999	0.992	0.026	0.005
Portugal	1.000	1.003	0.000	0.000
Slovenia	1.000	0.997	0.016	0.004
Sweden	0.987	0.920	0.099	0.013

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Chinese Taipei	0.998	0.987	0.029	0.009
Turkey	1.000	1.001	0.000	0.002
United Arab Emirates	1.000	1.002	0.000	0.000
Viet Nam	0.995	0.972	0.035	0.011
TALIS-PISA link				
Australia	0.975	0.970	0.063	0.104
Ciudad Autónoma de Buenos Aires (Argentina)	0.904	0.885	0.085	0.440
Colombia	0.882	0.859	0.063	0.296
Czech Republic	0.995	0.994	0.022	0.062
Denmark	1.000	1.007	0.000	0.081
Georgia	0.872	0.847	0.057	0.209
Malta	0.965	0.958	0.081	0.167
Turkey	0.972	0.966	0.032	0.119
Viet Nam	0.875	0.850	0.061	0.313

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.72. CFA model-data fit for scale T3SATAT

Satisfaction with target class autonomy

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Alberta (Canada)	1.000	1.005	0.000	0.015
Australia	0.906	0.764	0.108	0.045
Austria	0.992	0.980	0.036	0.015
Belgium	0.976	0.940	0.057	0.026
Flemish Community (Belgium)	0.985	0.963	0.046	0.019
Brazil	0.980	0.951	0.056	0.019
Bulgaria	0.919	0.797	0.093	0.044
Ciudad Autónoma de Buenos Aires (Argentina)	0.996	0.989	0.027	0.012
Chile	0.996	0.991	0.026	0.010
Colombia	0.989	0.973	0.033	0.014
Croatia	0.982	0.955	0.047	0.021
Cyprus	0.985	0.964	0.042	0.022
Czech Republic	0.957	0.892	0.104	0.028
Denmark	0.994	0.986	0.035	0.012
England (United Kingdom)	0.968	0.921	0.087	0.028
Estonia	0.996	0.990	0.027	0.013
Finland	0.961	0.902	0.088	0.025
France	0.992	0.979	0.039	0.013
Georgia	0.981	0.953	0.060	0.018
Hungary	0.981	0.952	0.056	0.020
Iceland	0.980	0.949	0.070	0.023
Israel	0.980	0.951	0.057	0.021
Italy	0.986	0.966	0.059	0.017
Japan	0.985	0.961	0.061	0.017
Kazakhstan	0.990	0.975	0.032	0.015
Korea	0.974	0.934	0.064	0.021
Latvia	0.992	0.980	0.039	0.018
Lithuania	0.991	0.978	0.048	0.015

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Malta	0.986	0.964	0.058	0.022
Mexico	0.993	0.983	0.033	0.012
Netherlands	0.987	0.967	0.055	0.024
New Zealand	0.910	0.774	0.121	0.042
Norway	0.977	0.944	0.074	0.021
Portugal	0.877	0.693	0.126	0.050
Romania	0.989	0.973	0.047	0.014
Russian Federation	0.973	0.932	0.052	0.023
Saudi Arabia	0.986	0.964	0.056	0.019
Shanghai (China)	0.990	0.976	0.041	0.013
Singapore	0.990	0.974	0.044	0.017
Slovak Republic	0.994	0.985	0.040	0.013
Slovenia	0.977	0.942	0.065	0.026
South Africa[2]	0.918	0.909	0.052	0.166
Spain	0.974	0.935	0.062	0.026
Sweden	0.978	0.946	0.058	0.022
Chinese Taipei	0.993	0.981	0.043	0.010
Turkey	0.987	0.967	0.048	0.016
United Arab Emirates	0.998	0.996	0.016	0.008
United States	0.987	0.966	0.027	0.018
Viet Nam	1.000	1.000	0.071	0.019
ISCED level 1				
Australia[1]	0.963	0.959	0.051	0.093
Flemish Community (Belgium)	0.861	0.651	0.144	0.051
Ciudad Autónoma de Buenos Aires (Argentina)	1.000	0.999	0.007	0.007
Denmark	0.998	0.995	0.024	0.011
England (United Kingdom)	0.956	0.891	0.094	0.029
France	1.000	1.006	0.000	0.007
Japan	0.935	0.838	0.125	0.036
Korea	0.969	0.922	0.073	0.023
Netherlands[1]	0.880	0.867	0.098	0.293
Spain	0.986	0.965	0.035	0.020
Sweden	0.965	0.914	0.082	0.031
Chinese Taipei	0.991	0.977	0.047	0.011
Turkey	0.980	0.950	0.048	0.017
United Arab Emirates	0.992	0.981	0.034	0.013
Viet Nam	0.998	0.995	0.023	0.009
ISCED level 3				
Alberta (Canada)	0.974	0.935	0.087	0.019
Brazil	0.981	0.953	0.056	0.021
Croatia	0.966	0.914	0.075	0.027
Denmark	0.965	0.911	0.073	0.029
Portugal	0.883	0.708	0.132	0.054
Slovenia	0.981	0.952	0.057	0.021
Sweden	0.970	0.925	0.059	0.025
Chinese Taipei	0.988	0.970	0.054	0.014
Turkey	0.985	0.962	0.040	0.018
United Arab Emirates	0.993	0.983	0.029	0.014
Viet Nam	0.977	0.943	0.060	0.024
TALIS-PISA link				
Australia	0.867	0.853	0.115	0.100
Ciudad Autónoma de Buenos Aires (Argentina)	0.985	0.983	0.028	0.163

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Colombia	0.996	0.996	0.015	0.091
Czech Republic	0.961	0.956	0.054	0.167
Denmark	1.000	1.006	0.000	0.055
Georgia	0.991	0.990	0.022	0.121
Malta	0.933	0.925	0.077	0.081
Turkey	0.967	0.963	0.042	0.174
Viet Nam	0.985	0.983	0.042	0.169

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.73. Invariance test results for scale T3JSENV

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level of ISCED level 2								
Configural	0.986	0.957	0.060					
Metric	0.969	0.962	0.056	0.092	0.017	-0.005	0.004	-0.074
Scalar	0.878	0.907	0.088	0.133	0.091	0.055	-0.032	-0.041
Invariance level of ISCED level 1								
Configural	0.981	0.942	0.071	0.022				
Metric	0.963	0.953	0.064	0.103	0.018	-0.011	0.007	-0.081
Scalar	0.887	0.910	0.089	0.141	0.076	0.043	-0.025	-0.038
Invariance level of ISCED level 3								
Configural	0.988	0.965	0.057	0.017				
Metric	0.970	0.962	0.060	0.102	0.018	0.003	-0.003	-0.085
Scalar	0.913	0.930	0.081	0.118	0.057	0.032	-0.021	-0.016

Note: See endnote 34.
Source: OECD, TALIS 2018 database.

Table 11.74. Invariance test results for scale T3JSPRO

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level of ISCED level 2								
Configural	0.998	0.989	0.031	0.006				
Metric	0.961	0.940	0.071	0.088	0.037	0.049	-0.040	-0.082
Scalar	0.791	0.817	0.124	0.127	0.170	0.123	-0.053	-0.039
Invariance level of ISCED level 1								
Configural	0.995	0.973	0.045	0.009				
Metric	0.979	0.967	0.049	0.067	0.016	0.006	-0.004	-0.058
Scalar	0.812	0.827	0.113	0.120	0.167	0.140	-0.064	-0.053
Invariance level of ISCED level 3								
Configural	0.999	0.993	0.023	0.006				
Metric	0.980	0.968	0.051	0.065	0.019	0.025	-0.028	-0.059
Scalar	0.876	0.885	0.098	0.098	0.104	0.083	-0.047	-0.033

Note: See endnote 34.
Source: OECD, TALIS 2018 database.

Table 11.75. Invariance test results for scale T3SATAT

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level of ISCED level 2								
Configural	0.982	0.954	0.056	0.022				
Metric	0.968	0.960	0.053	0.073	0.014	-0.006	0.003	-0.051
Scalar	0.843	0.867	0.096	0.112	0.125	0.093	-0.043	-0.039
Invariance level of ISCED level 1								
Configural	0.980	0.949	0.058	0.022				
Metric	0.968	0.958	0.053	0.070	0.012	-0.009	0.005	-0.048
Scalar	0.854	0.872	0.092	0.112	0.114	0.086	-0.039	-0.042
Invariance level of ISCED level 3								
Configural	0.977	0.943	0.060	0.026				
Metric	0.966	0.956	0.053	0.066	0.011	-0.013	0.007	-0.040
Scalar	0.825	0.845	0.099	0.121	0.141	0.111	-0.046	-0.055

Note: See endnote 34.
Source: OECD, TALIS 2018 database.

Table 11.76. Unstandardised factor loadings for T3JSENV, T3JSPRO and T3SATAT for all countries for all populations

T3JSENV (Metric)		T3JSPRO (Metric)		T3SATAT (Metric)	
TT3G53C	0.484	TT3G53A	0.436	TT3G40A	0.488
TT3G53E	0.559	TT3G53B	0.728	TT3G40B	0.499
TT3G53G	0.579	TT3G53D	0.423	TT3G40C	0.505
TT3G53J	0.337	TT3G53F	0.566	TT3G40D	0.421
				TT3G40E	0.448

Source: OECD, TALIS 2018 database.

Table 11.77. Standardised factor loadings and unstandardised intercepts for scale T3JSENV

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G53C	TT3G53E	TT3G53G	TT3G53J	TT3G53C	TT3G53E	TT3G53G	TT3G53J
ISCED level 2								
Alberta (Canada)	0.592	0.878	0.830	0.581	3.025	3.353	3.214	3.247
Australia	0.611	0.881	0.849	0.625	3.002	3.277	3.128	3.162
Austria	0.628	0.855	0.771	0.539	3.556	3.583	3.374	3.452
Belgium	0.654	0.883	0.813	0.572	3.308	3.332	3.118	3.125
Flemish Community (Belgium)	0.666	0.883	0.831	0.605	3.340	3.322	3.140	3.205
Brazil	0.590	0.776	0.784	0.474	3.243	3.344	3.232	3.101
Bulgaria	0.550	0.798	0.800	0.540	3.178	3.278	3.192	3.139
Ciudad Autónoma de Buenos Aires (Argentina)	0.567	0.798	0.751	0.517	3.277	3.406	3.297	3.390
Chile	0.574	0.751	0.751	0.541	3.063	3.342	3.144	3.380
Colombia	0.509	0.815	0.780	0.568	3.078	3.445	3.373	3.591
Croatia	0.663	0.856	0.824	0.606	3.183	3.070	3.050	3.146
Cyprus	0.619	0.833	0.833	0.550	2.946	3.014	2.938	3.196
Czech Republic	0.605	0.835	0.758	0.591	3.272	3.140	3.072	3.033
Denmark	0.629	0.856	0.790	0.532	3.344	3.434	3.242	3.189
England (United Kingdom)	0.644	0.894	0.836	0.579	2.989	3.155	3.058	2.905
Estonia	0.604	0.794	0.762	0.587	3.171	3.056	3.015	3.110
Finland	0.569	0.849	0.771	0.569	3.099	3.142	3.068	3.088

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G53C	TT3G53E	TT3G53G	TT3G53J	TT3G53C	TT3G53E	TT3G53G	TT3G53J
France	0.570	0.869	0.793	0.540	3.042	3.247	3.056	2.998
Georgia	0.522	0.684	0.751	0.506	3.266	3.285	3.284	3.217
Hungary	0.646	0.836	0.807	0.571	3.242	3.271	3.043	3.049
Iceland	0.585	0.825	0.821	0.534	3.239	3.351	3.250	3.184
Israel	0.657	0.886	0.842	0.608	3.253	3.236	3.179	3.220
Italy	0.606	0.848	0.808	0.537	3.099	3.229	3.089	3.260
Japan	0.546	0.772	0.704	0.561	2.836	2.913	2.690	2.932
Kazakhstan	0.527	0.727	0.724	0.481	3.072	3.183	3.065	3.118
Korea	0.634	0.840	0.796	0.596	2.746	2.860	2.751	3.133
Latvia	0.541	0.768	0.746	0.519	3.152	3.256	3.089	3.049
Lithuania	0.602	0.841	0.797	0.521	3.172	3.212	3.023	2.975
Malta	0.596	0.840	0.789	0.493	3.260	3.277	3.165	3.048
Mexico	0.452	0.759	0.705	0.535	3.041	3.441	3.255	3.577
Netherlands	0.582	0.846	0.733	0.592	3.152	3.310	3.068	3.188
New Zealand	0.622	0.880	0.829	0.590	2.987	3.246	3.100	3.039
Norway	0.597	0.862	0.809	0.583	3.264	3.371	3.266	3.174
Portugal	0.569	0.867	0.828	0.530	2.937	3.185	3.057	3.174
Romania	0.604	0.818	0.805	0.608	3.293	3.339	3.198	3.238
Russian Federation	0.587	0.765	0.771	0.524	3.177	3.170	3.027	3.064
Saudi Arabia	0.527	0.816	0.760	0.505	2.584	2.967	2.876	3.190
Shanghai (China)	0.577	0.776	0.761	0.550	2.807	2.857	2.796	3.111
Singapore	0.633	0.888	0.800	0.631	2.673	2.997	2.769	3.036
Slovak Republic	0.610	0.794	0.753	0.559	3.164	3.149	2.999	3.030
Slovenia	0.544	0.799	0.757	0.566	3.170	3.102	2.995	3.112
South Africa[2]	0.611	0.848	0.820	0.556	2.620	2.927	2.868	2.983
Spain	0.593	0.840	0.803	0.567	3.132	3.291	3.183	3.362
Sweden	0.581	0.867	0.784	0.527	3.175	3.283	3.095	3.219
Chinese Taipei	0.562	0.842	0.787	0.595	2.706	2.997	2.843	3.009
Turkey	0.638	0.855	0.836	0.560	2.717	3.005	2.890	3.160
United Arab Emirates	0.569	0.837	0.833	0.563	2.789	3.102	3.029	3.197
United States	0.642	0.909	0.828	0.599	3.120	3.351	3.223	3.205
Viet Nam	0.497	0.715	0.792	0.490	3.045	3.205	3.199	3.264
ISCED level 1								
Australia[1]	0.626	0.907	0.860	0.609	3.057	3.342	3.221	3.198
Flemish Community (Belgium)	0.670	0.872	0.821	0.561	3.340	3.322	3.140	3.205
Ciudad Autónoma de Buenos Aires (Argentina)	0.562	0.795	0.749	0.517	3.277	3.406	3.297	3.390
Denmark	0.655	0.869	0.787	0.535	3.344	3.434	3.242	3.189
England (United Kingdom)	0.660	0.888	0.887	0.572	2.989	3.155	3.058	2.905
France	0.624	0.882	0.825	0.563	3.042	3.247	3.056	2.998
Japan	0.566	0.765	0.690	0.582	2.836	2.913	2.690	2.932
Korea	0.654	0.860	0.800	0.601	2.746	2.860	2.751	3.133
Netherlands[1]	0.594	0.828	0.775	0.547	3.259	3.360	3.232	3.130
Spain	0.603	0.856	0.795	0.563	3.132	3.291	3.183	3.362
Sweden	0.595	0.842	0.783	0.536	3.175	3.283	3.095	3.219
Chinese Taipei	0.560	0.823	0.783	0.597	2.706	2.997	2.843	3.009
Turkey	0.606	0.848	0.834	0.574	2.717	3.005	2.890	3.160
United Arab Emirates	0.578	0.849	0.849	0.573	2.789	3.102	3.029	3.197
Viet Nam	0.522	0.757	0.840	0.541	3.045	3.205	3.199	3.264
ISCED level 3								
Alberta (Canada)	0.619	0.905	0.842	0.638	3.025	3.353	3.214	3.247

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G53C	TT3G53E	TT3G53G	TT3G53J	TT3G53C	TT3G53E	TT3G53G	TT3G53J
Brazil	0.591	0.828	0.800	0.489	3.243	3.344	3.232	3.101
Croatia	0.660	0.843	0.821	0.609	3.183	3.070	3.050	3.146
Denmark	0.634	0.855	0.796	0.587	3.344	3.434	3.242	3.189
Portugal	0.584	0.893	0.846	0.540	2.937	3.185	3.057	3.174
Slovenia	0.578	0.789	0.776	0.584	3.170	3.102	2.995	3.112
Sweden	0.622	0.861	0.788	0.564	3.175	3.283	3.095	3.219
Chinese Taipei	0.567	0.850	0.817	0.603	2.706	2.997	2.843	3.009
Turkey	0.636	0.846	0.841	0.572	2.717	3.005	2.890	3.160
United Arab Emirates	0.578	0.839	0.837	0.564	2.789	3.102	3.029	3.197
Viet Nam	0.528	0.767	0.864	0.546	3.045	3.205	3.199	3.264
TALIS-PISA link								
Australia	0.597	0.900	0.809	0.604	3.043	3.292	3.147	3.123
Ciudad Autónoma de Buenos Aires (Argentina)	0.551	0.784	0.781	0.498	3.372	3.476	3.398	3.395
Colombia	0.486	0.758	0.765	0.564	3.059	3.416	3.376	3.580
Czech Republic	0.627	0.839	0.779	0.601	3.283	3.141	3.086	3.030
Denmark	0.643	0.876	0.775	0.536	3.383	3.407	3.247	3.202
Georgia	0.536	0.694	0.761	0.501	3.274	3.300	3.341	3.232
Malta	0.610	0.825	0.812	0.490	3.250	3.254	3.185	3.073
Turkey	0.633	0.841	0.857	0.577	2.761	3.010	2.936	3.194
Viet Nam	0.529	0.803	0.849	0.578	2.985	3.151	3.166	3.274

1. Data from participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.78. Standardised factor loadings and unstandardised intercepts for scale T3JSPRO

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G53A	TT3G53B	TT3G53D	TT3G53F	TT3G53A	TT3G53B	TT3G53D	TT3G53F
ISCED level 2								
Alberta (Canada)	0.665	0.967	0.670	0.655	3.249	3.228	3.539	2.951
Australia	0.678	0.951	0.639	0.647	3.157	3.132	3.482	2.927
Austria	0.538	0.849	0.699	0.692	3.217	3.291	3.763	3.506
Belgium	0.556	0.892	0.641	0.665	2.658	3.059	3.458	3.031
Flemish Community (Belgium)	0.562	0.902	0.665	0.663	2.771	3.099	3.503	3.029
Brazil	0.553	0.869	0.568	0.656	2.692	2.950	3.334	3.012
Bulgaria	0.652	0.954	0.624	0.698	2.584	2.785	3.229	2.725
Ciudad Autónoma de Buenos Aires (Argentina)	0.483	0.861	0.587	0.601	2.995	3.416	3.661	3.318
Chile	0.553	0.860	0.611	0.637	2.803	3.177	3.518	3.046
Colombia	0.471	0.833	0.521	0.557	3.169	3.447	3.675	3.347
Croatia	0.612	0.915	0.641	0.667	2.799	2.972	3.441	2.867
Cyprus	0.640	0.951	0.596	0.674	3.035	3.081	3.357	2.904
Czech Republic	0.577	0.924	0.617	0.699	2.605	2.869	3.379	2.990
Denmark	0.662	0.927	0.624	0.654	2.977	2.880	3.422	2.717
England (United Kingdom)	0.668	0.940	0.660	0.689	2.835	2.798	3.240	2.600
Estonia	0.606	0.873	0.602	0.651	2.922	2.912	3.374	2.914
Finland	0.728	0.943	0.648	0.667	3.284	3.064	3.476	2.900
France	0.559	0.876	0.649	0.684	2.537	2.979	3.476	3.155

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G53A	TT3G53B	TT3G53D	TT3G53F	TT3G53A	TT3G53B	TT3G53D	TT3G53F
Georgia	0.537	0.866	0.504	0.554	3.051	3.145	3.350	2.787
Hungary	0.629	0.923	0.658	0.675	2.661	2.885	3.390	2.665
Iceland	0.692	0.903	0.592	0.631	3.095	2.715	3.254	2.562
Israel	0.570	0.890	0.563	0.625	2.898	3.028	3.380	2.946
Italy	0.534	0.892	0.602	0.663	2.820	3.207	3.500	3.300
Japan	0.613	0.838	0.633	0.670	2.882	2.571	3.395	2.944
Kazakhstan	0.480	0.776	0.487	0.598	2.761	2.753	3.090	2.844
Korea	0.713	0.912	0.567	0.680	3.114	2.806	3.117	2.744
Latvia	0.544	0.831	0.561	0.608	2.580	2.739	3.239	2.785
Lithuania	0.452	0.600	0.418	0.383	2.889	2.772	3.158	2.376
Malta	0.603	0.904	0.621	0.692	2.573	2.715	3.114	2.404
Mexico	0.369	0.721	0.500	0.515	2.900	3.458	3.760	3.400
Netherlands	0.607	0.857	0.600	0.637	3.001	3.059	3.482	3.136
New Zealand	0.643	0.905	0.648	0.676	2.972	2.926	3.393	2.733
Norway	0.682	0.924	0.623	0.648	3.158	2.969	3.387	2.899
Portugal	0.647	0.882	0.599	0.712	2.696	2.752	3.107	2.633
Romania	0.551	0.866	0.584	0.652	2.791	3.101	3.475	3.138
Russian Federation	0.494	0.862	0.556	0.669	2.699	2.905	3.267	3.048
Saudi Arabia	0.563	0.867	0.525	0.638	2.685	2.751	3.046	2.558
Shanghai (China)	0.562	0.882	0.546	0.593	2.882	2.913	3.118	2.728
Singapore	0.641	0.916	0.572	0.593	3.019	3.027	3.305	2.588
Slovak Republic	0.559	0.895	0.581	0.624	2.744	2.926	3.296	2.695
Slovenia	0.639	0.906	0.614	0.676	2.966	3.006	3.489	3.076
South Africa[2]	0.530	0.771	0.542	0.622	2.826	2.771	3.200	2.575
Spain	0.596	0.932	0.615	0.646	3.148	3.344	3.630	3.309
Sweden	0.688	0.912	0.660	0.671	2.961	2.715	3.327	2.755
Chinese Taipei	0.571	0.894	0.552	0.546	2.821	2.939	3.207	2.391
Turkey	0.603	0.908	0.592	0.656	2.856	2.997	3.258	2.664
United Arab Emirates	0.602	0.892	0.541	0.646	2.978	2.993	3.278	2.755
United States	0.689	1.001	0.658	0.679	3.173	3.134	3.414	2.840
Viet Nam	0.518	0.771	0.466	0.507	3.073	3.106	3.373	2.919
ISCED level 1								
Australia[1]	0.665	0.936	0.650	0.651	3.153	3.167	3.521	3.019
Flemish Community (Belgium)	0.585	0.903	0.690	0.688	2.771	3.099	3.503	3.029
Ciudad Autónoma de Buenos Aires (Argentina)	0.471	0.875	0.570	0.579	2.995	3.416	3.661	3.318
Denmark	0.683	0.937	0.639	0.653	2.977	2.880	3.422	2.717
England (United Kingdom)	0.683	0.970	0.650	0.683	2.835	2.798	3.240	2.600
France	0.546	0.855	0.617	0.634	2.537	2.979	3.476	3.155
Japan	0.650	0.845	0.644	0.681	2.882	2.571	3.395	2.944
Korea	0.702	0.901	0.597	0.686	3.114	2.806	3.117	2.744
Netherlands[1]	0.616	0.881	0.667	0.690	2.833	2.909	3.418	3.043
Spain	0.520	0.907	0.581	0.622	3.148	3.344	3.630	3.309
Sweden	0.698	0.904	0.653	0.672	2.961	2.715	3.327	2.755
Chinese Taipei	0.557	0.892	0.537	0.538	2.821	2.939	3.207	2.391
Turkey	0.584	0.892	0.568	0.644	2.856	2.997	3.258	2.664
United Arab Emirates	0.616	0.899	0.564	0.652	2.978	2.993	3.278	2.755
Viet Nam	0.469	0.784	0.462	0.502	3.073	3.106	3.373	2.919
ISCED level 3								

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G53A	TT3G53B	TT3G53D	TT3G53F	TT3G53A	TT3G53B	TT3G53D	TT3G53F
Alberta (Canada)	0.671	0.945	0.664	0.631	3.249	3.228	3.539	2.951
Brazil	0.572	0.890	0.582	0.681	2.692	2.950	3.334	3.012
Croatia	0.604	0.927	0.658	0.678	2.799	2.972	3.441	2.867
Denmark	0.659	0.931	0.637	0.601	2.977	2.880	3.422	2.717
Portugal	0.647	0.887	0.599	0.681	2.696	2.752	3.107	2.633
Slovenia	0.630	0.894	0.618	0.670	2.966	3.006	3.489	3.076
Sweden	0.703	0.934	0.666	0.670	2.961	2.715	3.327	2.755
Chinese Taipei	0.525	0.847	0.518	0.537	2.821	2.939	3.207	2.391
Turkey	0.604	0.896	0.588	0.659	2.856	2.997	3.258	2.664
United Arab Emirates	0.639	0.908	0.568	0.650	2.978	2.993	3.278	2.755
Viet Nam	0.572	0.839	0.479	0.526	3.073	3.106	3.373	2.919
TALIS-PISA link								
Australia	0.666	0.928	0.627	0.650	3.069	3.033	3.431	2.848
Ciudad Autónoma de Buenos Aires (Argentina)	0.428	0.872	0.598	0.566	3.007	3.427	3.714	3.328
Colombia	0.525	0.857	0.535	0.567	3.230	3.470	3.689	3.366
Czech Republic	0.569	0.927	0.613	0.692	2.635	2.880	3.378	2.975
Denmark	0.665	0.933	0.619	0.652	3.003	2.916	3.438	2.764
Georgia	0.502	0.814	0.491	0.538	3.033	3.136	3.383	2.769
Malta	0.628	0.936	0.632	0.665	2.640	2.736	3.146	2.474
Turkey	0.605	0.898	0.594	0.650	2.898	3.004	3.292	2.731
Viet Nam	0.513	0.809	0.497	0.543	3.107	3.140	3.426	2.909

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.79. Standardised factor loadings and unstandardised intercepts for scale T3SATAT

Participating countries/economies	Standardised factor loadings					Unstandardised intercepts				
	TT3G40A	TT3G40B	TT3G40C	TT3G40D	TT3G40E	TT3G40A	TT3G40B	TT3G40C	TT3G40D	TT3G40E
ISCED level 2										
Alberta (Canada)	0.510	0.870	0.865	0.656	0.665	2.876	3.591	3.497	3.314	3.523
Australia	0.547	0.785	0.679	0.623	0.640	2.989	3.541	3.224	3.354	3.418
Austria	0.557	0.805	0.771	0.560	0.504	3.249	3.669	3.520	3.398	3.434
Belgium	0.546	0.792	0.784	0.593	0.628	3.201	3.455	3.373	3.280	3.416
Flemish Community (Belgium)	0.582	0.798	0.817	0.610	0.638	3.327	3.495	3.422	3.286	3.415
Brazil	0.735	0.856	0.837	0.615	0.650	3.393	3.366	3.336	3.139	3.221
Bulgaria	0.446	0.777	0.787	0.461	0.617	2.809	3.398	3.427	2.898	3.337
Ciudad Autónoma de Buenos Aires (Argentina)	0.648	0.895	0.897	0.719	0.721	3.305	3.497	3.433	3.419	3.361
Chile	0.696	0.857	0.866	0.664	0.468	3.361	3.405	3.407	3.260	2.863
Colombia	0.637	0.796	0.816	0.642	0.671	3.361	3.486	3.451	3.330	3.380
Croatia	0.512	0.803	0.806	0.603	0.600	3.226	3.480	3.458	3.303	3.380
Cyprus	0.550	0.809	0.806	0.641	0.673	3.154	3.381	3.347	3.302	3.316
Czech Republic	0.655	0.839	0.824	0.603	0.672	3.412	3.500	3.406	3.151	3.353
Denmark	0.778	0.899	0.776	0.709	0.633	3.527	3.631	3.407	3.571	3.472
England (United Kingdom)	0.545	0.787	0.742	0.659	0.579	2.870	3.457	3.127	3.331	2.965
Estonia	0.665	0.849	0.839	0.630	0.662	3.381	3.503	3.477	3.335	3.381

Participating countries/economies	Standardised factor loadings					Unstandardised intercepts				
	TT3G40A	TT3G40B	TT3G40C	TT3G40D	TT3G40E	TT3G40A	TT3G40B	TT3G40C	TT3G40D	TT3G40E
Finland	0.575	0.865	0.779	0.629	0.754	3.245	3.650	3.495	3.411	3.663
France	0.712	0.842	0.810	0.594	0.625	3.593	3.629	3.560	3.448	3.563
Georgia	0.675	0.852	0.852	0.726	0.702	3.304	3.362	3.372	3.350	3.319
Hungary	0.631	0.834	0.806	0.683	0.659	3.421	3.623	3.553	3.545	3.523
Iceland	0.767	0.842	0.750	0.608	0.462	3.510	3.496	3.330	3.232	3.127
Israel	0.697	0.848	0.732	0.608	0.636	3.541	3.625	3.436	3.439	3.547
Italy	0.822	0.864	0.850	0.726	0.722	3.302	3.338	3.263	3.226	3.221
Japan	0.602	0.811	0.849	0.669	0.641	2.938	3.325	3.360	3.291	3.148
Kazakhstan	0.704	0.774	0.771	0.590	0.689	3.155	3.214	3.258	3.198	3.181
Korea	0.824	0.908	0.848	0.716	0.747	3.533	3.592	3.482	3.445	3.484
Latvia	0.625	0.815	0.823	0.634	0.681	3.134	3.474	3.311	3.238	3.248
Lithuania	0.668	0.866	0.847	0.714	0.723	3.244	3.550	3.432	3.419	3.397
Malta	0.478	0.814	0.767	0.624	0.663	2.701	3.353	3.156	3.130	3.263
Mexico	0.577	0.782	0.798	0.587	0.659	3.259	3.365	3.415	3.168	3.253
Netherlands	0.728	0.631	0.776	0.679	0.676	3.521	3.240	3.334	3.458	3.505
New Zealand	0.620	0.820	0.663	0.649	0.636	3.193	3.560	3.162	3.473	3.438
Norway	0.739	0.838	0.794	0.647	0.655	3.536	3.538	3.389	3.359	3.419
Portugal	0.407	0.756	0.675	0.623	0.563	2.362	3.416	3.271	3.434	3.415
Romania	0.721	0.880	0.888	0.639	0.643	3.319	3.466	3.451	3.263	3.220
Russian Federation	0.553	0.841	0.868	0.670	0.739	3.053	3.386	3.434	3.337	3.372
Saudi Arabia	0.735	0.841	0.853	0.737	0.703	3.260	3.319	3.309	3.437	3.256
Shanghai (China)	0.770	0.928	0.911	0.761	0.792	3.352	3.455	3.393	3.383	3.371
Singapore	0.568	0.807	0.785	0.639	0.682	2.952	3.416	3.220	3.249	3.206
Slovak Republic	0.627	0.848	0.869	0.486	0.720	3.224	3.445	3.401	2.891	3.338
Slovenia	0.499	0.789	0.767	0.566	0.578	3.132	3.547	3.447	3.297	3.436
South Africa[2]	0.602	0.777	0.763	0.585	0.677	3.185	3.327	3.293	3.225	3.289
Spain	0.509	0.815	0.813	0.624	0.694	2.960	3.412	3.398	3.230	3.451
Sweden	0.739	0.837	0.765	0.471	0.541	3.661	3.720	3.623	3.314	3.556
Chinese Taipei	0.807	0.936	0.944	0.749	0.803	3.354	3.473	3.431	3.302	3.367
Turkey	0.596	0.851	0.894	0.690	0.751	2.982	3.353	3.368	3.282	3.315
United Arab Emirates	0.590	0.831	0.836	0.649	0.693	3.094	3.454	3.381	3.405	3.297
United States	0.610	0.880	0.841	0.599	0.653	3.187	3.553	3.451	3.241	3.434
Viet Nam	0.735	0.886	0.889	0.608	0.789	3.091	3.290	3.272	2.898	3.190
ISCED level 1										
Australia[1]	0.603	0.790	0.786	0.684	0.538	2.938	3.412	3.233	3.321	3.025
Flemish Community (Belgium)	0.559	0.610	0.768	0.636	0.532	3.170	3.149	3.340	3.372	3.255
Ciudad Autónoma de Buenos Aires (Argentina)	0.763	0.907	0.878	0.729	0.726	3.305	3.497	3.433	3.419	3.361
Denmark	0.802	0.884	0.716	0.679	0.571	3.546	3.607	3.338	3.540	3.398
England (United Kingdom)	0.661	0.799	0.726	0.716	0.587	2.870	3.457	3.127	3.331	2.965
France	0.581	0.796	0.756	0.654	0.531	3.148	3.463	3.306	3.377	3.214
Japan	0.583	0.810	0.851	0.709	0.544	2.938	3.325	3.360	3.291	3.148
Korea	0.694	0.897	0.794	0.743	0.709	3.528	3.700	3.587	3.658	3.635
Netherlands[1]	0.641	0.596	0.640	0.640	0.594	3.246	2.881	3.067	3.395	3.195
Spain	0.546	0.805	0.814	0.696	0.629	2.954	3.342	3.347	3.314	3.296
Sweden	0.761	0.860	0.742	0.520	0.538	3.661	3.720	3.623	3.314	3.556
Chinese Taipei	0.781	0.929	0.919	0.750	0.735	3.354	3.473	3.431	3.302	3.367
Turkey	0.556	0.844	0.900	0.668	0.732	2.982	3.353	3.368	3.282	3.315
United Arab Emirates	0.642	0.822	0.838	0.701	0.649	3.094	3.454	3.381	3.405	3.297

Participating countries/economies	Standardised factor loadings					Unstandardised intercepts				
	TT3G40A	TT3G40B	TT3G40C	TT3G40D	TT3G40E	TT3G40A	TT3G40B	TT3G40C	TT3G40D	TT3G40E
Viet Nam	0.714	0.885	0.859	0.463	0.506	3.120	3.347	3.322	2.626	2.791
ISCED level 3										
Alberta (Canada)	0.478	0.875	0.839	0.595	0.750	2.876	3.591	3.497	3.314	3.523
Brazil	0.727	0.839	0.815	0.620	0.644	3.393	3.366	3.336	3.139	3.221
Croatia	0.544	0.805	0.817	0.613	0.593	3.226	3.480	3.458	3.303	3.380
Denmark	0.564	0.835	0.761	0.615	0.545	3.374	3.707	3.531	3.572	3.413
Portugal	0.397	0.774	0.692	0.622	0.557	2.362	3.416	3.271	3.434	3.415
Slovenia	0.556	0.819	0.786	0.593	0.613	3.132	3.547	3.447	3.297	3.436
Sweden	0.695	0.833	0.745	0.434	0.549	3.661	3.720	3.623	3.314	3.556
Chinese Taipei	0.800	0.930	0.921	0.689	0.793	3.354	3.473	3.431	3.302	3.367
Turkey	0.589	0.832	0.864	0.705	0.741	2.982	3.353	3.368	3.282	3.315
United Arab Emirates	0.534	0.816	0.822	0.655	0.699	3.094	3.454	3.381	3.405	3.297
Viet Nam	0.706	0.850	0.854	0.573	0.776	3.170	3.303	3.283	2.984	3.197
TALIS-PISA link										
Australia	0.547	0.813	0.678	0.602	0.661	2.968	3.547	3.213	3.331	3.421
Ciudad Autónoma de Buenos Aires (Argentina)	0.615	0.885	0.884	0.692	0.710	3.118	3.490	3.438	3.400	3.336
Colombia	0.637	0.813	0.837	0.672	0.700	3.281	3.474	3.416	3.369	3.363
Czech Republic	0.671	0.853	0.842	0.581	0.709	3.396	3.476	3.415	3.115	3.360
Denmark	0.676	0.872	0.759	0.681	0.664	3.495	3.644	3.424	3.592	3.518
Georgia	0.684	0.846	0.857	0.750	0.724	3.296	3.329	3.355	3.311	3.307
Malta	0.428	0.789	0.711	0.578	0.632	2.719	3.384	3.166	3.173	3.279
Turkey	0.573	0.839	0.846	0.698	0.743	2.953	3.322	3.323	3.261	3.279
Viet Nam	0.756	0.881	0.891	0.600	0.810	3.084	3.263	3.211	2.864	3.151

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Work stress and well-being: Workplace well-being and stress (T3WELS); Workload stress (T3WLOAD); Student behaviour stress (T3STBEH)

11.35. Measured items

The three scales measuring latent concepts regarding workplace well-being and stress were developed from two question stems:

- "In your experience as a teacher at this school, to what extent do the following occur?" (TT3G51). The question was followed by items on how the teaching profession affects other areas of life, and these were used to form the scale *Workplace well-being and stress* (T3WELS).
- "Thinking about your job at this school, to what extent are the following sources of stress in your work?" (TT3G52). The items about teacher workload that followed this question were used to form the scale *Workload stress* (T3WLOAD), while the items regarding student interaction were used for the scale *Student behaviour stress* (T3STBEH).

These scales are presented in Table 11.80.

11.36. Model improvements

One model improvement was made to the scale T3WLOAD by adding a correlation between items TT3G52D and TT3G52E.

11.37. Scale reliability

Table 11.81 presents the reliability for all populations for the three scales. Here, the reliabilities are above 0.600 for all populations for all scales, and above 0.700 for scale T3WELS. The coefficient for T3WLOAD is below 0.700 for several populations, including Austria and Finland ISCED level 2 and the Flemish Community (Belgium) ISCED level 1. The coefficient for scale T3STBEH is also below 0.700 for several populations: Austria, Estonia, Hungary, Italy and the Slovak Republic ISCED level 2; Denmark ISCED levels 1 and 3; and Ciudad Autónoma de Buenos Aires (Argentina) ISCED level 3.

11.38. Model fits

Table 11.82 presents the model fit indices for scale T3WELS. In general, the model fits are acceptable in most populations. However, there are several populations where the model fit is not acceptable. They include the ISCED level 2 populations in Israel and South Africa, the ISCED level 1 population in Viet Nam, and the TALIS-PISA link populations in Georgia and Viet Nam.

Table 11.83, which presents the fit indices for the scale T3WLOAD, shows a similarly good fit across the populations, with the exception of the Netherlands and Sweden ISCED level 1 populations, and the Denmark and Georgia TALIS-PISA link populations. The fit indices for scale T3STBEH are not presented here because the scale was measured by just three items. Also, because the scale reached only configural invariance for ISCED level 2 (see Table 11.86), those populations deemed insufficient, participating countries with late data delivery, and the TALIS-PISA link populations also have free parameters. The model is therefore just identified for these populations, resulting in the perfect model fit.

11.39. Invariance testing

Table 11.84 presents the results of the invariance testing for scale T3WELS. It reached configural invariance for ISCED levels 1 and 3, and metric invariance for ISCED level 2. The T3WLOAD scale reached metric invariance for ISCED levels 1and 2 and configural invariance for ISCED level 3, as presented in Table 11.85 Lastly, the scale T3STBEH reached configural invariance for all ISCED levels, as shown in Table 11.86 Although the configural model was perfect for this scale for all ISCED levels, the metric models did not reach an acceptable fit.

11.40. Item parameters

Table 11.87 presents the unstandardised factor loadings for scales T3WELS and T3WLOAD.

Table 11.88 presents the standardised factor loadings and unstandardised intercepts for the T3WELS scale. As is evident in the tables, the factor loadings for items TT3G51C and TT3G51D are above 0.600 for all populations, and in nearly all populations for item TT3G51A. However, the factor loadings for item TT3G51B are below 0.450 in all populations, suggesting a weak relationship between this item and the latent factor.

The results for the scale T3WLOAD are presented in Table 11.89. Here, the factor loadings for item TT3G52B are above 0.600 for all populations, and the same can be said for items TT3G52A and TT3G52C for most populations. While the factor loadings for item TT3G52D are above 0.450 for most populations, the factor loading is lower for a good number of populations. The factor loadings for item TT3G52E are weak for almost all populations, suggesting a weak relationship between this item and the latent construct.

The factor loadings for the scale T3STBEH item TT3G52G are above 0.600 in all populations, as depicted in Table 11.80. However, the factor loadings for item TT3G52H are moderate (between 0.450 and 0.600) in many populations and below 0.450 in some populations, while the factor loadings for item TT3G52F are below 0.450 for nearly half the populations. These results suggest the scale is a weak construct in a fair number of populations.

Table 11.80. Item wording for workplace well-being and stress scales

T3WELS: Workplace well-being and stress	
TT3G51: In your experience as a teacher at this school, to what extent do the following occur?	
Response options: “Not at all” (1), “To some extent” (2), “Quite a bit” (3), “A lot” (4).	
TT3G51A	I experience stress in my work
TT3G51B*	My job leaves me time for my personal life
TT3G51C	My job negatively impacts my mental health
TT3G51D	My job negatively impacts my physical health
T3WLOAD: Workload stress	
TT3G52: Thinking about your job at this school, to what extent are the following sources of stress in your work?	
Response options: “Not at all” (1), “To some extent” (2), “Quite a bit” (3), “A lot” (4).	
TT3G52A	Having too much lesson preparation
TT3G52B	Having too many lessons to teach
TT3G52C	Having too much marking
TT3G52D	Having too much administrative work to do (e.g. filling out forms)
TT3G52E	Having extra duties due to absent teachers
T3STBEH: Student behaviour stress	
TT3G52: Thinking about your job at this school, to what extent are the following sources of stress in your work?	
Response options: “Not at all” (1), “To some extent” (2), “Quite a bit” (3), “A lot” (4).	
TT3G52F	Being held responsible for students’ achievement
TT3G52G	Maintaining classroom discipline
TT3G52H	Being intimidated or verbally abused by students

* Item was reverse coded
Source: OECD, TALIS 2018 database.

Table 11.81. Omega coefficients for workplace well-being and stress scales

Participating countries/economies	T3WELS	T3WLOAD	T3STBEH
	Omega coefficient		
ISCED level 2			
Alberta (Canada)	0.872	0.773	0.901
Australia	0.874	0.783	0.771
Austria	0.865	0.682	0.671
Belgium	0.852	0.762	0.759
Flemish Community (Belgium)	0.854	0.717	0.792
Brazil	0.910	0.884	0.773
Bulgaria	0.880	0.933	0.767

Participating countries/economies	T3WELS	T3WLOAD	T3STBEH
	Omega coefficient		
Ciudad Autónoma de Buenos Aires (Argentina)	0.885	0.750	0.706
Chile	0.895	0.817	0.743
Colombia[3]	0.872	0.856	-
Croatia	0.889	0.785	0.826
Cyprus	0.887	0.839	0.803
Czech Republic	0.857	0.755	0.828
Denmark	0.884	0.887	0.719
England (United Kingdom)[3]	0.872	0.767	-
Estonia	0.841	0.824	0.676
Finland	0.797	0.694	0.769
France	0.810	0.771	0.805
Georgia	0.845	0.806	0.956
Hungary	0.859	0.843	0.646
Iceland	0.906	0.792	0.712
Israel[3]	0.882	0.797	-
Italy	0.850	0.876	0.661
Japan[3]	0.899	0.814	-
Kazakhstan	0.874	0.846	0.741
Korea	0.924	0.824	0.830
Latvia	0.843	0.785	0.755
Lithuania	0.884	0.762	0.721
Malta	0.863	0.814	0.766
Mexico	0.857	0.796	0.882
Netherlands[3]	0.859	0.740	-
New Zealand	0.887	0.781	0.824
Norway	0.815	0.764	0.757
Portugal	0.861	0.854	0.856
Romania	0.832	0.906	0.984
Russian Federation	0.878	0.801	0.903
Saudi Arabia	0.906	0.899	0.778
Shanghai (China)	0.865	0.834	0.801
Singapore	0.865	0.812	0.845
Slovak Republic	0.850	0.797	0.681
Slovenia	0.897	0.740	0.797
South Africa[2]	0.852	0.759	0.764
Spain	0.869	0.817	0.872
Sweden	0.874	0.741	0.810
Chinese Taipei	0.895	0.785	0.910
Turkey	0.835	0.769	0.733
United Arab Emirates	0.904	0.872	0.869
United States[3]	0.867	0.797	-
Viet Nam	0.859	0.889	0.776
ISCED level 1			
Australia[1]	0.882	0.792	0.857
Flemish Community (Belgium)	0.867	0.696	0.719
Ciudad Autónoma de Buenos Aires (Argentina)	0.885	0.759	0.717
Denmark	0.857	0.839	0.669
England (United Kingdom)	0.869	0.789	0.835
France	0.819	0.762	0.787

Participating countries/economies	T3WELS	T3WLOAD	T3STBEH
	Omega coefficient		
Japan[3]	0.901	0.854	-
Korea	0.920	0.810	0.815
Netherlands[1]	0.885	0.797	0.978
Spain	0.876	0.824	0.828
Sweden	0.870	0.752	0.709
Chinese Taipei	0.884	0.785	0.908
Turkey	0.859	0.762	0.760
United Arab Emirates	0.906	0.859	0.865
Viet Nam	0.872	0.893	0.796
ISCED level 3			
Alberta (Canada)	0.895	0.785	0.823
Brazil	0.895	0.876	0.767
Croatia	0.867	0.796	0.861
Denmark	0.872	0.878	0.642
Portugal	0.870	0.859	0.846
Slovenia	0.880	0.753	0.769
Sweden	0.852	0.760	0.723
Chinese Taipei	0.901	0.796	0.880
Turkey	0.832	0.776	0.778
United Arab Emirates	0.908	0.887	0.891
Viet Nam	0.845	0.876	0.760
TALIS-PISA link			
Australia	0.863	0.785	0.794
Ciudad Autónoma de Buenos Aires (Argentina)	0.891	0.812	0.658
Colombia[3]	0.854	0.823	
Czech Republic	0.861	0.817	0.837
Denmark	0.863	0.828	0.709
Georgia	0.947	0.884	0.738
Malta	0.845	0.778	0.857
Turkey	0.880	0.821	0.771
Viet Nam	0.922	0.856	0.850

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
3. These participating countries'/economies' reliability coefficient estimation failed in the final scale model due to a negative residual variance for one or more items that could not be corrected; these countries/economies have untrustworthy scale scores for the corresponding ISCED level.
Source: OECD, TALIS 2018 database.

Table 11.82. CFA model-data fit for scale T3WELS

Workplace well-being and stress

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Alberta (Canada)	0.960	0.880	0.128	0.027
Australia	0.971	0.913	0.108	0.024
Austria	0.954	0.863	0.140	0.038
Belgium	0.964	0.891	0.112	0.033
Flemish Community (Belgium)	0.964	0.892	0.126	0.032
Brazil	0.994	0.983	0.051	0.010
Bulgaria	0.980	0.940	0.091	0.024

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Ciudad Autónoma de Buenos Aires (Argentina)	0.994	0.982	0.048	0.014
Chile	0.993	0.978	0.064	0.018
Colombia	0.996	0.987	0.036	0.018
Croatia	0.988	0.963	0.081	0.023
Cyprus	0.961	0.884	0.122	0.033
Czech Republic	0.985	0.956	0.091	0.021
Denmark	0.992	0.977	0.060	0.015
England (United Kingdom)	0.985	0.955	0.100	0.020
Estonia	0.982	0.945	0.079	0.019
Finland	0.972	0.915	0.101	0.026
France	0.984	0.953	0.073	0.019
Georgia	0.996	0.988	0.029	0.009
Hungary	0.990	0.969	0.070	0.020
Iceland	0.981	0.942	0.115	0.025
Israel	0.893	0.680	0.186	0.054
Italy	0.982	0.947	0.080	0.019
Japan	0.988	0.963	0.080	0.019
Kazakhstan	0.994	0.983	0.031	0.011
Korea	0.990	0.969	0.079	0.018
Latvia	0.984	0.951	0.057	0.015
Lithuania	0.991	0.973	0.062	0.014
Malta	0.976	0.927	0.117	0.028
Mexico	1.000	1.000	0.002	0.006
Netherlands	0.978	0.933	0.080	0.026
New Zealand	0.980	0.941	0.098	0.024
Norway	0.988	0.964	0.065	0.016
Portugal	0.996	0.989	0.040	0.010
Romania	0.992	0.977	0.039	0.016
Russian Federation	1.000	1.003	0.000	0.003
Saudi Arabia	0.974	0.923	0.096	0.032
Shanghai (China)	0.993	0.979	0.052	0.015
Singapore	0.986	0.958	0.076	0.022
Slovak Republic	0.990	0.969	0.056	0.016
Slovenia	0.997	0.990	0.050	0.010
South Africa[2]	0.850	0.850	0.093	0.157
Spain	0.971	0.913	0.077	0.025
Sweden	0.969	0.908	0.110	0.026
Chinese Taipei	0.992	0.977	0.056	0.012
Turkey	0.999	0.996	0.018	0.007
United Arab Emirates	0.980	0.941	0.092	0.028
United States	0.989	0.968	0.041	0.019
Viet Nam	0.954	0.862	0.164	0.036
ISCED level 1				
Australia[1]	0.966	0.966	0.073	0.071
Flemish Community (Belgium)	0.974	0.921	0.109	0.027
Ciudad Autónoma de Buenos Aires (Argentina)	0.992	0.976	0.065	0.020
Denmark	0.981	0.944	0.087	0.020
England (United Kingdom)	0.965	0.896	0.109	0.029
France	0.982	0.946	0.064	0.023
Japan	0.989	0.967	0.071	0.017
Korea	0.995	0.986	0.041	0.011
Netherlands[1]	0.946	0.946	0.090	0.122

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Spain	0.976	0.929	0.072	0.026
Sweden	0.958	0.873	0.140	0.029
Chinese Taipei	0.994	0.981	0.050	0.012
Turkey	0.996	0.988	0.027	0.013
United Arab Emirates	0.988	0.963	0.069	0.024
Viet Nam	0.892	0.677	0.249	0.044
ISCED level 3				
Alberta (Canada)	0.977	0.932	0.110	0.023
Brazil	0.999	0.997	0.017	0.007
Croatia	0.988	0.965	0.059	0.017
Denmark	0.985	0.954	0.086	0.018
Portugal	0.995	0.986	0.043	0.010
Slovenia	0.991	0.974	0.062	0.015
Sweden	0.963	0.890	0.112	0.026
Chinese Taipei	0.982	0.947	0.106	0.021
Turkey	1.000	0.999	0.009	0.005
United Arab Emirates	0.984	0.951	0.083	0.025
Viet Nam	0.945	0.836	0.151	0.034
TALIS-PISA link				
Australia	0.957	0.957	0.089	0.090
Ciudad Autónoma de Buenos Aires (Argentina)	0.980	0.980	0.052	0.089
Colombia	0.991	0.991	0.029	0.079
Czech Republic	0.971	0.971	0.047	0.090
Denmark	0.979	0.979	0.054	0.043
Georgia	0.703	0.703	0.107	0.556
Malta	0.960	0.960	0.079	0.069
Turkey	0.936	0.936	0.053	0.183
Viet Nam	0.367	0.367	0.267	0.513

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.83. CFA model-data fit for scale T3WLOAD

Workload stress

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Alberta (Canada)	0.970	0.925	0.062	0.024
Australia	0.980	0.950	0.053	0.020
Austria	0.933	0.833	0.103	0.037
Belgium	0.946	0.864	0.096	0.031
Flemish Community (Belgium)	0.953	0.882	0.082	0.027
Brazil	0.973	0.933	0.079	0.021
Bulgaria	0.957	0.893	0.106	0.043
Ciudad Autónoma de Buenos Aires (Argentina)	0.971	0.927	0.056	0.023
Chile	0.988	0.969	0.052	0.015
Colombia	0.994	0.984	0.033	0.011
Croatia	0.986	0.966	0.050	0.019
Cyprus	0.997	0.994	0.025	0.010
Czech Republic	0.960	0.901	0.084	0.027
Denmark	0.976	0.939	0.086	0.029

Participating countries/economies	CFI	TLI	RMSEA	SRMR
England (United Kingdom)	0.956	0.891	0.089	0.030
Estonia	0.990	0.974	0.049	0.015
Finland	0.992	0.979	0.034	0.014
France	0.965	0.912	0.081	0.028
Georgia	0.976	0.939	0.066	0.023
Hungary	0.976	0.940	0.080	0.022
Iceland	0.939	0.847	0.116	0.033
Israel	0.987	0.966	0.051	0.018
Italy	0.956	0.891	0.104	0.033
Japan	0.986	0.965	0.053	0.017
Kazakhstan	0.991	0.976	0.042	0.015
Korea	0.991	0.977	0.043	0.014
Latvia	0.991	0.977	0.039	0.014
Lithuania	0.993	0.982	0.033	0.015
Malta	0.971	0.927	0.082	0.026
Mexico	0.969	0.922	0.080	0.022
Netherlands	0.982	0.955	0.047	0.022
New Zealand	0.953	0.884	0.081	0.029
Norway	0.956	0.889	0.085	0.028
Portugal	0.980	0.949	0.072	0.025
Romania	0.970	0.926	0.084	0.040
Russian Federation	0.979	0.948	0.044	0.020
Saudi Arabia	0.976	0.941	0.078	0.030
Shanghai (China)	0.997	0.992	0.026	0.009
Singapore	0.978	0.945	0.066	0.021
Slovak Republic	0.968	0.920	0.085	0.024
Slovenia	0.981	0.951	0.059	0.020
South Africa[2]	0.905	0.894	0.069	0.112
Spain	0.971	0.927	0.058	0.022
Sweden	0.938	0.845	0.081	0.037
Chinese Taipei	0.996	0.990	0.027	0.009
Turkey	0.989	0.972	0.041	0.014
United Arab Emirates	0.974	0.934	0.080	0.021
United States	0.984	0.959	0.026	0.017
Viet Nam	0.991	0.977	0.050	0.014
ISCED level 1				
Australia[1]	0.949	0.943	0.065	0.064
Flemish Community (Belgium)	0.966	0.916	0.072	0.025
Ciudad Autónoma de Buenos Aires (Argentina)	0.904	0.759	0.105	0.045
Denmark	0.958	0.895	0.095	0.043
England (United Kingdom)	0.981	0.953	0.056	0.020
France	0.987	0.967	0.041	0.019
Japan	0.984	0.960	0.062	0.019
Korea	0.968	0.920	0.076	0.028
Netherlands[1]	0.895	0.884	0.091	0.103
Spain	0.981	0.952	0.050	0.021
Sweden	0.865	0.663	0.155	0.048
Chinese Taipei	0.996	0.991	0.024	0.011
Turkey	0.992	0.981	0.026	0.015
United Arab Emirates	0.983	0.957	0.062	0.017
Viet Nam	0.995	0.987	0.043	0.011
ISCED level 3				

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Alberta (Canada)	0.990	0.974	0.041	0.021
Brazil	0.979	0.948	0.069	0.020
Croatia	0.992	0.979	0.045	0.015
Denmark	0.964	0.910	0.082	0.033
Portugal	0.985	0.964	0.055	0.019
Slovenia	0.947	0.868	0.094	0.033
Sweden	0.947	0.868	0.092	0.032
Chinese Taipei	0.999	0.997	0.014	0.008
Turkey	0.976	0.939	0.045	0.019
United Arab Emirates	0.985	0.961	0.064	0.017
Viet Nam	0.990	0.975	0.048	0.014
TALIS-PISA link				
Australia	0.974	0.971	0.053	0.033
Ciudad Autónoma de Buenos Aires (Argentina)	0.901	0.890	0.070	0.114
Colombia	0.986	0.984	0.034	0.084
Czech Republic	0.946	0.940	0.049	0.126
Denmark	0.889	0.877	0.107	0.184
Georgia	0.805	0.783	0.077	0.292
Malta	0.977	0.974	0.050	0.056
Turkey	0.908	0.897	0.052	0.138
Viet Nam	0.951	0.945	0.061	0.111

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.84. Invariance test results for scale T3WELS

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level of ISCED level 2								
Configural	0.983	0.948	0.080	0.022				
Metric	0.948	0.936	0.088	0.090	0.035	0.012	-0.008	-0.068
Scalar	0.710	0.779	0.164	0.211	0.238	0.157	-0.076	-0.121
Invariance level of ISCED level 1								
Configural	0.977	0.932	0.091	0.025				
Metric	0.904	0.879	0.121	0.133	0.073	0.053	-0.030	-0.108
Scalar	0.724	0.780	0.164	0.264	0.180	0.099	-0.043	-0.131
Invariance level of ISCED level 3								
Configural	0.984	0.953	0.077	0.020				
Metric	0.904	0.879	0.124	0.138	0.080	0.074	-0.047	-0.118
Scalar	0.746	0.796	0.161	0.283	0.158	0.083	-0.037	-0.145

Note: See endnote 34.
Source: OECD, TALIS 2018 database.

Table 11.85. Invariance test results for scale T3WLOAD

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level of ISCED level 2								
Configural	0.976	0.939	0.067	0.024				
Metric	0.949	0.936	0.068	0.069	0.027	0.003	-0.001	-0.045
Scalar	0.762	0.799	0.121	0.136	0.187	0.137	-0.053	-0.067
Invariance level of ISCED level 1								
Configural	0.977	0.943	0.062	0.025				
Metric	0.954	0.940	0.064	0.064	0.023	0.003	-0.002	-0.039
Scalar	0.714	0.749	0.131	0.155	0.240	0.191	-0.067	-0.091
Invariance level of ISCED level 3								
Configural	0.980	0.951	0.062	0.021				
Metric	0.938	0.919	0.080	0.087	0.042	0.032	-0.018	-0.066
Scalar	0.815	0.836	0.113	0.120	0.123	0.083	-0.033	-0.033

Note: See endnote 34.
Source: OECD, TALIS 2018 database.

Table 11.86. Invariance test results for scale T3STBEH

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level of ISCED level 2								
Configural	1.000	1.000	0.000	0.000				
Metric	0.934	0.899	0.096	0.082	0.066	0.101	-0.096	-0.082
Scalar	0.706	0.775	0.144	0.163	0.228	0.124	-0.048	-0.081
Invariance level of ISCED level 1								
Configural	1.000	1.000	0.000	0.000				
Metric	0.929	0.885	0.100	0.103	0.071	0.115	-0.100	-0.103
Scalar	0.739	0.788	0.136	0.159	0.190	0.097	-0.036	-0.056
Invariance level of ISCED level 3								
Configural	1.000	1.000	0.000	0.000				
Metric	0.915	0.860	0.114	0.101	0.085	0.140	-0.114	-0.101
Scalar	0.739	0.785	0.141	0.137	0.176	0.075	-0.027	-0.036

Note: See endnote 34.
Source: OECD, TALIS 2018 database.

Table 11.87. Unstandardised factor loadings for T3WELS, T3WLOAD and T3STBEH for all countries for all populations

T3WELS (Metric)		T3WLOAD (Metric)	
TT3G51A	0.561	TT3G52A	0.629
TT3G51B	0.209	TT3G52B	0.707
TT3G51C	0.767	TT3G52C	0.685
TT3G51D	0.692	TT3G52D	0.464
		TT3G52E	0.352

Source: OECD, TALIS 2018 database.

Table 11.88. Standardised factor loadings and unstandardised intercepts for scale T3WELS

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G51A	TT3G51B	TT3G51C	TT3G51D	TT3G51A	TT3G51B	TT3G51C	TT3G51D
ISCED level 2								
Alberta (Canada)	0.673	0.331	0.899	0.794	2.814	2.748	2.085	1.957
Australia	0.716	0.315	0.894	0.800	2.794	2.685	2.078	1.914
Austria	0.651	0.278	0.880	0.827	2.464	2.317	1.743	1.676
Belgium	0.685	0.317	0.879	0.758	2.790	2.113	2.208	2.057
Flemish Community (Belgium)	0.700	0.314	0.875	0.773	2.947	2.208	2.130	1.848
Brazil	0.680	0.336	0.928	0.862	2.354	2.607	2.019	2.050
Bulgaria	0.689	0.300	0.893	0.836	2.710	2.752	2.192	1.932
Ciudad Autónoma de Buenos Aires (Argentina)	0.607	0.261	0.918	0.801	2.155	2.643	1.479	1.618
Chile	0.671	0.318	0.913	0.846	2.607	2.778	1.924	1.842
Colombia	0.677	0.332	0.891	0.816	2.501	1.806	1.870	2.065
Croatia	0.674	0.291	0.909	0.834	2.214	2.409	1.639	1.619
Cyprus	0.646	0.303	0.908	0.837	2.578	2.622	2.113	1.981
Czech Republic	0.674	0.266	0.878	0.797	2.307	2.355	1.983	1.717
Denmark	0.710	0.330	0.904	0.810	2.619	1.918	2.078	1.715
England (United Kingdom)	0.721	0.334	0.895	0.781	3.052	2.856	2.273	2.069
Estonia	0.650	0.274	0.864	0.775	2.707	2.484	1.952	1.764
Finland	0.617	0.258	0.828	0.716	2.507	2.376	1.747	1.581
France	0.629	0.303	0.834	0.743	2.440	2.136	2.024	2.115
Georgia	0.591	0.171	0.877	0.773	1.351	2.659	1.256	1.261
Hungary	0.687	0.328	0.864	0.828	2.941	2.095	1.932	2.046
Iceland	0.668	0.279	0.931	0.828	2.688	2.974	1.928	1.825
Israel	0.569	0.304	0.908	0.829	2.492	2.738	1.825	1.818
Italy	0.609	0.294	0.874	0.799	2.206	2.275	1.555	1.645
Japan	0.696	0.310	0.921	0.828	2.573	2.817	2.070	1.992
Kazakhstan	0.673	0.246	0.898	0.804	1.653	2.705	1.649	1.679
Korea	0.725	0.300	0.941	0.871	2.528	2.891	2.307	2.180
Latvia	0.662	0.302	0.858	0.790	2.806	2.299	2.342	2.250
Lithuania	0.726	0.307	0.902	0.821	2.339	2.478	2.158	1.971
Malta	0.689	0.298	0.878	0.812	2.884	2.603	2.037	1.916
Mexico	0.593	0.224	0.885	0.801	2.171	2.530	1.541	1.562
Netherlands	0.600	0.248	0.893	0.782	2.268	2.401	1.631	1.504
New Zealand	0.696	0.323	0.914	0.798	2.827	2.705	2.091	1.923
Norway	0.581	0.244	0.842	0.765	2.528	2.135	1.712	1.484
Portugal	0.744	0.326	0.869	0.800	3.215	2.419	2.724	2.636
Romania	0.602	0.237	0.850	0.793	1.994	2.497	1.495	1.572
Russian Federation	0.708	0.247	0.903	0.799	2.010	2.778	1.914	1.824
Saudi Arabia	0.691	0.292	0.928	0.841	2.235	2.718	2.154	2.229
Shanghai (China)	0.650	0.326	0.885	0.812	2.470	2.812	1.759	1.975
Singapore	0.674	0.313	0.882	0.809	2.822	2.729	1.993	2.057
Slovak Republic	0.674	0.283	0.869	0.791	2.455	2.464	1.999	1.759
Slovenia	0.695	0.318	0.921	0.823	2.561	2.512	1.931	1.855
South Africa[2]	0.680	0.278	0.917	0.849	2.794	2.718	2.055	2.074
Spain	0.647	0.281	0.890	0.820	2.313	2.448	1.685	1.656
Sweden	0.680	0.292	0.902	0.792	2.530	2.496	2.012	1.729
Chinese Taipei	0.696	0.300	0.912	0.849	2.444	2.612	2.045	2.097

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G51A	TT3G51B	TT3G51C	TT3G51D	TT3G51A	TT3G51B	TT3G51C	TT3G51D
Turkey	0.649	0.266	0.856	0.780	2.135	2.469	1.724	1.865
United Arab Emirates	0.705	0.306	0.921	0.857	2.823	2.448	2.192	2.234
United States	0.632	0.286	0.887	0.818	2.757	2.494	1.862	1.711
Viet Nam	0.603	0.185	0.886	0.803	2.100	3.227	1.491	1.555
ISCED level 1								
Australia[1]	0.688	0.309	0.913	0.807	2.765	2.707	2.078	1.902
Flemish Community (Belgium)	0.714	0.330	0.891	0.778	2.947	2.208	2.130	1.848
Ciudad Autónoma de Buenos Aires (Argentina)	0.644	0.317	0.903	0.848	2.155	2.643	1.479	1.618
Denmark	0.714	0.319	0.877	0.781	2.619	1.918	2.078	1.715
England (United Kingdom)	0.696	0.318	0.892	0.790	3.052	2.856	2.273	2.069
France	0.673	0.328	0.829	0.761	2.440	2.136	2.024	2.115
Japan	0.686	0.312	0.924	0.827	2.573	2.817	2.070	1.992
Korea	0.736	0.280	0.936	0.874	2.528	2.891	2.307	2.180
Netherlands[1]	0.648	0.277	0.882	0.811	2.377	2.492	1.733	1.574
Spain	0.619	0.270	0.904	0.809	2.313	2.448	1.685	1.656
Sweden	0.685	0.295	0.897	0.786	2.530	2.496	2.012	1.729
Chinese Taipei	0.703	0.297	0.900	0.835	2.444	2.612	2.045	2.097
Turkey	0.669	0.280	0.881	0.801	2.135	2.469	1.724	1.865
United Arab Emirates	0.717	0.315	0.924	0.857	2.823	2.448	2.192	2.234
Viet Nam	0.585	0.182	0.900	0.816	2.100	3.227	1.491	1.555
ISCED level 3								
Alberta (Canada)	0.675	0.328	0.924	0.798	2.814	2.748	2.085	1.957
Brazil	0.675	0.332	0.913	0.850	2.354	2.607	2.019	2.050
Croatia	0.641	0.266	0.894	0.797	2.214	2.409	1.639	1.619
Denmark	0.709	0.320	0.891	0.805	2.619	1.918	2.078	1.715
Portugal	0.742	0.338	0.878	0.814	3.215	2.419	2.724	2.636
Slovenia	0.674	0.291	0.905	0.808	2.561	2.512	1.931	1.855
Sweden	0.678	0.286	0.871	0.791	2.530	2.496	2.012	1.729
Chinese Taipei	0.709	0.324	0.915	0.858	2.444	2.612	2.045	2.097
Turkey	0.659	0.262	0.850	0.772	2.135	2.469	1.724	1.865
United Arab Emirates	0.712	0.306	0.925	0.859	2.823	2.448	2.192	2.234
Viet Nam	0.617	0.185	0.875	0.777	2.100	3.227	1.491	1.555
TALIS-PISA link								
Australia	0.697	0.316	0.905	0.794	2.857	2.735	2.184	1.986
Ciudad Autónoma de Buenos Aires (Argentina)	0.615	0.277	0.893	0.837	2.236	2.706	1.565	1.662
Colombia	0.681	0.327	0.894	0.811	2.474	1.817	1.821	2.004
Czech Republic	0.661	0.250	0.855	0.785	2.292	2.318	1.961	1.684
Denmark	0.685	0.311	0.871	0.819	2.567	1.889	2.039	1.700
Georgia	0.621	0.180	0.889	0.830	1.331	2.668	1.252	1.243
Malta	0.685	0.309	0.880	0.816	2.857	2.626	2.010	1.918
Turkey	0.631	0.249	0.854	0.741	2.076	2.502	1.610	1.761
Viet Nam	0.610	0.181	0.885	0.785	2.094	3.234	1.462	1.520

1. Data from participating country/economy rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.89. Standardised factor loadings and unstandardised intercepts for scale T3WLOAD

Participating countries/economies	Standardised factor loadings					Unstandardised intercepts				
	TT3G52A	TT3G52B	TT3G52C	TT3G52D	TT3G52E	TT3G52A	TT3G52B	TT3G52C	TT3G52D	TT3G52E
ISCED level 2										
Alberta (Canada)	0.715	0.746	0.651	0.453	0.387	2.201	2.040	2.428	2.191	1.583
Australia	0.707	0.749	0.697	0.475	0.382	2.145	1.937	2.426	2.672	1.958
Austria	0.613	0.685	0.557	0.378	0.315	2.046	1.649	2.209	2.494	2.192
Belgium	0.678	0.743	0.671	0.453	0.353	2.408	1.879	2.533	2.838	2.189
Flemish Community (Belgium)	0.592	0.736	0.599	0.422	0.304	2.259	1.568	2.433	2.978	2.230
Brazil	0.830	0.863	0.806	0.550	0.454	2.144	2.241	2.529	2.271	1.789
Bulgaria	0.891	0.945	0.741	0.514	0.446	2.040	2.042	2.073	2.712	1.910
Ciudad Autónoma de Buenos Aires (Argentina)	0.721	0.696	0.600	0.454	0.436	1.637	1.704	2.215	1.772	1.308
Chile	0.743	0.784	0.748	0.507	0.370	2.348	2.344	2.565	2.616	2.266
Colombia	0.776	0.824	0.809	0.520	0.412	2.401	2.236	2.628	2.478	2.240
Croatia	0.723	0.722	0.720	0.468	0.411	2.176	1.774	2.196	2.677	1.775
Cyprus	0.780	0.764	0.802	0.539	0.431	2.312	2.249	2.498	2.252	2.064
Czech Republic	0.658	0.727	0.695	0.410	0.345	1.932	1.703	2.004	2.794	2.104
Denmark	0.847	0.873	0.770	0.566	0.449	2.743	2.690	2.574	2.543	2.070
England (United Kingdom)	0.692	0.699	0.708	0.515	0.350	2.345	2.269	2.998	2.860	2.083
Estonia	0.744	0.795	0.747	0.536	0.439	2.079	1.861	2.055	2.146	1.920
Finland	0.609	0.690	0.587	0.374	0.352	1.962	1.537	1.912	2.175	1.572
France	0.689	0.748	0.665	0.470	0.411	2.580	2.106	2.724	2.664	1.662
Georgia	0.679	0.795	0.729	0.444	0.469	1.605	1.417	1.476	1.730	1.351
Hungary	0.735	0.781	0.822	0.561	0.424	2.068	2.362	2.185	2.826	2.468
Iceland	0.728	0.749	0.719	0.458	0.357	1.930	1.948	2.008	2.364	2.107
Israel	0.720	0.766	0.712	0.489	0.400	2.254	2.204	2.515	2.205	1.949
Italy	0.823	0.885	0.701	0.480	0.413	2.108	1.990	2.287	2.294	1.820
Japan	0.756	0.759	0.748	0.480	0.398	2.109	1.926	1.988	2.656	1.752
Kazakhstan	0.750	0.825	0.786	0.505	0.450	2.097	1.882	2.030	2.196	1.715
Korea	0.775	0.768	0.757	0.455	0.431	1.921	2.074	1.844	2.585	1.638
Latvia	0.660	0.725	0.759	0.492	0.401	2.684	2.014	2.033	2.339	2.041
Lithuania	0.699	0.739	0.645	0.454	0.350	2.441	1.940	2.280	2.581	1.965
Malta	0.752	0.770	0.729	0.534	0.393	2.729	2.514	2.682	2.493	2.306
Mexico	0.703	0.793	0.701	0.396	0.375	1.750	1.519	1.957	2.167	1.506
Netherlands	0.677	0.671	0.671	0.471	0.350	1.825	1.787	2.090	2.451	1.918
New Zealand	0.720	0.736	0.687	0.493	0.380	2.160	1.928	2.513	2.848	1.890
Norway	0.718	0.717	0.659	0.457	0.356	2.273	2.021	2.485	2.484	2.032
Portugal	0.798	0.830	0.769	0.493	0.377	2.918	2.880	3.144	3.088	2.027
Romania	0.876	0.912	0.732	0.471	0.393	1.855	1.836	2.008	2.381	1.850
Russian Federation	0.689	0.788	0.722	0.426	0.428	1.789	1.742	1.911	2.253	1.575
Saudi Arabia	0.828	0.894	0.830	0.567	0.437	2.701	2.779	2.845	2.287	2.418
Shanghai (China)	0.803	0.797	0.715	0.464	0.456	2.111	2.140	2.184	1.886	1.618
Singapore	0.757	0.784	0.694	0.502	0.398	2.242	2.088	2.496	2.625	2.016
Slovak Republic	0.704	0.755	0.747	0.465	0.389	2.094	1.796	1.927	2.606	2.041
Slovenia	0.666	0.698	0.660	0.445	0.352	2.154	1.744	2.111	2.721	2.213
South Africa[2]	0.712	0.778	0.754	0.527	0.364	2.553	2.573	3.133	2.851	2.210
Spain	0.752	0.769	0.747	0.483	0.426	2.238	2.178	2.468	2.452	1.736
Sweden	0.680	0.679	0.668	0.478	0.314	2.167	2.301	2.560	2.884	2.437

Participating countries/economies	Standardised factor loadings					Unstandardised intercepts				
	TT3G52A	TT3G52B	TT3G52C	TT3G52D	TT3G52E	TT3G52A	TT3G52B	TT3G52C	TT3G52D	TT3G52E
Chinese Taipei	0.735	0.732	0.710	0.379	0.408	1.936	2.017	2.017	2.259	1.849
Turkey	0.728	0.724	0.668	0.442	0.354	1.842	1.928	2.036	2.188	1.797
United Arab Emirates	0.799	0.834	0.824	0.584	0.463	2.529	2.547	2.628	2.421	2.448
United States	0.729	0.775	0.682	0.472	0.397	2.093	1.896	2.211	2.064	1.586
Viet Nam	0.814	0.874	0.822	0.566	0.527	2.338	2.117	2.166	2.110	1.649
ISCED level 1										
Australia[1]	0.724	0.760	0.738	0.498	0.420	2.333	2.047	2.164	2.512	1.589
Flemish Community (Belgium)	0.602	0.696	0.576	0.430	0.294	2.259	1.568	2.433	2.978	2.230
Ciudad Autónoma de Buenos Aires (Argentina)	0.721	0.725	0.633	0.461	0.308	1.673	1.661	2.025	1.807	1.953
Denmark	0.799	0.809	0.717	0.529	0.411	2.874	2.804	2.237	2.631	2.135
England (United Kingdom)	0.727	0.736	0.700	0.516	0.378	2.449	2.002	2.599	2.729	1.809
France	0.681	0.721	0.692	0.469	0.356	2.876	2.163	2.597	2.742	1.950
Japan	0.815	0.811	0.764	0.540	0.403	2.109	1.926	1.988	2.656	1.752
Korea	0.749	0.738	0.776	0.368	0.392	1.921	2.074	1.844	2.585	1.638
Netherlands[1]	0.679	0.685	0.679	0.475	0.311	1.908	1.815	2.029	3.078	1.890
Spain	0.773	0.784	0.742	0.471	0.427	2.238	2.178	2.468	2.452	1.736
Sweden	0.675	0.699	0.694	0.454	0.314	2.059	2.033	2.345	2.749	2.536
Chinese Taipei	0.751	0.765	0.629	0.381	0.415	1.863	1.838	2.026	2.339	1.470
Turkey	0.714	0.696	0.684	0.445	0.401	1.842	1.928	2.036	2.188	1.797
United Arab Emirates	0.801	0.813	0.800	0.576	0.444	2.529	2.547	2.628	2.421	2.448
Viet Nam	0.843	0.873	0.809	0.611	0.548	2.338	2.117	2.166	2.110	1.649
ISCED level 3										
Alberta (Canada)	0.724	0.771	0.647	0.449	0.385	2.201	2.040	2.428	2.191	1.583
Brazil	0.813	0.849	0.816	0.532	0.437	2.144	2.241	2.529	2.271	1.789
Croatia	0.712	0.772	0.710	0.462	0.422	2.176	1.774	2.196	2.677	1.775
Denmark	0.850	0.877	0.674	0.520	0.429	2.666	2.628	2.684	2.281	1.936
Portugal	0.813	0.835	0.764	0.502	0.398	2.918	2.880	3.144	3.088	2.027
Slovenia	0.713	0.675	0.670	0.459	0.374	2.046	1.933	2.198	2.485	2.147
Sweden	0.702	0.711	0.671	0.477	0.352	2.125	2.248	2.582	2.724	1.893
Chinese Taipei	0.738	0.744	0.731	0.386	0.426	2.016	2.081	2.076	2.341	1.743
Turkey	0.723	0.740	0.675	0.444	0.368	1.842	1.928	2.036	2.188	1.797
United Arab Emirates	0.819	0.852	0.846	0.592	0.474	2.529	2.547	2.628	2.421	2.448
Viet Nam	0.805	0.850	0.813	0.552	0.537	2.338	2.117	2.166	2.110	1.649
TALIS-PISA link										
Australia	0.724	0.752	0.697	0.489	0.381	2.175	1.983	2.546	2.815	1.940
Ciudad Autónoma de Buenos Aires (Argentina)	0.730	0.738	0.651	0.460	0.421	1.734	1.793	2.375	1.921	1.385
Colombia	0.781	0.812	0.792	0.521	0.396	2.368	2.207	2.613	2.444	2.153
Czech Republic	0.662	0.729	0.700	0.404	0.344	1.934	1.762	2.017	2.693	2.034
Denmark	0.838	0.861	0.735	0.552	0.436	2.793	2.669	2.692	2.568	2.063
Georgia	0.642	0.786	0.718	0.414	0.443	1.607	1.371	1.443	1.730	1.340
Malta	0.755	0.750	0.704	0.516	0.385	2.694	2.527	2.760	2.577	2.344
Turkey	0.729	0.749	0.670	0.440	0.369	1.777	1.852	2.066	2.109	1.806
Viet Nam	0.816	0.860	0.818	0.595	0.519	2.382	2.121	2.199	2.176	1.657

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.90. Standardised factor loadings and unstandardised intercepts for scale T3STBEH

Participating countries/economies	Standardised factor loadings			Unstandardised intercepts		
	TT3G52F	TT3G52G	TT3G52H	TT3G52F	TT3G52G	TT3G52H
ISCED level 2						
Alberta (Canada)	0.349	0.946	0.539	2.327	2.096	1.428
Australia	0.356	0.824	0.724	2.268	2.047	1.527
Austria	0.483	0.677	0.686	2.050	2.274	1.357
Belgium	0.389	0.804	0.729	2.495	2.517	1.858
Flemish Community (Belgium)	0.378	0.857	0.682	2.458	2.322	1.648
Brazil	0.685	0.825	0.531	2.603	2.593	2.180
Bulgaria	0.556	0.849	0.460	2.761	2.872	1.866
Ciudad Autónoma de Buenos Aires (Argentina)	0.588	0.727	0.653	1.723	2.051	1.391
Chile	0.580	0.818	0.508	2.697	2.462	1.647
Colombia	0.622	1.022	0.431	2.683	2.485	2.060
Croatia	0.373	0.901	0.481	2.588	2.184	1.409
Cyprus	0.425	0.870	0.652	2.567	2.321	1.857
Czech Republic	0.366	0.901	0.515	2.367	2.159	1.344
Denmark	0.448	0.789	0.633	2.084	2.028	1.451
England (United Kingdom)	0.338	1.039	0.530	2.978	2.118	1.549
Estonia	0.378	0.775	0.538	2.480	2.134	1.628
Finland	0.359	0.833	0.694	2.006	2.096	1.555
France	0.434	0.877	0.591	2.522	2.649	1.894
Georgia	0.612	0.978	0.246	1.793	1.685	1.131
Hungary	0.537	0.689	0.584	1.781	2.444	1.307
Iceland	0.454	0.795	0.578	1.976	2.238	1.617
Israel	0.526	1.016	0.307	2.742	2.628	1.392
Italy	0.466	0.731	0.584	2.165	2.313	1.390
Japan	0.516	1.031	0.346	2.337	2.187	1.402
Kazakhstan	0.613	0.790	0.614	2.105	1.850	1.507
Korea	0.559	0.891	0.611	2.109	2.456	2.030
Latvia	0.341	0.851	0.503	3.052	2.685	1.711
Lithuania	0.333	0.778	0.694	2.945	2.417	1.963
Malta	0.423	0.822	0.703	2.394	2.524	1.815
Mexico	0.606	0.933	0.425	2.133	1.884	1.399
Netherlands	0.356	1.044	0.491	2.163	1.836	1.294
New Zealand	0.403	0.890	0.648	2.460	2.110	1.522
Norway	0.419	0.846	0.527	1.934	1.776	1.338
Portugal	0.369	0.915	0.635	3.119	3.013	2.269
Romania	0.525	0.992	0.520	2.383	2.140	1.514
Russian Federation	0.340	0.948	0.476	2.317	1.748	1.333
Saudi Arabia	0.692	0.845	0.312	2.913	2.838	1.563
Shanghai (China)	0.309	0.886	0.439	2.677	1.902	1.262
Singapore	0.413	0.908	0.601	2.616	2.180	1.482
Slovak Republic	0.470	0.739	0.624	2.430	2.361	1.459
Slovenia	0.355	0.882	0.459	2.570	2.445	1.355
South Africa[2]	0.398	0.833	0.663	3.153	2.757	2.154
Spain	0.433	0.930	0.440	2.320	2.414	1.536
Sweden	0.416	0.886	0.533	2.336	1.989	1.499
Chinese Taipei	0.533	0.951	0.415	2.439	2.216	1.401
Turkey	0.522	0.820	0.482	2.336	2.174	1.398
United Arab Emirates	0.613	0.923	0.447	2.572	2.373	1.482
United States	0.291	1.095	0.489	2.233	2.163	1.496

Participating countries/economies	Standardised factor loadings			Unstandardised intercepts		
	TT3G52F	TT3G52G	TT3G52H	TT3G52F	TT3G52G	TT3G52H
Viet Nam	0.803	0.785	0.171	2.703	2.599	1.263
ISCED level 1						
Australia[1]	0.431	0.919	0.536	2.304	2.135	1.441
Flemish Community (Belgium)	0.368	0.787	0.658	2.458	2.322	1.648
Ciudad Autónoma de Buenos Aires (Argentina)	0.601	0.755	0.628	1.723	2.051	1.391
Denmark	0.451	0.753	0.560	2.084	2.028	1.451
England (United Kingdom)	0.291	0.904	0.572	2.815	1.978	1.270
France	0.437	0.867	0.550	3.035	2.813	1.763
Japan	0.546	1.070	0.363	2.337	2.187	1.402
Korea	0.561	0.880	0.580	2.139	2.539	1.832
Netherlands[1]	0.362	0.988	0.444	2.698	1.856	1.247
Spain	0.420	0.901	0.459	2.399	2.288	1.337
Sweden	0.405	0.811	0.491	2.336	1.989	1.499
Chinese Taipei	0.553	0.949	0.460	2.439	2.216	1.401
Turkey	0.556	0.837	0.528	2.336	2.174	1.398
United Arab Emirates	0.624	0.919	0.459	2.572	2.373	1.482
Viet Nam	0.818	0.805	0.208	2.827	2.575	1.168
ISCED level 3						
Alberta (Canada)	0.322	0.898	0.516	2.327	2.096	1.428
Brazil	0.666	0.821	0.543	2.603	2.593	2.180
Croatia	0.375	0.922	0.493	2.588	2.184	1.409
Denmark	0.385	0.677	0.661	2.084	2.028	1.451
Portugal	0.382	0.904	0.677	3.096	2.725	2.042
Slovenia	0.332	0.864	0.463	2.592	2.251	1.325
Sweden	0.370	0.818	0.550	2.336	1.989	1.499
Chinese Taipei	0.535	0.933	0.427	2.439	2.216	1.401
Turkey	0.546	0.856	0.497	2.336	2.174	1.398
United Arab Emirates	0.609	0.938	0.472	2.572	2.373	1.482
Viet Nam	0.779	0.785	0.165	2.591	2.460	1.254
TALIS-PISA link						
Australia	0.380	0.850	0.722	2.347	2.123	1.587
Ciudad Autónoma de Buenos Aires (Argentina)	0.567	0.721	0.515	1.840	2.026	1.330
Colombia	0.607	1.021	0.418	2.627	2.438	1.899
Czech Republic	0.358	0.908	0.498	2.423	2.113	1.327
Denmark	0.411	0.758	0.682	2.123	1.861	1.409
Georgia	0.609	0.826	0.172	1.847	1.653	1.119
Malta	0.376	0.914	0.643	2.446	2.299	1.708
Turkey	0.462	0.853	0.550	2.161	2.027	1.346
Viet Nam	0.704	0.906	0.233	2.641	2.547	1.214

1. Data from participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

School Climate: Teachers' perceived disciplinary climate (T3DISC); Teacher-student relations (T3STUD); Participation among stakeholders (T3STAKE)

11.41. Measured items

Three scales concerning teacher background characteristics were developed from three question stems:

- "How strongly do you agree or disagree with the following statements about this <target class>?" (TT3G41). The stem was followed by items regarding student behaviour that were used to form the scale *Teacher's perceived disciplinary climate* (T3DISC).
- "How strongly do you agree or disagree with the following statements about what happens in this school?" (TT3G49). Items about teacher-student interaction following this question were used to form the scale *Teacher-student relation* (T3STUD).
- "How strongly do you agree or disagree with these statements, as applied to this school?" (TT3G48), followed by items concerning school decision making that were used to form the scale *Participation among stakeholders* (T3STAKE).

These scales are presented in Table 11.91.

11.42. Model improvements

Model improvements were included for scale T3STAKE by initially adding a correlation between items TT3G48D and TT3G48E. After the analysis of each country's/economy's model, a correlation between items TT3G48B and TT3G48C was added, as this improvement was needed for nearly all populations to improve the overall fit of the models.

11.43. Scale reliability

Table 11.92, which presents the reliabilities for all populations for the three scales, shows that all scales have high reliability in all populations.

11.44. Model fits

The model fit indices presented for scale T3DISC in Table 11.93 show acceptable fit for all populations except the TALIS-PISA link population in Viet Nam. All populations exhibit an acceptable fit for scale T3STUD (Table 11.94), and all except the Netherlands ISCED level 1 population for scale T3STAKE (Table 11.95).

11.45. Invariance testing

r present the invariance results for scales T3DISC, T3STUD and T3STAKE respectively. All the scales reached metric invariance for all ISCED levels. The configural models are near perfect for scale T3DISC, and the metric models exhibit acceptable fit, leading to a metric invariant scale.

11.46. Item parameters

Table 11.99 presents the unstandardised factor loadings for the school climate scales, while Table 11.100 presents the standardised factor loadings and unstandardised intercepts for scale T3DISC.

The tables show that the factor loadings for items TT3G41A, TT3G41C and TT3G41D are above 0.600 in all populations. However, the majority of factor loadings for item TT3G41B are between 0.450 and 0.600, suggesting a moderately strong relationship between this item and the latent factor.

Most factor loadings for scale T3STUD presented in Table 11.101 are above 0.600 for items TT3G49A, TT3G49B and TT3G49C. The factor loading for item TT3G49D is

between 0.450 and 0.600 in a fair number of populations, while the loading for the Denmark ISCED level 2 population is below 0.450.

Lastly, for scale T3STAKE, presented in Table 11.102, most factor loadings for all items are above 0.600, with notable exceptions for several items for a number of ISCED level 1 populations and for item TT3G48E for some populations.

Table 11.91. Item wording for school climate scales

T3DISC: Teachers' perceived disciplinary climate	
TT3G41: How strongly do you agree or disagree with the following statements about this <target class>?	
Response options: "Strongly disagree" (1), "Disagree" (2), "Agree" (3), "Strongly agree" (4).	
TT3G41A	When the lesson begins, I have to wait quite a long time for students to quieten down
TT3G41B*	Students in this class take care to create a pleasant learning atmosphere
TT3G41C	I lose quite a lot of time because of students interrupting the lesson
TT3G41D	There is much disruptive noise in this classroom
T3STUD: Teacher-student relations	
TT3G49: How strongly do you agree or disagree with the following statements about what happens in this school?	
Response options: "Strongly disagree" (1), "Disagree" (2), "Agree" (3), "Strongly agree" (4).	
TT3G49A	Teachers and students usually get on well with each other.
TT3G49B	Most teachers believe that the students' well-being is important.
TT3G49C	Most teachers are interested in what students have to say.
TT3G49D	If a student needs extra assistance, the school provides it.
T3STAKE: Participation among stakeholders, teachers	
TT3G48: How strongly do you agree or disagree with these statements, as applied to this school?	
Response options: "Strongly disagree" (1), "Disagree" (2), "Agree" (3), "Strongly agree" (4).	
TT3G48A	This school provides staff with opportunities to actively participate in school decisions.
TT3G48B	This school provides parents or guardians with opportunities to actively participate in school decisions.
TT3G48C	This school provides students with opportunities to actively participate in school decisions.
TT3G48D	This school has a culture of shared responsibility for school issues.
TT3G48E	There is a collaborative school culture which is characterised by mutual support.

* Item was reverse coded.
Source: OECD, TALIS 2018 database.

Table 11.92. Omega coefficients for populations of each participating country/economy

Participating countries/economies	T3DISC	T3STUD	T3STAKE
	Omega coefficient		
ISCED level 2			
Alberta (Canada)	0.901	0.848	0.869
Australia	0.927	0.843	0.834
Austria	0.872	0.808	0.830
Belgium	0.906	0.821	0.812
Flemish Community (Belgium)	0.916	0.819	0.799
Brazil	0.901	0.812	0.880
Bulgaria	0.841	0.857	0.846
Ciudad Autónoma de Buenos Aires (Argentina)	0.861	0.856	0.845
Chile	0.904	0.837	0.882
Colombia	0.869	0.839	0.895
Croatia	0.918	0.823	0.867
Cyprus	0.899	0.815	0.828
Czech Republic	0.910	0.789	0.792

Participating countries/economies	T3DISC	T3STUD	T3STAKE
	Omega coefficient		
Denmark	0.874	0.799	0.762
England (United Kingdom)	0.924	0.843	0.854
Estonia	0.910	0.817	0.852
Finland	0.924	0.843	0.803
France	0.889	0.835	0.792
Georgia	0.834	0.863	0.887
Hungary	0.901	0.830	0.837
Iceland	0.876	0.830	0.856
Israel	0.920	0.845	0.806
Italy	0.880	0.803	0.776
Japan	0.885	0.870	0.774
Kazakhstan	0.774	0.734	0.764
Korea	0.897	0.887	0.893
Latvia	0.863	0.823	0.850
Lithuania	0.882	0.819	0.884
Malta	0.906	0.824	0.837
Mexico	0.814	0.805	0.832
Netherlands	0.878	0.812	0.806
New Zealand	0.901	0.850	0.865
Norway	0.901	0.821	0.783
Portugal	0.903	0.803	0.846
Romania	0.891	0.861	0.826
Russian Federation	0.880	0.835	0.821
Saudi Arabia	0.823	0.870	0.870
Shanghai (China)	0.876	0.920	0.927
Singapore	0.920	0.832	0.835
Slovak Republic	0.901	0.753	0.773
Slovenia	0.884	0.767	0.801
South Africa[2]	0.867	0.776	0.819
Spain	0.903	0.834	0.882
Sweden	0.908	0.814	0.814
Chinese Taipei	0.889	0.861	0.799
Turkey	0.901	0.889	0.904
United Arab Emirates	0.895	0.869	0.882
United States	0.920	0.848	0.845
Viet Nam	0.812	0.796	0.712
ISCED level 1			
Australia[1]	0.889	0.852	0.848
Flemish Community (Belgium)	0.899	0.837	0.790
Ciudad Autónoma de Buenos Aires (Argentina)	0.870	0.869	0.780
Denmark	0.889	0.771	0.799
England (United Kingdom)	0.914	0.878	0.859
France	0.876	0.882	0.731
Japan	0.882	0.880	0.767
Korea	0.872	0.899	0.899
Netherlands[1]	0.891	0.857	0.870
Spain	0.884	0.850	0.869
Sweden	0.889	0.810	0.796
Chinese Taipei	0.867	0.870	0.773
Turkey	0.897	0.914	0.912
United Arab Emirates	0.882	0.872	0.884

Participating countries/economies	T3DISC	T3STUD	T3STAKE
	Omega coefficient		
Viet Nam	0.780	0.834	0.729
ISCED level 3			
Alberta (Canada)	0.891	0.850	0.859
Brazil	0.895	0.824	0.889
Croatia	0.903	0.828	0.870
Denmark	0.895	0.790	0.797
Portugal	0.908	0.815	0.869
Slovenia	0.878	0.774	0.823
Sweden	0.908	0.835	0.846
Chinese Taipei	0.899	0.843	0.830
Turkey	0.901	0.889	0.908
United Arab Emirates	0.891	0.870	0.887
Viet Nam	0.830	0.794	0.752
TALIS-PISA link			
Australia	0.901	0.845	0.848
Ciudad Autónoma de Buenos Aires (Argentina)	0.861	0.812	0.805
Colombia	0.865	0.799	0.863
Czech Republic	0.914	0.846	0.863
Denmark	0.897	0.834	0.808
Georgia	0.908	0.859	0.906
Malta	0.895	0.835	0.828
Turkey	0.893	0.850	0.869
Viet Nam	0.920	0.826	0.865

1. Data from participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.93. CFA model-data fit for scale T3DISC

Teachers perceived disciplinary climate

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Alberta (Canada)	1.000	1.007	0.000	0.005
Australia	1.000	1.000	0.008	0.004
Austria	1.000	1.001	0.000	0.003
Belgium	0.999	0.998	0.016	0.004
Flemish Community (Belgium)	1.000	1.000	0.000	0.004
Brazil	1.000	1.000	0.005	0.005
Bulgaria	0.999	0.997	0.017	0.009
Ciudad Autónoma de Buenos Aires (Argentina)	1.000	1.004	0.000	0.005
Chile	1.000	1.000	0.000	0.005
Colombia	1.000	1.003	0.000	0.005
Croatia	0.999	0.998	0.028	0.007
Cyprus	0.998	0.994	0.027	0.008
Czech Republic	1.000	1.000	0.000	0.003
Denmark	0.999	0.998	0.015	0.007
England (United Kingdom)	0.994	0.983	0.062	0.011
Estonia	1.000	1.001	0.000	0.003
Finland	1.000	0.999	0.017	0.004
France	0.998	0.993	0.041	0.008

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Georgia	0.996	0.989	0.030	0.009
Hungary	0.998	0.994	0.028	0.007
Iceland	0.998	0.994	0.026	0.010
Israel	0.997	0.992	0.038	0.010
Italy	0.996	0.989	0.042	0.010
Japan	0.999	0.997	0.027	0.006
Kazakhstan	0.995	0.985	0.024	0.011
Korea	0.998	0.994	0.030	0.008
Latvia	1.000	1.005	0.000	0.004
Lithuania	0.999	0.996	0.019	0.005
Malta	1.000	0.999	0.015	0.007
Mexico	1.000	1.000	0.000	0.006
Netherlands	1.000	1.000	0.000	0.006
New Zealand	1.000	1.002	0.000	0.004
Norway	1.000	0.999	0.009	0.004
Portugal	1.000	1.000	0.011	0.003
Romania	0.999	0.998	0.017	0.006
Russian Federation	0.998	0.994	0.019	0.007
Saudi Arabia	0.977	0.932	0.075	0.022
Shanghai (China)	1.000	1.003	0.000	0.002
Singapore	1.000	1.001	0.000	0.002
Slovak Republic	0.995	0.984	0.047	0.010
Slovenia	1.000	1.000	0.010	0.004
South Africa[2]	0.985	0.985	0.039	0.118
Spain	0.997	0.991	0.034	0.008
Sweden	1.000	1.002	0.000	0.003
Chinese Taipei	0.994	0.983	0.046	0.012
Turkey	0.996	0.987	0.040	0.011
United Arab Emirates	0.996	0.988	0.031	0.009
United States	0.998	0.993	0.033	0.007
Viet Nam	0.975	0.924	0.059	0.018
ISCED level 1				
Australia[1]	0.993	0.993	0.029	0.042
Flemish Community (Belgium)	0.999	0.997	0.020	0.006
Ciudad Autónoma de Buenos Aires (Argentina)	1.000	1.003	0.000	0.002
Denmark	0.999	0.997	0.019	0.007
England (United Kingdom)	1.000	1.002	0.000	0.004
France	0.997	0.992	0.038	0.008
Japan	1.000	1.000	0.000	0.003
Korea	0.999	0.998	0.017	0.006
Netherlands[1]	0.992	0.992	0.036	0.110
Spain	1.000	1.002	0.000	0.002
Sweden	1.000	1.002	0.000	0.005
Chinese Taipei	0.999	0.997	0.019	0.007
Turkey	0.990	0.970	0.041	0.017
United Arab Emirates	1.000	1.000	0.000	0.003
Viet Nam	1.000	1.002	0.000	0.006
ISCED level 3				
Alberta (Canada)	1.000	1.005	0.000	0.006
Brazil	0.999	0.998	0.015	0.006
Croatia	1.000	1.004	0.000	0.001
Denmark	0.999	0.996	0.022	0.007

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Portugal	0.998	0.993	0.030	0.008
Slovenia	0.999	0.997	0.020	0.007
Sweden	1.000	1.001	0.000	0.003
Chinese Taipei	0.995	0.986	0.043	0.012
Turkey	0.997	0.991	0.023	0.010
United Arab Emirates	0.999	0.997	0.017	0.004
Viet Nam	0.998	0.994	0.019	0.009
TALIS-PISA link				
Australia	0.973	0.973	0.070	0.129
Ciudad Autónoma de Buenos Aires (Argentina)	0.981	0.981	0.036	0.046
Colombia	0.965	0.965	0.046	0.150
Czech Republic	0.988	0.988	0.028	0.091
Denmark	0.992	0.992	0.031	0.097
Georgia	0.917	0.917	0.069	0.328
Malta	0.992	0.992	0.037	0.070
Turkey	1.000	1.000	0.000	0.049
Viet Nam	0.671	0.671	0.112	0.448

1. Data from participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.94. CFA model-data fit for scale T3STUD

Teacher-student relations

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Alberta (Canada)	0.991	0.974	0.052	0.013
Australia	0.999	0.998	0.015	0.006
Austria	0.986	0.957	0.072	0.017
Belgium	0.999	0.997	0.018	0.007
Flemish Community (Belgium)	0.998	0.994	0.025	0.008
Brazil	0.982	0.945	0.064	0.018
Bulgaria	0.993	0.979	0.041	0.012
Ciudad Autónoma de Buenos Aires (Argentina)	0.990	0.969	0.076	0.019
Chile	0.996	0.987	0.038	0.012
Colombia	0.993	0.979	0.047	0.016
Croatia	1.000	1.000	0.000	0.006
Cyprus	0.998	0.994	0.018	0.010
Czech Republic	0.998	0.995	0.025	0.008
Denmark	0.985	0.954	0.092	0.025
England (United Kingdom)	0.999	0.997	0.029	0.007
Estonia	0.999	0.998	0.014	0.006
Finland	0.998	0.993	0.033	0.009
France	1.000	1.000	0.000	0.005
Georgia	0.989	0.967	0.053	0.014
Hungary	0.994	0.982	0.038	0.011
Iceland	0.986	0.958	0.079	0.023
Israel	0.993	0.979	0.050	0.016
Italy	0.997	0.990	0.029	0.010
Japan	0.994	0.982	0.057	0.013
Kazakhstan	1.000	1.004	0.000	0.002

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Korea	0.999	0.997	0.018	0.006
Latvia	0.998	0.995	0.019	0.008
Lithuania	1.000	0.999	0.013	0.006
Malta	1.000	1.003	0.000	0.004
Mexico	0.988	0.963	0.061	0.017
Netherlands	0.995	0.984	0.040	0.017
New Zealand	0.989	0.967	0.043	0.016
Norway	0.993	0.978	0.060	0.014
Portugal	0.999	0.997	0.018	0.006
Romania	0.991	0.974	0.063	0.016
Russian Federation	0.996	0.988	0.030	0.011
Saudi Arabia	0.989	0.968	0.059	0.016
Shanghai (China)	0.986	0.958	0.077	0.013
Singapore	0.994	0.983	0.042	0.011
Slovak Republic	0.979	0.937	0.059	0.021
Slovenia	0.996	0.989	0.033	0.011
South Africa[2]	0.970	0.970	0.039	0.104
Spain	0.993	0.978	0.039	0.013
Sweden	0.998	0.995	0.022	0.009
Chinese Taipei	0.995	0.986	0.047	0.012
Turkey	0.989	0.966	0.054	0.014
United Arab Emirates	0.994	0.982	0.045	0.011
United States	1.000	1.003	0.000	0.007
Viet Nam	0.992	0.976	0.034	0.015
ISCED level 1				
Australia[1]	0.963	0.963	0.061	0.184
Flemish Community (Belgium)	1.000	1.000	0.007	0.005
Ciudad Autónoma de Buenos Aires (Argentina)	0.994	0.983	0.048	0.012
Denmark	0.989	0.966	0.068	0.017
England (United Kingdom)	0.999	0.997	0.021	0.009
France	1.000	1.003	0.000	0.006
Japan	0.994	0.983	0.049	0.014
Korea	0.997	0.991	0.031	0.009
Netherlands[1]	0.922	0.922	0.091	0.310
Spain	0.996	0.988	0.031	0.010
Sweden	0.991	0.973	0.056	0.017
Chinese Taipei	1.000	1.000	0.004	0.004
Turkey	0.991	0.973	0.041	0.012
United Arab Emirates	0.986	0.957	0.063	0.017
Viet Nam	0.975	0.925	0.093	0.020
ISCED level 3				
Alberta (Canada)	0.999	0.998	0.021	0.008
Brazil	0.985	0.955	0.056	0.019
Croatia	1.000	0.999	0.008	0.005
Denmark	0.962	0.886	0.080	0.026
Portugal	0.995	0.985	0.036	0.012
Slovenia	0.998	0.993	0.023	0.008
Sweden	0.993	0.978	0.050	0.014
Chinese Taipei	0.987	0.961	0.056	0.017
Turkey	0.988	0.964	0.050	0.015
United Arab Emirates	0.997	0.991	0.029	0.007
Viet Nam	0.996	0.987	0.033	0.012

Participating countries/economies	CFI	TLI	RMSEA	SRMR
TALIS-PISA link				
Australia	1.000	1.001	0.000	0.038
Ciudad Autónoma de Buenos Aires (Argentina)	0.966	0.966	0.043	0.080
Colombia	0.980	0.980	0.041	0.165
Czech Republic	0.964	0.964	0.049	0.300
Denmark	0.930	0.930	0.071	0.247
Georgia	0.969	0.969	0.039	0.205
Malta	1.000	1.000	0.000	0.050
Turkey	0.939	0.939	0.057	0.351
Viet Nam	0.959	0.959	0.049	0.138

1. Data from participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.95. CFA model-data fit for scale T3STAKE

Participation among stakeholders

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Alberta (Canada)	0.991	0.968	0.057	0.016
Australia	0.992	0.975	0.048	0.014
Austria	0.995	0.985	0.044	0.010
Belgium	0.996	0.987	0.037	0.013
Flemish Community (Belgium)	0.994	0.979	0.038	0.012
Brazil	0.993	0.978	0.047	0.010
Bulgaria	0.992	0.975	0.050	0.014
Ciudad Autónoma de Buenos Aires (Argentina)	0.993	0.976	0.053	0.013
Chile	0.996	0.986	0.048	0.009
Colombia	1.000	1.006	0.000	0.001
Croatia	0.979	0.931	0.079	0.019
Cyprus	0.998	0.992	0.024	0.009
Czech Republic	0.979	0.931	0.075	0.023
Denmark	1.000	1.000	0.005	0.007
England (United Kingdom)	0.994	0.981	0.055	0.012
Estonia	0.992	0.972	0.050	0.015
Finland	0.998	0.994	0.026	0.008
France	0.983	0.945	0.077	0.021
Georgia	0.988	0.960	0.057	0.013
Hungary	0.998	0.994	0.025	0.007
Iceland	0.993	0.977	0.054	0.015
Israel	0.998	0.992	0.030	0.009
Italy	0.995	0.982	0.035	0.012
Japan	0.987	0.956	0.069	0.018
Kazakhstan	0.988	0.959	0.039	0.015
Korea	0.994	0.980	0.052	0.010
Latvia	1.000	0.999	0.007	0.006
Lithuania	0.998	0.992	0.030	0.007
Malta	1.000	0.999	0.011	0.005
Mexico	0.998	0.994	0.028	0.008
Netherlands	0.998	0.992	0.031	0.014
New Zealand	0.999	0.997	0.019	0.009

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Norway	0.989	0.963	0.054	0.016
Portugal	0.996	0.988	0.041	0.008
Romania	0.995	0.983	0.037	0.010
Russian Federation	0.996	0.987	0.027	0.010
Saudi Arabia	0.993	0.976	0.054	0.009
Shanghai (China)	0.998	0.994	0.025	0.004
Singapore	0.994	0.980	0.045	0.011
Slovak Republic	0.981	0.935	0.064	0.023
Slovenia	0.992	0.973	0.052	0.013
South Africa[2]	0.960	0.950	0.060	0.313
Spain	0.996	0.986	0.027	0.010
Sweden	0.989	0.964	0.061	0.016
Chinese Taipei	0.997	0.989	0.032	0.009
Turkey	1.000	1.000	0.000	0.002
United Arab Emirates	0.997	0.989	0.032	0.006
United States	0.990	0.966	0.041	0.013
Viet Nam	0.963	0.878	0.073	0.026
ISCED level 1				
Australia[1]	0.990	0.988	0.038	0.060
Flemish Community (Belgium)	0.980	0.932	0.080	0.020
Ciudad Autónoma de Buenos Aires (Argentina)	0.975	0.917	0.072	0.022
Denmark	0.993	0.978	0.045	0.010
England (United Kingdom)	0.992	0.973	0.057	0.014
France	0.981	0.936	0.069	0.021
Japan	0.986	0.953	0.060	0.017
Korea	0.993	0.977	0.053	0.009
Netherlands[1]	0.831	0.788	0.126	0.604
Spain	0.993	0.978	0.041	0.011
Sweden	0.986	0.954	0.058	0.018
Chinese Taipei	0.996	0.987	0.032	0.011
Turkey	0.996	0.988	0.026	0.007
United Arab Emirates	1.000	0.999	0.010	0.003
Viet Nam	0.982	0.940	0.062	0.018
ISCED level 3				
Alberta (Canada)	0.989	0.964	0.060	0.010
Brazil	0.997	0.988	0.035	0.007
Croatia	0.984	0.946	0.063	0.014
Denmark	0.998	0.992	0.039	0.013
Portugal	1.000	0.999	0.013	0.004
Slovenia	1.000	1.002	0.000	0.004
Sweden	0.995	0.982	0.042	0.012
Chinese Taipei	0.991	0.971	0.051	0.014
Turkey	0.997	0.990	0.029	0.007
United Arab Emirates	0.998	0.992	0.029	0.005
Viet Nam	0.958	0.860	0.082	0.024
TALIS-PISA link				
Australia	0.995	0.994	0.034	0.079
Ciudad Autónoma de Buenos Aires (Argentina)	0.941	0.926	0.074	0.185
Colombia	0.993	0.991	0.045	0.196
Czech Republic	0.981	0.976	0.039	0.160
Denmark	0.990	0.987	0.029	0.138
Georgia	0.966	0.957	0.044	0.284

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Malta	0.986	0.983	0.050	0.059
Turkey	0.962	0.952	0.066	0.336
Viet Nam	0.952	0.940	0.059	0.331

1. Data from participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.96. Invariance test results for scale T3DISC

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level of ISCED level 2								
Configural	0.998	0.995	0.025	0.008				
Metric	0.985	0.982	0.048	0.066	0.013	0.013	-0.023	-0.058
Scalar	0.933	0.949	0.081	0.083	0.052	0.033	-0.033	-0.017
Invariance level of ISCED level 1								
Configural	0.999	0.998	0.016	0.006				
Metric	0.988	0.984	0.041	0.056	0.011	0.014	-0.025	-0.05
Scalar	0.921	0.937	0.083	0.068	0.067	0.047	-0.042	-0.012
Invariance Level of ISCED level 3								
Configural	0.998	0.995	0.023	0.008				
Metric	0.985	0.98	0.046	0.068	0.013	0.015	-0.023	-0.06
Scalar	0.923	0.938	0.082	0.075	0.062	0.042	-0.036	-0.007

Source: OECD, TALIS 2018 database.

Table 11.97. Invariance test results for scale T3STUD

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level of ISCED level 2								
Configural	0.994	0.982	0.042	0.012				
Metric	0.979	0.975	0.050	0.100	0.015	0.007	-0.008	-0.088
Scalar	0.871	0.902	0.099	0.137	0.108	0.073	-0.049	-0.037
Invariance level of ISCED level 1								
Configural	0.993	0.978	0.048	0.013				
Metric	0.978	0.972	0.054	0.102	0.015	0.006	-0.006	-0.089
Scalar	0.867	0.894	0.104	0.142	0.111	0.078	-0.050	-0.040
Invariance Level of ISCED level 3								
Configural	0.992	0.976	0.048	0.014				
Metric	0.981	0.976	0.048	0.080	0.011	0.000	0.000	-0.066
Scalar	0.897	0.917	0.089	0.111	0.084	0.059	-0.041	-0.031

Note: See endnote 34.
Source: OECD, TALIS 2018 database.

Table 11.98. Invariance test results for scale T3STAKE

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level of ISCED level 2								
Configural	0.994	0.980	0.043	0.013				
Metric	0.982	0.975	0.049	0.079	0.012	0.005	-0.006	-0.066
Scalar	0.914	0.921	0.086	0.123	0.068	0.054	-0.037	-0.044
Invariance Level of ISCED level 1								
Configural	0.993	0.977	0.044	0.013				
Metric	0.985	0.978	0.043	0.063	0.008	-0.001	0.001	-0.050
Scalar	0.892	0.896	0.093	0.121	0.093	0.082	-0.050	-0.058
Invariance Level of ISCED level 3								
Configural	0.995	0.982	0.044	0.011				
Metric	0.984	0.976	0.051	0.074	0.011	0.006	-0.007	-0.063
Scalar	0.897	0.900	0.104	0.146	0.087	0.076	-0.053	-0.072

Note: See endnote 34.
Source: OECD, TALIS 2018 database.

Table 11.99. Unstandardised factor loadings for T3DISC, T3STUD and T3STAKE for all countries for all populations

T3DISC (Metric)		T3STUD (Metric)		T3STAKE (Metric)	
TT3G41A	0.613	TT3G49A	0.359	TT3G48A	0.585
TT3G41B	0.395	TT3G49B	0.440	TT3G48B	0.447
TT3G41C	0.704	TT3G49C	0.448	TT3G48C	0.479
TT3G41D	0.680	TT3G49D	0.374	TT3G48D	0.483
				TT3G48E	0.446

Source: OECD, TALIS 2018 database.

Table 11.100. Standardised factor loadings and unstandardised intercepts for scale T3DISC

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G41A	TT3G41B	TT3G41C	TT3G41D	TT3G41A	TT3G41B	TT3G41C	TT3G41D
ISCED level 2								
Alberta (Canada)	0.772	0.560	0.890	0.877	2.052	2.115	2.094	2.069
Australia	0.820	0.614	0.917	0.910	2.042	2.192	2.089	2.011
Austria	0.780	0.508	0.853	0.835	1.937	2.132	2.005	1.890
Belgium	0.790	0.600	0.894	0.884	2.316	2.290	2.364	2.245
Flemish Community (Belgium)	0.786	0.585	0.899	0.907	2.306	2.268	2.350	2.225
Brazil	0.767	0.571	0.893	0.873	2.568	2.414	2.530	2.569
Bulgaria	0.763	0.501	0.818	0.783	1.986	2.291	2.198	1.841
Ciudad Autónoma de Buenos Aires (Argentina)	0.741	0.540	0.872	0.766	2.293	2.150	2.248	2.228
Chile	0.771	0.553	0.908	0.860	2.391	2.304	2.323	2.311
Colombia	0.748	0.527	0.885	0.762	1.977	2.033	2.010	2.148
Croatia	0.804	0.558	0.913	0.890	1.815	2.117	1.883	1.840
Cyprus	0.771	0.558	0.883	0.878	2.016	2.281	2.137	2.019
Czech Republic	0.778	0.555	0.908	0.878	1.910	2.113	1.918	1.960
Denmark	0.737	0.516	0.851	0.860	1.877	1.963	1.950	1.883
England (United Kingdom)	0.818	0.587	0.904	0.916	1.934	2.102	2.046	1.964
Estonia	0.796	0.563	0.907	0.873	1.870	2.231	1.835	1.860
Finland	0.806	0.600	0.923	0.892	2.191	2.355	2.137	2.189

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G41A	TT3G41B	TT3G41C	TT3G41D	TT3G41A	TT3G41B	TT3G41C	TT3G41D
France	0.796	0.583	0.860	0.866	2.238	2.189	2.313	2.180
Georgia	0.693	0.413	0.828	0.794	1.738	2.012	1.710	1.583
Hungary	0.781	0.523	0.895	0.868	1.926	2.196	1.999	1.970
Iceland	0.720	0.573	0.883	0.811	2.354	2.254	2.322	2.137
Israel	0.796	0.594	0.915	0.896	2.156	2.149	2.136	2.074
Italy	0.769	0.531	0.875	0.827	2.007	2.146	2.070	1.823
Japan	0.771	0.488	0.891	0.821	1.643	1.918	1.506	1.660
Kazakhstan	0.662	0.418	0.754	0.729	1.814	2.041	1.773	1.725
Korea	0.793	0.484	0.890	0.860	2.260	2.048	2.300	2.153
Latvia	0.721	0.532	0.856	0.822	2.001	2.216	1.969	2.064
Lithuania	0.725	0.566	0.883	0.834	2.023	2.023	1.856	1.859
Malta	0.789	0.559	0.907	0.866	2.251	2.278	2.273	2.072
Mexico	0.671	0.435	0.823	0.739	1.937	2.056	1.974	1.952
Netherlands	0.713	0.604	0.865	0.850	2.655	2.106	2.273	2.152
New Zealand	0.784	0.583	0.878	0.886	2.065	2.183	2.168	2.055
Norway	0.758	0.529	0.897	0.876	1.864	2.234	2.032	1.952
Portugal	0.793	0.609	0.894	0.867	2.440	2.270	2.405	2.231
Romania	0.775	0.520	0.885	0.851	1.899	1.968	1.936	1.879
Russian Federation	0.774	0.534	0.879	0.822	1.839	2.097	1.750	1.965
Saudi Arabia	0.632	0.439	0.815	0.798	1.900	2.107	2.041	1.831
Shanghai (China)	0.759	0.462	0.859	0.853	1.641	1.824	1.748	1.649
Singapore	0.803	0.584	0.913	0.899	2.202	2.267	2.201	2.171
Slovak Republic	0.772	0.550	0.897	0.869	2.033	2.226	2.200	2.151
Slovenia	0.766	0.575	0.886	0.822	2.147	2.216	2.163	2.042
South Africa[2]	0.743	0.536	0.887	0.863	2.360	2.351	2.330	2.243
Spain	0.785	0.610	0.897	0.866	2.434	2.346	2.456	2.377
Sweden	0.804	0.565	0.906	0.865	1.997	2.257	2.045	2.118
Chinese Taipei	0.777	0.479	0.884	0.853	1.837	2.033	2.026	1.993
Turkey	0.774	0.526	0.905	0.851	2.064	2.316	2.190	2.172
United Arab Emirates	0.749	0.549	0.889	0.865	1.947	2.000	2.004	1.863
United States	0.792	0.587	0.914	0.897	2.011	2.214	2.072	2.007
Viet Nam	0.689	0.397	0.810	0.755	1.837	1.842	1.919	1.670
ISCED level 1								
Australia[1]	0.794	0.586	0.873	0.866	1.984	2.052	2.190	2.022
Flemish Community (Belgium)	0.785	0.572	0.869	0.887	2.220	2.103	2.370	2.262
Ciudad Autónoma de Buenos Aires (Argentina)	0.749	0.538	0.879	0.788	2.293	2.150	2.248	2.228
Denmark	0.765	0.572	0.846	0.886	2.062	2.033	2.406	2.216
England (United Kingdom)	0.780	0.575	0.891	0.907	1.934	2.102	2.046	1.964
France	0.796	0.582	0.837	0.844	2.203	2.091	2.414	2.330
Japan	0.771	0.540	0.869	0.847	1.840	1.896	1.659	1.843
Korea	0.773	0.484	0.840	0.851	2.240	1.922	2.387	2.167
Netherlands[1]	0.693	0.568	0.855	0.849	2.345	2.005	2.301	2.111
Spain	0.770	0.596	0.874	0.837	2.332	2.103	2.416	2.329
Sweden	0.768	0.531	0.883	0.856	1.997	2.257	2.045	2.118
Chinese Taipei	0.754	0.485	0.855	0.825	1.827	1.947	2.078	2.032
Turkey	0.776	0.538	0.892	0.860	2.064	2.316	2.190	2.172
United Arab Emirates	0.745	0.532	0.873	0.851	1.947	2.000	2.004	1.863
Viet Nam	0.674	0.398	0.767	0.721	1.837	1.842	1.919	1.670
ISCED level 3								
Alberta (Canada)	0.747	0.532	0.889	0.856	2.052	2.115	2.094	2.069

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G41A	TT3G41B	TT3G41C	TT3G41D	TT3G41A	TT3G41B	TT3G41C	TT3G41D
Brazil	0.747	0.560	0.900	0.849	2.568	2.414	2.530	2.569
Croatia	0.780	0.522	0.896	0.874	1.815	2.117	1.883	1.840
Denmark	0.749	0.508	0.886	0.874	1.801	1.910	1.807	1.851
Portugal	0.783	0.595	0.899	0.881	2.440	2.270	2.405	2.231
Slovenia	0.765	0.551	0.874	0.821	2.147	2.216	2.163	2.042
Sweden	0.800	0.553	0.904	0.870	1.997	2.257	2.045	2.118
Chinese Taipei	0.792	0.505	0.893	0.862	2.062	2.112	2.135	2.119
Turkey	0.777	0.527	0.899	0.862	2.064	2.316	2.190	2.172
United Arab Emirates	0.753	0.532	0.883	0.867	1.947	2.000	2.004	1.863
Viet Nam	0.727	0.465	0.824	0.762	1.837	1.842	1.919	1.670
TALIS-PISA link								
Australia	0.812	0.598	0.902	0.888	2.073	2.192	2.118	2.032
Ciudad Autónoma de Buenos Aires (Argentina)	0.717	0.531	0.869	0.773	2.234	2.135	2.172	2.176
Colombia	0.704	0.495	0.834	0.732	1.935	2.015	2.000	2.131
Czech Republic	0.764	0.533	0.907	0.854	1.889	2.102	1.884	1.899
Denmark	0.743	0.488	0.879	0.853	1.830	1.919	1.797	1.778
Georgia	0.678	0.461	0.838	0.817	1.726	1.967	1.697	1.627
Malta	0.789	0.595	0.915	0.843	2.096	2.214	2.111	1.953
Turkey	0.791	0.526	0.906	0.844	2.006	2.347	2.128	2.127
Viet Nam	0.704	0.434	0.858	0.745	1.840	1.856	1.936	1.705

1. Data from participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.101. Standardised factor loadings and unstandardised intercepts for scale T3STUD

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G49A	TT3G49B	TT3G49C	TT3G49D	TT3G49A	TT3G49B	TT3G49C	TT3G49D
ISCED level 2								
Alberta (Canada)	0.642	0.835	0.814	0.629	3.381	3.653	3.459	3.513
Australia	0.672	0.809	0.821	0.612	3.349	3.583	3.350	3.378
Austria	0.653	0.802	0.754	0.495	3.361	3.410	3.182	3.134
Belgium	0.665	0.788	0.784	0.590	3.180	3.278	3.101	3.361
Flemish Community (Belgium)	0.659	0.787	0.782	0.604	3.180	3.362	3.169	3.415
Brazil	0.643	0.806	0.763	0.521	3.227	3.343	3.085	2.958
Bulgaria	0.676	0.837	0.811	0.693	3.198	3.310	3.214	3.456
Ciudad Autónoma de Buenos Aires (Argentina)	0.714	0.847	0.800	0.597	3.267	3.387	3.206	3.220
Chile	0.696	0.842	0.754	0.563	3.374	3.512	3.203	3.248
Colombia	0.706	0.820	0.785	0.604	3.321	3.518	3.209	3.178
Croatia	0.685	0.786	0.759	0.659	3.083	3.284	3.055	3.254
Cyprus	0.656	0.795	0.762	0.605	3.085	3.249	3.065	3.224
Czech Republic	0.669	0.744	0.707	0.632	3.116	3.196	2.997	3.275
Denmark	0.644	0.820	0.702	0.439	3.524	3.743	3.380	2.983
England (United Kingdom)	0.676	0.811	0.809	0.637	3.317	3.553	3.374	3.323
Estonia	0.673	0.782	0.772	0.606	3.160	3.244	3.105	3.331
Finland	0.690	0.810	0.808	0.628	3.204	3.411	3.237	3.394
France	0.636	0.816	0.805	0.599	3.180	3.326	3.199	3.354
Georgia	0.728	0.825	0.824	0.693	3.413	3.494	3.359	3.359

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G49A	TT3G49B	TT3G49C	TT3G49D	TT3G49A	TT3G49B	TT3G49C	TT3G49D
Hungary	0.704	0.745	0.808	0.662	3.217	3.150	3.200	3.305
Iceland	0.651	0.819	0.802	0.483	3.357	3.665	3.466	3.136
Israel	0.695	0.794	0.822	0.649	3.151	3.251	3.172	3.302
Italy	0.672	0.761	0.763	0.576	3.172	3.318	3.124	3.153
Japan	0.702	0.820	0.856	0.693	3.126	3.222	3.183	3.203
Kazakhstan	0.603	0.541	0.736	0.611	3.265	2.968	3.151	3.198
Korea	0.716	0.848	0.879	0.677	3.246	3.170	3.200	3.067
Latvia	0.678	0.776	0.792	0.605	3.090	3.223	3.110	3.374
Lithuania	0.660	0.778	0.785	0.619	3.162	3.318	3.134	3.360
Malta	0.637	0.792	0.787	0.640	3.246	3.501	3.280	3.398
Mexico	0.657	0.783	0.756	0.554	3.161	3.397	3.067	3.036
Netherlands	0.658	0.779	0.778	0.573	3.364	3.472	3.245	3.264
New Zealand	0.672	0.826	0.820	0.618	3.345	3.561	3.342	3.339
Norway	0.639	0.816	0.776	0.516	3.428	3.688	3.445	3.149
Portugal	0.661	0.774	0.750	0.576	3.268	3.396	3.120	3.292
Romania	0.747	0.834	0.801	0.670	3.233	3.346	3.162	3.249
Russian Federation	0.708	0.782	0.788	0.674	3.146	3.137	3.057	3.164
Saudi Arabia	0.751	0.839	0.826	0.689	3.429	3.497	3.326	3.315
Shanghai (China)	0.815	0.866	0.914	0.778	3.348	3.471	3.342	3.270
Singapore	0.696	0.785	0.779	0.682	3.231	3.381	3.144	3.302
Slovak Republic	0.627	0.690	0.718	0.554	3.087	2.988	2.992	3.256
Slovenia	0.662	0.721	0.701	0.571	3.166	3.280	3.044	3.452
South Africa[2]	0.583	0.779	0.710	0.571	2.991	3.313	3.014	3.164
Spain	0.680	0.817	0.785	0.589	3.242	3.379	3.163	3.199
Sweden	0.648	0.811	0.769	0.465	3.376	3.578	3.329	2.999
Chinese Taipei	0.733	0.816	0.832	0.666	3.138	3.160	3.069	3.138
Turkey	0.730	0.876	0.859	0.665	3.170	3.213	3.175	3.165
United Arab Emirates	0.702	0.829	0.850	0.673	3.413	3.449	3.360	3.335
United States	0.675	0.815	0.812	0.681	3.226	3.551	3.274	3.397
Viet Nam	0.613	0.742	0.737	0.682	3.281	3.277	3.104	3.291
ISCED level 1								
Australia[1]	0.656	0.818	0.818	0.565	3.425	3.683	3.481	3.336
Flemish Community (Belgium)	0.656	0.814	0.805	0.619	3.313	3.573	3.381	3.475
Ciudad Autónoma de Buenos Aires (Argentina)	0.698	0.862	0.824	0.624	3.267	3.387	3.206	3.220
Denmark	0.590	0.798	0.689	0.386	3.490	3.757	3.382	2.791
England (United Kingdom)	0.670	0.870	0.854	0.615	3.317	3.553	3.374	3.323
France	0.657	0.872	0.858	0.655	3.327	3.521	3.409	3.350
Japan	0.694	0.830	0.874	0.693	3.126	3.222	3.183	3.203
Korea	0.755	0.865	0.889	0.667	3.246	3.170	3.200	3.067
Netherlands[1]	0.617	0.816	0.770	0.553	3.457	3.722	3.523	3.362
Spain	0.676	0.841	0.796	0.631	3.242	3.379	3.163	3.199
Sweden	0.650	0.802	0.772	0.450	3.386	3.647	3.406	2.968
Chinese Taipei	0.716	0.827	0.851	0.670	3.138	3.160	3.069	3.138
Turkey	0.777	0.897	0.896	0.673	3.170	3.213	3.175	3.165
United Arab Emirates	0.719	0.841	0.854	0.626	3.413	3.449	3.360	3.335
Viet Nam	0.659	0.795	0.769	0.718	3.281	3.277	3.104	3.291
ISCED level 3								
Alberta (Canada)	0.658	0.826	0.821	0.643	3.381	3.653	3.459	3.513
Brazil	0.677	0.818	0.767	0.519	3.227	3.343	3.085	2.958

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G49A	TT3G49B	TT3G49C	TT3G49D	TT3G49A	TT3G49B	TT3G49C	TT3G49D
Croatia	0.694	0.796	0.771	0.639	3.083	3.284	3.055	3.254
Denmark	0.617	0.797	0.712	0.528	3.584	3.687	3.353	3.314
Portugal	0.688	0.782	0.765	0.599	3.268	3.396	3.120	3.292
Slovenia	0.675	0.732	0.704	0.559	3.166	3.280	3.044	3.452
Sweden	0.685	0.834	0.780	0.508	3.426	3.524	3.291	3.148
Chinese Taipei	0.684	0.804	0.820	0.600	3.138	3.160	3.069	3.138
Turkey	0.718	0.878	0.860	0.667	3.170	3.213	3.175	3.165
United Arab Emirates	0.723	0.840	0.836	0.688	3.413	3.449	3.360	3.335
Viet Nam	0.585	0.742	0.751	0.670	3.281	3.277	3.104	3.291
TALIS-PISA link								
Australia	0.689	0.805	0.829	0.624	3.282	3.513	3.288	3.338
Ciudad Autónoma de Buenos Aires (Argentina)	0.677	0.802	0.727	0.603	3.293	3.364	3.143	3.326
Colombia	0.694	0.811	0.784	0.597	3.352	3.512	3.221	3.172
Czech Republic	0.669	0.757	0.715	0.638	3.133	3.214	2.986	3.274
Denmark	0.651	0.821	0.714	0.450	3.579	3.743	3.387	3.084
Georgia	0.749	0.825	0.842	0.741	3.416	3.521	3.382	3.419
Malta	0.689	0.806	0.801	0.643	3.302	3.489	3.280	3.361
Turkey	0.703	0.889	0.876	0.682	3.081	3.136	3.108	3.167
Viet Nam	0.614	0.796	0.757	0.686	3.242	3.284	3.102	3.340

1. Data from the participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.102. Standardised factor loadings and unstandardised intercepts for scale T3STAKE

Participating countries/economies	Standardised factor loadings					Unstandardised intercepts				
	TT3G48A	TT3G48B	TT3G48C	TT3G48D	TT3G48E	TT3G48A	TT3G48B	TT3G48C	TT3G48D	TT3G48E
ISCED level 2										
Alberta (Canada)	0.870	0.739	0.747	0.766	0.668	2.969	3.077	2.878	2.939	3.049
Australia	0.837	0.686	0.705	0.722	0.639	2.702	2.761	2.672	2.759	2.876
Austria	0.845	0.671	0.666	0.708	0.649	3.103	2.930	2.816	3.126	3.129
Belgium	0.828	0.605	0.661	0.691	0.620	2.701	2.618	2.670	2.647	2.831
Flemish Community (Belgium)	0.783	0.629	0.707	0.678	0.605	2.827	2.880	2.951	2.746	2.841
Brazil	0.868	0.748	0.748	0.796	0.724	2.907	2.925	2.799	2.895	2.891
Bulgaria	0.879	0.708	0.677	0.632	0.586	3.128	3.086	2.926	2.980	3.010
Ciudad Autónoma de Buenos Aires (Argentina)	0.846	0.694	0.711	0.721	0.664	2.675	2.628	2.447	2.900	3.041
Chile	0.865	0.743	0.807	0.794	0.716	2.589	2.640	2.518	2.628	2.790
Colombia	0.909	0.775	0.809	0.703	0.669	2.979	3.073	3.010	2.893	2.934
Croatia	0.883	0.724	0.727	0.702	0.662	2.924	3.002	2.838	2.817	2.883
Cyprus	0.823	0.620	0.714	0.739	0.674	2.722	2.868	2.802	2.782	2.854
Czech Republic	0.776	0.666	0.650	0.655	0.591	2.962	2.997	2.891	2.842	3.059
Denmark	0.727	0.583	0.661	0.659	0.611	2.872	2.709	2.659	2.952	3.045
England (United Kingdom)	0.845	0.714	0.754	0.736	0.656	2.622	2.666	2.773	2.747	2.846
Estonia	0.850	0.741	0.734	0.669	0.662	3.050	3.074	3.030	2.856	2.975
Finland	0.788	0.626	0.698	0.696	0.590	2.867	2.712	2.861	2.893	2.930
France	0.819	0.642	0.657	0.615	0.545	2.848	2.778	2.616	2.606	2.813

Participating countries/economies	Standardised factor loadings					Unstandardised intercepts				
	TT3G48A	TT3G48B	TT3G48C	TT3G48D	TT3G48E	TT3G48A	TT3G48B	TT3G48C	TT3G48D	TT3G48E
Georgia	0.898	0.770	0.742	0.759	0.705	3.225	3.195	3.166	3.236	3.268
Hungary	0.852	0.706	0.695	0.667	0.656	3.099	3.034	2.875	2.925	2.999
Iceland	0.835	0.692	0.737	0.774	0.656	2.921	2.823	2.809	2.900	3.064
Israel	0.802	0.620	0.691	0.697	0.674	2.734	2.718	2.639	2.854	2.998
Italy	0.776	0.630	0.575	0.675	0.550	2.774	2.856	2.390	2.906	2.926
Japan	0.784	0.607	0.627	0.637	0.594	2.837	2.699	2.574	2.734	2.995
Kazakhstan	0.753	0.613	0.585	0.632	0.582	2.982	2.963	2.794	3.000	3.189
Korea	0.887	0.767	0.796	0.795	0.774	2.862	3.048	2.886	2.842	2.915
Latvia	0.841	0.715	0.730	0.709	0.704	3.082	3.180	3.052	3.053	3.103
Lithuania	0.881	0.764	0.777	0.768	0.733	3.016	3.139	3.098	3.133	3.081
Malta	0.828	0.663	0.723	0.745	0.670	2.779	2.660	2.714	2.833	2.904
Mexico	0.823	0.708	0.704	0.715	0.661	2.836	2.849	2.576	2.964	2.880
Netherlands	0.833	0.686	0.680	0.600	0.562	2.884	2.897	2.825	2.811	2.871
New Zealand	0.861	0.727	0.746	0.750	0.668	2.801	2.826	2.798	2.790	2.883
Norway	0.740	0.642	0.702	0.670	0.544	3.014	2.912	2.900	2.878	3.281
Portugal	0.854	0.694	0.736	0.707	0.646	2.792	2.984	2.875	2.765	2.822
Romania	0.848	0.688	0.644	0.678	0.641	3.067	2.971	2.785	3.142	3.239
Russian Federation	0.841	0.681	0.659	0.646	0.643	2.998	3.013	2.894	3.043	3.050
Saudi Arabia	0.864	0.729	0.766	0.781	0.715	2.787	2.626	2.610	2.808	2.974
Shanghai (China)	0.924	0.854	0.852	0.841	0.813	2.973	3.026	2.938	3.083	3.121
Singapore	0.835	0.629	0.711	0.738	0.673	2.725	2.701	2.710	2.818	2.914
Slovak Republic	0.756	0.659	0.605	0.597	0.609	2.842	2.872	2.566	2.709	2.886
Slovenia	0.787	0.661	0.678	0.700	0.643	3.008	3.113	2.924	3.074	3.083
South Africa[2]	0.848	0.797	0.776	0.802	0.771	2.721	2.947	2.717	2.804	2.793
Spain	0.892	0.755	0.753	0.753	0.695	2.863	2.881	2.689	2.823	2.891
Sweden	0.795	0.597	0.724	0.708	0.596	2.910	2.707	2.838	2.782	2.966
Chinese Taipei	0.798	0.634	0.638	0.710	0.660	2.779	2.653	2.452	2.854	2.853
Turkey	0.910	0.766	0.791	0.820	0.792	2.938	2.938	2.847	2.962	2.906
United Arab Emirates	0.865	0.755	0.783	0.805	0.757	2.756	3.009	2.834	2.986	3.051
United States	0.846	0.650	0.700	0.774	0.697	2.900	2.815	2.670	2.803	2.896
Viet Nam	0.694	0.482	0.455	0.644	0.644	3.172	2.894	2.638	3.006	3.126
ISCED level 1										
Australia[1]	0.839	0.743	0.743	0.772	0.667	2.941	2.980	2.766	2.945	3.034
Flemish Community (Belgium)	0.792	0.631	0.588	0.685	0.590	3.094	2.982	2.843	2.926	3.038
Ciudad Autónoma de Buenos Aires (Argentina)	0.748	0.589	0.667	0.692	0.626	2.675	2.628	2.447	2.900	3.041
Denmark	0.772	0.660	0.684	0.680	0.634	2.790	2.778	2.604	2.897	2.999
England (United Kingdom)	0.843	0.704	0.779	0.771	0.686	2.622	2.666	2.773	2.747	2.846
France	0.719	0.607	0.571	0.599	0.547	3.088	2.789	2.473	2.798	3.095
Japan	0.775	0.609	0.573	0.645	0.576	2.837	2.699	2.574	2.734	2.995
Korea	0.888	0.782	0.797	0.812	0.783	2.862	3.048	2.886	2.842	2.915
Netherlands[1]	0.757	0.630	0.494	0.566	0.501	3.186	3.024	2.764	3.165	3.171
Spain	0.859	0.748	0.699	0.785	0.711	2.863	2.881	2.689	2.823	2.891
Sweden	0.771	0.574	0.708	0.697	0.584	2.950	2.773	2.874	2.848	3.023
Chinese Taipei	0.783	0.588	0.584	0.676	0.628	2.868	2.757	2.415	2.936	2.948
Turkey	0.918	0.768	0.781	0.835	0.793	2.938	2.938	2.847	2.962	2.906
United Arab Emirates	0.874	0.738	0.777	0.799	0.759	2.756	3.009	2.834	2.986	3.051
Viet Nam	0.719	0.493	0.457	0.658	0.658	3.172	2.894	2.638	3.006	3.126
ISCED level 3										

Participating countries/economies	Standardised factor loadings					Unstandardised intercepts				
	TT3G48A	TT3G48B	TT3G48C	TT3G48D	TT3G48E	TT3G48A	TT3G48B	TT3G48C	TT3G48D	TT3G48E
Alberta (Canada)	0.857	0.715	0.745	0.776	0.680	2.969	3.077	2.878	2.939	3.049
Brazil	0.875	0.762	0.799	0.802	0.747	2.907	2.925	2.799	2.895	2.891
Croatia	0.886	0.754	0.730	0.707	0.680	2.924	3.002	2.838	2.817	2.883
Denmark	0.766	0.543	0.710	0.688	0.636	2.667	1.841	2.709	2.809	2.928
Portugal	0.875	0.714	0.768	0.757	0.685	2.792	2.984	2.875	2.765	2.822
Slovenia	0.808	0.706	0.711	0.723	0.680	2.871	2.971	2.946	2.972	2.989
Sweden	0.826	0.615	0.744	0.757	0.648	2.776	2.283	2.763	2.740	2.892
Chinese Taipei	0.820	0.663	0.741	0.697	0.680	2.722	2.640	2.709	2.811	2.800
Turkey	0.908	0.788	0.804	0.826	0.791	2.938	2.938	2.847	2.962	2.906
United Arab Emirates	0.881	0.757	0.795	0.803	0.764	2.756	3.009	2.834	2.986	3.051
Viet Nam	0.739	0.551	0.514	0.670	0.654	3.172	2.894	2.638	3.006	3.126
TALIS-PISA link										
Australia	0.858	0.736	0.765	0.759	0.660	2.684	2.798	2.706	2.750	2.846
Ciudad Autónoma de Buenos Aires (Argentina)	0.784	0.653	0.670	0.697	0.632	2.630	2.620	2.615	2.934	3.016
Colombia	0.901	0.759	0.807	0.731	0.691	3.008	3.091	3.040	2.949	2.976
Czech Republic	0.834	0.705	0.694	0.689	0.615	2.927	2.956	2.870	2.818	3.058
Denmark	0.742	0.578	0.653	0.673	0.657	2.820	2.693	2.657	2.928	3.045
Georgia	0.887	0.728	0.752	0.753	0.699	3.227	3.212	3.223	3.257	3.295
Malta	0.814	0.666	0.732	0.753	0.685	2.740	2.690	2.685	2.800	2.901
Turkey	0.923	0.790	0.819	0.809	0.781	2.881	2.860	2.818	2.929	2.889
Viet Nam	0.815	0.601	0.545	0.686	0.701	3.206	2.953	2.714	3.011	3.144

1. Data from participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Innovation: Team innovativeness (T3TEAM)

11.47. Measured items

Only one scale measured teaching innovation, and it was developed from this question stem:

- "Thinking about the teachers in this school, how strongly do you agree or disagree with the following statements?" (TT3G32). It was followed by items about general innovativeness that were used to form the scale *Team innovativeness* (T3TEAM).

The scale is presented in Table 11.103.

11.48. Scale reliability

The reliabilities for scale T3TEAM presented in Table 11.104 are all above 0.700.

11.49. Model fits

The model fit indices for scale T3TEAM presented in Table 11.105 suggest a good model fit in all populations, with the exceptions of the Netherlands ISCED level 1 and Georgia TALIS-PISA link populations.

11.50. Invariance testing

Table 11.106 presents the results from the invariance testing for scale T3TEAM. The scale reached scalar invariance for all ISCED levels. Although a comparison of the metric and scalar models revealed the cut-off criteria were not met, the scalar models themselves exhibited acceptable model fit.

11.51. Item parameters

The unstandardised item parameters for scale T3TEAM presented in Table 11.107 include both factor loadings and intercepts because the scale reached scalar invariance for the ISCED level 2 population.

Table 11.108 presents the standardised factor loadings. The unstandardised intercepts are not presented for the countries and economies because the scale was scalar invariant, which means the intercepts are the same for all populations (the values are presented in Table 11.107). The factor loadings for all the items in all populations are above 0.700, suggesting a strong relationship between all items and the latent construct.

Table 11.103. Item wording for the team innovativeness scale

T3TEAM: Team innovativeness	
TT3G32: Thinking about the teachers in this school, how strongly do you agree or disagree with the following statements?	
Response options: “Strongly disagree” (1), “Disagree” (2), “Agree” (3), “Strongly agree” (4).	
TT3G32A	Most teachers in this school strive to develop new ideas for teaching and learning.
TT3G32B	Most teachers in this school are open to change.
TT3G32C	Most teachers in this school search for new ways to solve problems.
TT3G32D	Most teachers in this school provide practical support to each other for the application of new ideas.

Table 11.104. Omega coefficients for the populations in each participating country/economy

Participating countries/economies	T3TEAM
	Omega coefficient
ISCED level 2	
Alberta (Canada)	0.912
Australia	0.895
Austria	0.887
Belgium	0.882
Flemish Community (Belgium)	0.876
Brazil	0.933
Bulgaria	0.918
Ciudad Autónoma de Buenos Aires (Argentina)	0.920
Chile	0.925
Colombia	0.935
Croatia	0.931
Cyprus	0.897
Czech Republic	0.882
Denmark	0.887
England (United Kingdom)	0.880
Estonia	0.880
Finland	0.882
France	0.878
Georgia	0.903

Participating countries/economies	T3TEAM
	Omega coefficient
Hungary	0.922
Iceland	0.903
Israel	0.903
Italy	0.916
Japan	0.901
Kazakhstan	0.812
Korea	0.920
Latvia	0.924
Lithuania	0.910
Malta	0.865
Mexico	0.920
Netherlands	0.821
New Zealand	0.893
Norway	0.794
Portugal	0.901
Romania	0.939
Russian Federation	0.880
Saudi Arabia	0.908
Shanghai (China)	0.953
Singapore	0.904
Slovak Republic	0.906
Slovenia	0.912
South Africa[2]	0.876
Spain	0.916
Sweden	0.891
Chinese Taipei	0.916
Turkey	0.956
United Arab Emirates	0.920
United States	0.889
Viet Nam	0.920
ISCED level 1	
Australia[1]	0.906
Flemish Community (Belgium)	0.891
Ciudad Autónoma de Buenos Aires (Argentina)	0.941
Denmark	0.882
England (United Kingdom)	0.922
France	0.918
Japan	0.906
Korea	0.925
Netherlands[1]	0.899
Spain	0.931
Sweden	0.908
Chinese Taipei	0.908
Turkey	0.958
United Arab Emirates	0.922
Viet Nam	0.941
ISCED level 3	
Alberta (Canada)	0.906
Brazil	0.937
Croatia	0.929
Denmark	0.874

Participating countries/economies	T3TEAM
	Omega coefficient
Portugal	0.910
Slovenia	0.899
Sweden	0.901
Chinese Taipei	0.918
Turkey	0.951
United Arab Emirates	0.925
Viet Nam	0.912
TALIS-PISA link	
Australia	0.903
Ciudad Autónoma de Buenos Aires (Argentina)	0.914
Colombia	0.910
Czech Republic	0.904
Denmark	0.891
Georgia	0.927
Malta	0.889
Turkey	0.929
Viet Nam	0.916

1. Data from participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.105. CFA model-data fit for scale T3TEAM

Team innovativeness

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Alberta (Canada)	1.000	1.006	0.000	0.002
Australia	0.996	0.988	0.041	0.009
Austria	0.999	0.997	0.024	0.005
Belgium	0.999	0.997	0.022	0.005
Flemish Community (Belgium)	0.999	0.998	0.018	0.005
Brazil	0.997	0.990	0.036	0.007
Bulgaria	0.999	0.997	0.020	0.005
Ciudad Autónoma de Buenos Aires (Argentina)	0.998	0.994	0.032	0.007
Chile	1.000	1.002	0.000	0.000
Colombia	0.997	0.990	0.033	0.008
Croatia	0.998	0.995	0.029	0.006
Cyprus	1.000	1.003	0.000	0.001
Czech Republic	0.998	0.994	0.039	0.009
Denmark	0.996	0.989	0.047	0.010
England (United Kingdom)	0.997	0.990	0.050	0.011
Estonia	0.999	0.997	0.025	0.007
Finland	1.000	1.001	0.000	0.001
France	1.000	1.001	0.000	0.001
Georgia	0.996	0.987	0.037	0.009
Hungary	0.998	0.995	0.034	0.007
Iceland	0.999	0.998	0.019	0.005
Israel	0.996	0.988	0.044	0.010
Italy	0.996	0.988	0.045	0.008

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Japan	0.999	0.996	0.032	0.006
Kazakhstan	0.985	0.954	0.059	0.020
Korea	0.999	0.996	0.031	0.005
Latvia	0.998	0.994	0.033	0.009
Lithuania	0.998	0.993	0.035	0.009
Malta	1.000	0.999	0.016	0.007
Mexico	0.999	0.998	0.020	0.005
Netherlands	0.999	0.998	0.017	0.009
New Zealand	0.995	0.985	0.051	0.012
Norway	0.975	0.926	0.109	0.031
Portugal	0.999	0.997	0.025	0.005
Romania	0.997	0.990	0.041	0.008
Russian Federation	1.000	1.001	0.000	0.004
Saudi Arabia	0.980	0.939	0.084	0.015
Shanghai (China)	0.997	0.990	0.037	0.006
Singapore	0.999	0.998	0.019	0.005
Slovak Republic	0.995	0.986	0.048	0.010
Slovenia	0.992	0.976	0.070	0.011
South Africa[2]	0.918	0.951	0.074	0.115
Spain	0.997	0.992	0.031	0.007
Sweden	1.000	1.002	0.000	0.003
Chinese Taipei	0.990	0.970	0.072	0.014
Turkey	0.995	0.986	0.049	0.006
United Arab Emirates	0.998	0.994	0.029	0.005
United States	1.000	1.004	0.000	0.006
Viet Nam	0.995	0.985	0.049	0.008
ISCED level 1				
Australia[1]	0.883	0.930	0.114	0.182
Flemish Community (Belgium)	0.996	0.989	0.045	0.008
Ciudad Autónoma de Buenos Aires (Argentina)	0.996	0.988	0.056	0.008
Denmark	0.996	0.988	0.046	0.011
England (United Kingdom)	0.996	0.987	0.052	0.009
France	0.994	0.983	0.087	0.014
Japan	1.000	1.002	0.000	0.001
Korea	1.000	1.000	0.003	0.003
Netherlands[1]	0.832	0.899	0.108	0.466
Spain	0.999	0.996	0.031	0.006
Sweden	0.998	0.994	0.032	0.008
Chinese Taipei	0.979	0.938	0.087	0.017
Turkey	0.997	0.991	0.028	0.006
United Arab Emirates	1.000	0.999	0.013	0.003
Viet Nam	0.998	0.993	0.037	0.006
ISCED level 3				
Alberta (Canada)	1.000	1.000	0.007	0.005
Brazil	0.996	0.989	0.039	0.007
Croatia	0.997	0.992	0.039	0.007
Denmark	0.997	0.991	0.032	0.010
Portugal	1.000	1.000	0.006	0.003
Slovenia	0.995	0.984	0.052	0.010
Sweden	0.995	0.984	0.052	0.010
Chinese Taipei	0.993	0.979	0.066	0.012
Turkey	0.988	0.964	0.056	0.010

Participating countries/economies	CFI	TLI	RMSEA	SRMR
United Arab Emirates	0.998	0.993	0.027	0.006
Viet Nam	0.995	0.984	0.047	0.009
TALIS-PISA link				
Australia	0.930	0.958	0.113	0.161
Ciudad Autónoma de Buenos Aires (Argentina)	0.948	0.969	0.061	0.158
Colombia	0.963	0.978	0.072	0.318
Czech Republic	0.899	0.940	0.085	0.121
Denmark	0.933	0.960	0.095	0.200
Georgia	0.727	0.836	0.092	0.546
Malta	0.879	0.927	0.102	0.136
Turkey	0.912	0.947	0.073	0.400
Viet Nam	0.861	0.917	0.096	0.108

1. Data from participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.106. Invariance test results for scale T3TEAM

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level of ISCED level 2								
Configural	0.997	0.990	0.040	0.010				
Metric	0.992	0.990	0.039	0.052	0.005	0.000	0.001	-0.042
Scalar	0.958	0.968	0.071	0.082	0.034	0.022	-0.032	-0.030
Invariance level of ISCED level 1								
Configural	0.997	0.991	0.039	0.008				
Metric	0.992	0.990	0.042	0.055	0.005	0.001	-0.003	-0.047
Scalar	0.968	0.975	0.065	0.076	0.024	0.015	-0.023	-0.021
Invariance level of ISCED level 3								
Configural	0.994	0.983	0.051	0.008				
Metric	0.989	0.986	0.046	0.047	0.005	-0.003	0.005	-0.039
Scalar	0.967	0.973	0.064	0.070	0.022	0.013	-0.018	-0.023

Source: OECD, TALIS 2018 database.

Table 11.107. Unstandardised factor loadings and intercepts for T3TEAM for all countries for all populations

	T3TEAM (Scalar)	
	Unstandardised factor loadings	Unstandardised intercepts
TT3G32A	0.574	2.990
TT3G32B	0.592	2.900
TT3G32C	0.598	2.951
TT3G32D	0.559	2.979

Source: OECD, TALIS 2018 database.

Table 11.108. Standardised factor loadings for scale T3TEAM

Participating countries/economies	Standardised factor loadings			
	TT3G32A	TT3G32B	TT3G32C	TT3G32D
ISCED level 2				
Alberta (Canada)	0.837	0.858	0.885	0.781

Participating countries/economies	Standardised factor loadings			
	TT3G32A	TT3G32B	TT3G32C	TT3G32D
Australia	0.802	0.841	0.869	0.740
Austria	0.801	0.840	0.843	0.744
Belgium	0.779	0.803	0.863	0.741
Flemish Community (Belgium)	0.789	0.787	0.858	0.711
Brazil	0.846	0.885	0.919	0.845
Bulgaria	0.852	0.870	0.882	0.810
Ciudad Autónoma de Buenos Aires (Argentina)	0.806	0.843	0.908	0.840
Chile	0.829	0.883	0.913	0.796
Colombia	0.826	0.884	0.931	0.820
Croatia	0.856	0.895	0.911	0.819
Cyprus	0.774	0.861	0.864	0.751
Czech Republic	0.780	0.832	0.847	0.724
Denmark	0.783	0.830	0.845	0.776
England (United Kingdom)	0.783	0.827	0.845	0.716
Estonia	0.756	0.814	0.857	0.740
Finland	0.790	0.819	0.850	0.736
France	0.789	0.809	0.856	0.697
Georgia	0.807	0.846	0.872	0.788
Hungary	0.853	0.877	0.898	0.770
Iceland	0.802	0.850	0.876	0.786
Israel	0.833	0.848	0.863	0.766
Italy	0.814	0.877	0.897	0.769
Japan	0.833	0.826	0.872	0.779
Kazakhstan	0.705	0.719	0.754	0.695
Korea	0.824	0.847	0.911	0.814
Latvia	0.849	0.897	0.893	0.775
Lithuania	0.837	0.875	0.876	0.725
Malta	0.709	0.796	0.857	0.693
Mexico	0.840	0.869	0.905	0.778
Netherlands	0.711	0.751	0.771	0.667
New Zealand	0.795	0.828	0.875	0.737
Norway	0.604	0.745	0.735	0.675
Portugal	0.808	0.847	0.876	0.767
Romania	0.864	0.908	0.920	0.842
Russian Federation	0.734	0.820	0.865	0.731
Saudi Arabia	0.825	0.854	0.874	0.804
Shanghai (China)	0.892	0.900	0.939	0.901
Singapore	0.817	0.855	0.874	0.777
Slovak Republic	0.819	0.879	0.859	0.752
Slovenia	0.829	0.882	0.873	0.770
South Africa[2]	0.649	0.833	0.864	0.808
Spain	0.841	0.866	0.896	0.779
Sweden	0.805	0.854	0.847	0.736
Chinese Taipei	0.838	0.853	0.887	0.830
Turkey	0.904	0.933	0.936	0.886
United Arab Emirates	0.819	0.872	0.898	0.819
United States	0.789	0.825	0.868	0.740
Viet Nam	0.822	0.824	0.901	0.862
ISCED level 1				
Australia[1]	0.818	0.857	0.878	0.787
Flemish Community (Belgium)	0.788	0.830	0.871	0.736

Participating countries/economies	Standardised factor loadings			
	TT3G32A	TT3G32B	TT3G32C	TT3G32D
Ciudad Autónoma de Buenos Aires (Argentina)	0.850	0.880	0.928	0.887
Denmark	0.769	0.815	0.852	0.769
England (United Kingdom)	0.846	0.878	0.895	0.804
France	0.874	0.861	0.882	0.768
Japan	0.838	0.814	0.884	0.798
Korea	0.837	0.846	0.914	0.852
Netherlands[1]	0.714	0.778	0.818	0.673
Spain	0.860	0.892	0.908	0.815
Sweden	0.813	0.871	0.878	0.764
Chinese Taipei	0.833	0.837	0.869	0.826
Turkey	0.908	0.934	0.943	0.875
United Arab Emirates	0.821	0.858	0.910	0.821
Viet Nam	0.860	0.853	0.928	0.900
ISCED level 3				
Alberta (Canada)	0.837	0.831	0.885	0.766
Brazil	0.840	0.898	0.926	0.836
Croatia	0.856	0.898	0.899	0.815
Denmark	0.772	0.825	0.824	0.737
Portugal	0.818	0.861	0.883	0.782
Slovenia	0.815	0.846	0.866	0.760
Sweden	0.815	0.857	0.872	0.739
Chinese Taipei	0.828	0.849	0.894	0.835
Turkey	0.886	0.926	0.929	0.878
United Arab Emirates	0.832	0.874	0.908	0.823
Viet Nam	0.792	0.827	0.893	0.846
TALIS-PISA link				
Australia	0.805	0.826	0.866	0.735
Ciudad Autónoma de Buenos Aires (Argentina)	0.827	0.829	0.928	0.864
Colombia	0.867	0.899	0.927	0.848
Czech Republic	0.813	0.846	0.866	0.755
Denmark	0.775	0.806	0.829	0.763
Georgia	0.824	0.837	0.877	0.791
Malta	0.678	0.788	0.876	0.706
Turkey	0.894	0.925	0.931	0.882
Viet Nam	0.829	0.838	0.911	0.871

1. Data from participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Equity and diversity: Self-related efficacy in multicultural classrooms (T3SEFE); Diversity practices (T3DIVP)

11.52. Measured items

Two scales gathering information about *Equity and diversity* were derived from the following two question stems:

- "In teaching a culturally diverse class, to what extent can you do the following?" (TT3G45). The question included items concerning diversity in the classroom that were used to form the scale *Self-related efficacy in multicultural classrooms* (T3SEFE).

- "In this school, are the following practices in relation to diversity implemented?" (TT3G47), followed by items regarding schools and diversity that were used to form the scale *Teacher diversity practices* (T3DIVP).

Table 11.109 provides information on each scale.

11.53. Model improvements

Model improvements were included for both scales. A correlation between items TT3G45A and TT3G45B was added for scale T3SEFE, and a correlation between items TT3G47A and TT3G47B was added for scale T3DIVP.

11.54. Scale reliability

Table 11.110, which presents the reliabilities for each scale, shows the coefficients for T3SEFE as higher than 0.700 for most populations, with a few populations exhibiting acceptable reliability and only the Italy ISCED level 2 population with low reliability. The reliability coefficients for T3DIVP are mostly between 0.600 and 0.700 for many populations, while a few exhibit low reliabilities.

11.55. Model fits

Tables 11.111 and 11.112 present the model fit indices for the scales T3SEFSE and T3DIVP respectively. As is evident from the tables, all populations exhibit acceptable fit indices for scale T3SEFE, with the exception of the Shanghai (China) ISCED level 2 populations, and all populations exhibit acceptable fit for the scale T3DIVP.

11.56. Invariance testing

The results from the invariance analyses scales of T3SEFSE and T3DIVP are presented in Tables 11.113 and 11.114 respectively. Here, T3SEFE is metric invariant in all populations, and although this scale did not meet the cut-off criteria for metric invariance, the configural models were near perfect and the metric models exhibited acceptable fit indices. T3DIVP reached configural invariance for all ISCED levels. The scalar models did not converge, however, this outcome does not affect the configural models.

11.57. Item parameters

Table 11.115 presents the unstandardised factor loadings for scale T3SEFE. Tables 11.116 and 11.117 present the standardised factor loadings and unstandardised intercepts for T3SEFE and T3DIVP respectively.

Most of the factor loadings for T3SEFSE are strong, and many are moderate; the only weak loading is that for item TT3G45C for the Italy ISCED level 2 population. Most factor loadings are strong for items TT3G47C and TT3G47D in scale T3DIVP. While the same is true for item TT3G47A, more populations exhibit only a moderate factor loading for this item. Finally, item TT3G47B exhibits mostly moderate strength with the latent factor, but the strength is low for the Latvia and Slovenia ISCED level 2 populations. Of particular note is the France ISCED level 1 population, where the factor loadings for items TT3G47A, TT3G47B and TT3G47D are weak.

Table 11.109. Item wording for equity and diversity scales

T3SEFE: Self-related efficacy in multicultural classrooms	
TT3G45: In teaching a culturally diverse class, to what extent can you do the following?	
Response options: "Not at all" (1), "To some extent" (2), "Quite a bit" (3), "A lot" (4).	
TT3G45A	Cope with the challenges of a multicultural classroom
TT3G45B	Adapt my teaching to the cultural diversity of students
TT3G45C	Ensure that students with and without a migrant background work together
TT3G45D	Raise awareness for cultural differences amongst students
TT3G45E	Reduce ethnic stereotyping amongst students
T3DIVP: Diversity practices	
TT3G47: In this school, are the following practices in relation to diversity implemented?	
Response options: "Yes" (1), "No" (2).	
TT3G47A*	Supporting activities or organisations that encourage students' expression of diverse ethnic and cultural identities (e.g. artistic groups)
TT3G47B*	Organising multicultural events (e.g. cultural diversity day)
TT3G47C*	Teaching students how to deal with ethnic and cultural discrimination
TT3G47D*	Adopting teaching and learning practices that integrate global issues throughout the curriculum

* Items were reverse coded.
Source: OECD, TALIS 2018 database.

Table 11.110. Reliability coefficients for the populations of participating each country/economy

Participating countries/economies	T3SEFE	T3DIVP
	Omega coefficient	Cronbach's alpha
ISCED level 2		
Alberta (Canada)	0.823	0.650
Australia	0.812	0.666
Austria	0.748	0.607
Belgium	0.736	0.669
Flemish Community (Belgium)	0.790	0.684
Brazil	0.773	0.703
Bulgaria	0.746	0.713
Ciudad Autónoma de Buenos Aires (Argentina)	0.696	0.679
Chile	0.792	0.691
Colombia	0.760	0.699
Croatia	0.801	0.676
Cyprus	0.805	0.716
Czech Republic	0.810	0.597
Denmark	0.723	0.660
England (United Kingdom)	0.785	0.663
Estonia	0.771	0.667
Finland	0.716	0.620
France	0.650	0.586
Georgia	0.821	0.712
Hungary	0.733	0.649
Iceland	0.839	0.624
Israel	0.759	0.685
Italy	0.563	0.636
Japan	0.808	0.665
Kazakhstan	0.824	0.624
Korea	0.880	0.737

Participating countries/economies	T3SEFE	T3DIVP
	Omega coefficient	Cronbach's alpha
Latvia	0.753	0.606
Lithuania	0.834	0.690
Malta	0.771	0.672
Mexico	0.743	0.688
Netherlands	0.799	0.628
New Zealand	0.787	0.449
Norway	0.787	0.594
Portugal	0.667	0.691
Romania	0.774	0.600
Russian Federation	0.815	0.690
Saudi Arabia	0.848	0.751
Shanghai (China)	0.869	0.714
Singapore	0.861	0.635
Slovak Republic	0.733	0.640
Slovenia	0.661	0.563
South Africa[2]	0.721	0.698
Spain	0.719	0.677
Sweden	0.741	0.585
Chinese Taipei	0.841	0.691
Turkey	0.766	0.790
United Arab Emirates	0.806	0.738
United States	0.805	0.702
Viet Nam	0.699	0.566
ISCED level 1		
Australia[1]	0.801	0.639
Flemish Community (Belgium)	0.781	0.624
Ciudad Autónoma de Buenos Aires (Argentina)	0.753	0.662
Denmark	0.766	0.632
England (United Kingdom)	0.812	0.619
France	0.623	0.476
Japan	0.812	0.665
Korea	0.876	0.606
Netherlands[1]	0.828	0.609
Spain	0.750	0.687
Sweden	0.740	0.616
Chinese Taipei	0.841	0.665
Turkey	0.753	0.815
United Arab Emirates	0.774	0.732
Viet Nam	0.789	0.529
ISCED level 3		
Alberta (Canada)	0.796	0.625
Brazil	0.787	0.710
Croatia	0.780	0.690
Denmark	0.746	0.630
Portugal	0.686	0.715
Slovenia	0.691	0.608
Sweden	0.736	0.628
Chinese Taipei	0.845	0.718
Turkey	0.773	0.812
United Arab Emirates	0.812	0.769
Viet Nam	0.634	0.602

Participating countries/economies	T3SEFE	T3DIVP
	Omega coefficient	Cronbach's alpha
TALIS-PISA link		
Australia	0.801	0.637
Ciudad Autónoma de Buenos Aires (Argentina)	0.736	0.641
Colombia	0.830	0.704
Czech Republic	0.790	0.652
Denmark	0.778	0.628
Georgia	0.783	0.752
Malta	0.757	0.711
Turkey	0.780	0.787
Viet Nam	0.691	0.555

1. Data from participating country/economy rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.111. CFA model-data fit for scale T3SEFE

Self-related efficacy in multicultural classrooms

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Alberta (Canada)	0.998	0.992	0.028	0.010
Australia	0.991	0.970	0.044	0.011
Austria	0.965	0.883	0.104	0.023
Belgium	0.992	0.973	0.051	0.014
Flemish Community (Belgium)	0.991	0.968	0.067	0.015
Brazil	1.000	1.010	0.000	0.005
Bulgaria	0.997	0.990	0.027	0.009
Ciudad Autónoma de Buenos Aires (Argentina)	1.000	0.999	0.010	0.007
Chile	1.000	1.010	0.000	0.001
Colombia	1.000	1.015	0.000	0.006
Croatia	0.994	0.981	0.046	0.010
Cyprus	0.988	0.960	0.054	0.011
Czech Republic	0.994	0.980	0.045	0.011
Denmark	0.994	0.980	0.042	0.013
England (United Kingdom)	0.983	0.945	0.074	0.016
Estonia	0.987	0.955	0.055	0.018
Finland	0.972	0.906	0.086	0.025
France	0.964	0.879	0.098	0.028
Georgia	0.993	0.976	0.044	0.015
Hungary	0.992	0.975	0.040	0.015
Iceland	1.000	1.003	0.000	0.005
Israel	0.999	0.998	0.013	0.007
Italy	0.996	0.985	0.030	0.009
Japan	0.997	0.989	0.040	0.009
Kazakhstan	0.999	0.996	0.014	0.006
Korea	1.000	1.009	0.000	0.002
Latvia	1.000	1.006	0.000	0.007
Lithuania	0.994	0.979	0.038	0.010
Malta	0.963	0.876	0.119	0.021
Mexico	1.000	1.007	0.000	0.006
Netherlands	0.971	0.904	0.108	0.019

Participating countries/economies	CFI	TLI	RMSEA	SRMR
New Zealand	0.998	0.992	0.026	0.007
Norway	0.988	0.959	0.069	0.015
Portugal	1.000	1.005	0.000	0.003
Romania	0.998	0.994	0.022	0.009
Russian Federation	1.000	1.003	0.000	0.004
Saudi Arabia	0.994	0.982	0.039	0.008
Shanghai (China)	0.812	0.372	0.252	0.057
Singapore	0.996	0.985	0.042	0.007
Slovak Republic	1.000	1.000	0.005	0.006
Slovenia	1.000	1.000	0.000	0.006
South Africa[2]	0.980	0.976	0.037	0.067
Spain	0.977	0.924	0.058	0.017
Sweden	0.987	0.957	0.060	0.013
Chinese Taipei	0.999	0.997	0.021	0.004
Turkey	1.000	1.000	0.000	0.006
United Arab Emirates	0.997	0.990	0.026	0.006
United States	0.985	0.951	0.049	0.011
Viet Nam	1.000	1.012	0.000	0.006
ISCED level 1				
Australia[1]	0.986	0.982	0.042	0.078
Flemish Community (Belgium)	0.988	0.960	0.069	0.015
Ciudad Autónoma de Buenos Aires (Argentina)	1.000	1.000	0.000	0.006
Denmark	0.990	0.967	0.054	0.014
England (United Kingdom)	0.997	0.989	0.036	0.008
France	0.961	0.868	0.090	0.028
Japan	0.998	0.995	0.027	0.008
Korea	0.999	0.995	0.024	0.005
Netherlands[1]	0.992	0.990	0.038	0.069
Spain	1.000	0.998	0.009	0.007
Sweden	0.975	0.915	0.074	0.022
Chinese Taipei	0.995	0.984	0.045	0.008
Turkey	0.997	0.990	0.019	0.010
United Arab Emirates	0.999	0.996	0.016	0.006
Viet Nam	0.987	0.958	0.062	0.021
ISCED level 3				
Alberta (Canada)	0.987	0.958	0.072	0.014
Brazil	0.999	0.997	0.016	0.009
Croatia	1.000	1.010	0.000	0.010
Denmark	0.978	0.928	0.065	0.026
Portugal	0.991	0.971	0.041	0.012
Slovenia	0.999	0.996	0.016	0.007
Sweden	0.972	0.905	0.090	0.023
Chinese Taipei	1.000	1.003	0.000	0.003
Turkey	0.994	0.979	0.029	0.011
United Arab Emirates	0.997	0.990	0.025	0.006
Viet Nam	0.999	0.997	0.011	0.011
TALIS-PISA link				
Australia	0.978	0.972	0.062	0.109
Ciudad Autónoma de Buenos Aires (Argentina)	1.000	1.019	0.000	0.013
Colombia	0.960	0.950	0.047	0.249
Czech Republic	0.987	0.984	0.040	0.081
Denmark	0.968	0.960	0.047	0.116

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Georgia	0.945	0.931	0.046	0.136
Malta	0.992	0.990	0.033	0.068
Turkey	0.998	0.997	0.013	0.053
Viet Nam	0.940	0.924	0.040	0.119

1. Data from participating country/economy rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.112. CFA model-data fit for scale T3DIVP

Diversity practices

Participating countries/economies	CFI	TLI	RMSEA	WRMR
ISCED level 2				
Alberta (Canada)	1.000	1.003	0.000	0.173
Australia	1.000	0.997	0.015	0.280
Austria	1.000	1.002	0.000	0.139
Belgium	1.000	1.000	0.005	0.247
Flemish Community (Belgium)	1.000	1.001	0.000	0.191
Brazil	0.998	0.987	0.035	0.356
Bulgaria	1.000	0.997	0.019	0.294
Ciudad Autónoma de Buenos Aires (Argentina)	0.999	0.994	0.023	0.332
Chile	1.000	1.001	0.000	0.172
Colombia	0.998	0.986	0.044	0.357
Croatia	1.000	0.998	0.012	0.286
Cyprus	1.000	0.999	0.012	0.159
Czech Republic	0.996	0.977	0.038	0.495
Denmark	0.993	0.959	0.065	0.493
England (United Kingdom)	0.997	0.981	0.050	0.558
Estonia	0.996	0.978	0.048	0.496
Finland	0.998	0.987	0.036	0.373
France	1.000	1.003	0.000	0.159
Georgia	0.994	0.963	0.082	0.608
Hungary	1.000	1.000	0.003	0.213
Iceland	0.994	0.966	0.055	0.471
Israel	1.000	1.004	0.000	0.173
Italy	1.000	1.001	0.000	0.212
Japan	0.998	0.991	0.029	0.319
Kazakhstan	0.998	0.987	0.025	0.435
Korea	1.000	1.000	0.009	0.229
Latvia	0.996	0.979	0.039	0.453
Lithuania	1.000	1.000	0.007	0.270
Malta	1.000	0.999	0.015	0.203
Mexico	0.998	0.988	0.044	0.268
Netherlands	1.000	1.002	0.000	0.272
New Zealand	0.967	0.805	0.068	0.728
Norway	1.000	0.999	0.006	0.225
Portugal	1.000	1.002	0.000	0.100
Romania	0.998	0.991	0.022	0.356
Russian Federation	0.997	0.985	0.036	0.488
Saudi Arabia	1.000	1.000	0.000	0.235
Shanghai (China)	0.999	0.994	0.035	0.338

Participating countries/economies	CFI	TLI	RMSEA	WRMR
Singapore	1.000	1.001	0.000	0.207
Slovak Republic	0.998	0.988	0.037	0.382
Slovenia	1.000	1.007	0.000	0.164
South Africa[2]	0.998	0.990	0.031	0.297
Spain	1.000	0.999	0.006	0.211
Sweden	0.997	0.983	0.033	0.279
Chinese Taipei	0.998	0.988	0.041	0.560
Turkey	1.000	1.001	0.000	0.111
United Arab Emirates	1.000	1.001	0.000	0.102
United States	0.991	0.945	0.060	0.311
Viet Nam	0.970	0.819	0.091	0.658
ISCED level 1				
Australia[1]	0.998	0.986	0.036	0.379
Flemish Community (Belgium)	1.000	1.003	0.000	0.114
Ciudad Autónoma de Buenos Aires (Argentina)	1.000	1.003	0.000	0.149
Denmark	0.999	0.993	0.026	0.377
England (United Kingdom)	1.000	1.001	0.000	0.258
France	0.975	0.852	0.081	0.568
Japan	1.000	1.002	0.000	0.164
Korea	0.990	0.942	0.065	0.772
Netherlands[1]	0.999	0.996	0.019	0.289
Spain	1.000	1.001	0.000	0.105
Sweden	1.000	0.999	0.009	0.260
Chinese Taipei	1.000	0.999	0.013	0.267
Turkey	1.000	1.000	0.000	0.155
United Arab Emirates	1.000	0.999	0.013	0.335
Viet Nam	0.996	0.977	0.033	0.393
ISCED level 3				
Alberta (Canada)	0.983	0.900	0.093	0.720
Brazil	1.000	1.001	0.000	0.200
Croatia	1.000	1.002	0.000	0.175
Denmark	0.991	0.945	0.065	0.441
Portugal	1.000	1.001	0.000	0.191
Slovenia	1.000	1.004	0.000	0.141
Sweden	0.999	0.991	0.030	0.443
Chinese Taipei	1.000	0.999	0.013	0.261
Turkey	1.000	1.001	0.000	0.111
United Arab Emirates	1.000	1.000	0.000	0.158
Viet Nam	0.990	0.939	0.054	0.612
TALIS-PISA link				
Australia	0.996	0.979	0.047	0.610
Ciudad Autónoma de Buenos Aires (Argentina)	1.000	1.006	0.000	0.151
Colombia	1.000	1.001	0.000	0.175
Czech Republic	1.000	1.008	0.000	0.020
Denmark	0.990	0.941	0.064	0.611
Georgia	0.996	0.974	0.051	0.421
Malta	1.000	1.007	0.000	0.066
Turkey	1.000	1.002	0.000	0.061
Viet Nam	1.000	1.012	0.000	0.164

1. Data from participating country/economy rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.113. Invariance test results for scale T3SEFE

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level of ISCED level 2								
Configural	0.999	0.993	0.027	0.006				
Metric	0.991	0.986	0.039	0.051	0.013	0.015	-0.021	-0.068
Scalar	0.875	0.891	0.11	0.113	0.118	0.1	-0.064	-0.081
Invariance level of ISCED level 1								
Configural	0.999	0.993	0.027	0.006				
Metric	0.986	0.978	0.048	0.074	0.008	0.007	-0.012	-0.045
Scalar	0.868	0.878	0.112	0.155	0.116	0.095	-0.071	-0.062
Invariance level of ISCED level 3								
Configural	0.999	0.996	0.021	0.004				
Metric	0.991	0.985	0.04	0.057	0.008	0.011	-0.019	-0.053
Scalar	0.88	0.888	0.11	0.117	0.111	0.097	-0.07	-0.06

Note: See endote 34.
Source: OECD, TALIS 2018 database.

Table 11.114. Invariance test results for scale T3DIVP

	CFI	TLI	RMSEA	WRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ WRMR
Invariance level of ISCED level 2								
Configural	0.999	0.997	0.019	2.044	0.001	0.001	-0.006	-1.005
Metric								
Scalar								
Invariance level of ISCED level 1								
Configural	1.000	0.998	0.013	1.039				
Metric								
Scalar								
Invariance Level of ISCED level 3								
Configural	0.999	0.997	0.022	1.082	0.000	0.000	-0.003	0.962
Metric								
Scalar								

Note: See endnote 34.
Source: OECD, TALIS 2018 database.

Table 11.115. Unstandardised factor loadings for T3SEFE for all countries for ISCED level 2

T3SEFE (Metric)	
TT3G45A	0.482
TT3G45B	0.519
TT3G45C	0.583
TT3G45D	0.544
TT3G45E	0.522

Source: OECD, TALIS 2018 database.

Table 11.116. Standardised factor loadings and unstandardised intercepts for T3SEFE

Participating countries/economies	Standardised factor loadings					Unstandardised intercepts				
	TT3G45A	TT3G45B	TT3G45C	TT3G45D	TT3G45E	TT3G45A	TT3G45B	TT3G45C	TT3G45D	TT3G45E
ISCED level 2										
Alberta (Canada)	0.675	0.746	0.781	0.733	0.701	2.923	2.792	2.903	2.844	3.015
Australia	0.681	0.736	0.757	0.708	0.699	2.942	2.826	2.954	2.866	3.045
Austria	0.634	0.626	0.694	0.650	0.609	2.918	2.566	3.091	2.919	2.729
Belgium	0.644	0.601	0.684	0.640	0.607	2.974	2.761	3.212	3.003	3.093
Flemish Community (Belgium)	0.697	0.664	0.724	0.712	0.665	2.903	2.677	3.170	2.956	2.904
Brazil	0.634	0.675	0.698	0.729	0.598	2.991	3.029	3.020	3.321	3.279
Bulgaria	0.646	0.666	0.591	0.681	0.642	3.040	2.905	2.519	2.797	2.866
Ciudad Autónoma de Buenos Aires (Argentina)	0.582	0.614	0.605	0.654	0.608	2.869	2.851	2.979	3.234	3.289
Chile	0.596	0.673	0.757	0.754	0.691	2.614	2.814	2.977	3.220	3.249
Colombia	0.584	0.614	0.649	0.770	0.582	3.316	3.384	3.510	3.670	3.557
Croatia	0.698	0.703	0.691	0.735	0.721	3.056	2.901	2.954	3.062	3.135
Cyprus	0.651	0.678	0.798	0.683	0.671	2.910	2.833	2.981	3.169	3.225
Czech Republic	0.633	0.707	0.751	0.730	0.702	2.776	2.559	2.738	2.643	2.669
Denmark	0.617	0.598	0.677	0.618	0.605	3.100	2.797	3.223	3.057	3.141
England (United Kingdom)	0.662	0.713	0.726	0.672	0.676	2.991	2.794	2.971	2.795	3.067
Estonia	0.648	0.646	0.647	0.686	0.620	2.858	2.541	2.776	2.844	3.113
Finland	0.620	0.643	0.594	0.609	0.577	2.854	2.430	2.920	2.474	2.744
France	0.512	0.510	0.660	0.512	0.532	2.706	2.674	3.453	2.900	3.123
Georgia	0.653	0.748	0.620	0.789	0.680	2.939	3.098	2.633	3.178	3.032
Hungary	0.641	0.682	0.480	0.632	0.661	3.066	2.960	2.314	3.021	3.166
Iceland	0.714	0.718	0.803	0.749	0.720	2.784	2.595	2.958	2.812	2.929
Israel	0.670	0.681	0.675	0.674	0.675	2.789	2.695	2.538	2.641	2.900
Italy	0.503	0.532	0.404	0.573	0.451	2.905	2.932	2.965	3.489	3.391
Japan	0.731	0.769	0.684	0.726	0.707	2.024	2.072	2.048	2.276	2.210
Kazakhstan	0.633	0.693	0.699	0.782	0.731	2.905	2.811	2.578	2.843	2.832
Korea	0.805	0.794	0.855	0.813	0.773	2.318	2.229	2.308	2.573	2.593
Latvia	0.649	0.656	0.653	0.694	0.631	3.091	3.032	2.994	3.086	3.111
Lithuania	0.678	0.747	0.746	0.788	0.723	2.747	2.806	2.813	3.003	2.994
Malta	0.629	0.664	0.749	0.649	0.657	2.829	2.793	3.118	2.969	3.127
Mexico	0.622	0.649	0.639	0.711	0.621	2.722	2.874	2.915	3.260	3.195
Netherlands	0.675	0.683	0.746	0.700	0.666	2.812	2.516	2.922	2.764	2.777
New Zealand	0.657	0.712	0.717	0.706	0.670	2.987	2.839	2.870	2.895	3.060
Norway	0.658	0.713	0.718	0.677	0.636	2.664	2.468	2.817	2.517	2.669
Portugal	0.597	0.596	0.562	0.548	0.566	3.180	3.119	3.278	3.371	3.519
Romania	0.683	0.723	0.607	0.732	0.656	2.945	2.977	2.349	2.904	3.002
Russian Federation	0.719	0.723	0.776	0.711	0.689	2.978	2.912	2.944	2.864	2.821
Saudi Arabia	0.655	0.707	0.851	0.760	0.701	3.113	3.157	3.414	3.368	3.454
Shanghai (China)	0.736	0.805	0.700	0.830	0.701	2.515	2.646	2.222	2.569	2.490
Singapore	0.689	0.770	0.826	0.810	0.771	2.824	2.797	2.887	2.945	2.966
Slovak Republic	0.652	0.666	0.626	0.648	0.644	2.737	2.696	2.539	2.771	2.734
Slovenia	0.584	0.610	0.539	0.589	0.590	2.697	2.378	2.852	2.933	3.093
South Africa[2]	0.595	0.640	0.641	0.611	0.636	3.138	3.178	3.054	3.187	3.383
Spain	0.587	0.601	0.708	0.584	0.618	2.590	2.590	3.036	2.998	3.164
Sweden	0.629	0.637	0.693	0.641	0.613	2.835	2.615	2.932	2.685	2.808
Chinese Taipei	0.741	0.762	0.745	0.804	0.723	2.294	2.246	2.197	2.443	2.630

Participating countries/economies	Standardised factor loadings					Unstandardised intercepts				
	TT3G45A	TT3G45B	TT3G45C	TT3G45D	TT3G45E	TT3G45A	TT3G45B	TT3G45C	TT3G45D	TT3G45E
Turkey	0.598	0.662	0.661	0.685	0.666	2.629	2.601	2.711	2.782	3.109
United Arab Emirates	0.667	0.754	0.744	0.708	0.673	3.454	3.488	3.471	3.444	3.457
United States	0.666	0.738	0.723	0.732	0.701	2.857	2.768	2.792	2.760	2.949
Viet Nam	0.613	0.671	0.515	0.609	0.580	2.490	2.772	2.270	2.788	3.249
ISCED level 1										
Australia[1]	0.692	0.734	0.770	0.754	0.700	2.972	2.907	3.123	3.115	3.123
Flemish Community (Belgium)	0.646	0.636	0.751	0.711	0.656	2.903	2.677	3.170	2.956	2.904
Ciudad Autónoma de Buenos Aires (Argentina)	0.631	0.651	0.636	0.728	0.681	2.869	2.851	2.979	3.234	3.289
Denmark	0.649	0.633	0.712	0.667	0.643	3.121	2.893	3.298	3.180	3.259
England (United Kingdom)	0.688	0.742	0.728	0.749	0.722	2.976	2.894	3.111	3.107	3.166
France	0.467	0.470	0.658	0.486	0.486	2.706	2.674	3.453	2.900	3.123
Japan	0.737	0.753	0.649	0.746	0.715	2.024	2.072	2.048	2.276	2.210
Korea	0.778	0.778	0.848	0.831	0.785	2.318	2.229	2.308	2.573	2.593
Netherlands[1]	0.684	0.709	0.813	0.767	0.734	2.937	2.750	3.133	3.062	3.004
Spain	0.573	0.598	0.734	0.635	0.665	2.590	2.590	3.036	2.998	3.164
Sweden	0.633	0.647	0.694	0.621	0.603	2.875	2.690	3.192	2.853	2.942
Chinese Taipei	0.733	0.774	0.739	0.802	0.727	2.294	2.246	2.197	2.443	2.630
Turkey	0.588	0.652	0.652	0.684	0.652	2.629	2.601	2.711	2.782	3.109
United Arab Emirates	0.649	0.717	0.726	0.669	0.636	3.454	3.488	3.471	3.444	3.457
Viet Nam	0.645	0.711	0.597	0.761	0.626	2.521	2.819	2.175	2.862	3.028
ISCED level 3										
Alberta (Canada)	0.659	0.726	0.742	0.685	0.665	2.923	2.792	2.903	2.844	3.015
Brazil	0.648	0.695	0.680	0.762	0.652	2.991	3.029	3.020	3.321	3.279
Croatia	0.665	0.676	0.667	0.727	0.677	3.056	2.901	2.954	3.062	3.135
Denmark	0.649	0.632	0.707	0.582	0.591	3.054	2.550	3.113	2.608	2.841
Portugal	0.618	0.605	0.588	0.568	0.564	3.180	3.119	3.278	3.371	3.519
Slovenia	0.610	0.639	0.553	0.602	0.598	2.697	2.378	2.852	2.933	3.093
Sweden	0.670	0.634	0.665	0.615	0.606	3.014	2.681	2.997	2.686	2.833
Chinese Taipei	0.742	0.771	0.759	0.791	0.721	2.294	2.246	2.197	2.443	2.630
Turkey	0.586	0.669	0.645	0.707	0.679	2.629	2.601	2.711	2.782	3.109
United Arab Emirates	0.677	0.751	0.760	0.689	0.693	3.454	3.488	3.471	3.444	3.457
Viet Nam	0.540	0.590	0.495	0.540	0.542	2.197	2.563	2.248	2.560	3.084
TALIS-PISA link										
Australia	0.697	0.765	0.788	0.729	0.711	2.926	2.801	2.939	2.859	3.038
Ciudad Autónoma de Buenos Aires (Argentina)	0.623	0.648	0.623	0.678	0.678	2.873	2.844	3.031	3.240	3.320
Colombia	0.574	0.619	0.635	0.776	0.592	3.269	3.314	3.457	3.642	3.498
Czech Republic	0.645	0.714	0.750	0.750	0.719	2.809	2.579	2.765	2.667	2.634
Denmark	0.597	0.605	0.700	0.669	0.609	3.067	2.707	3.227	2.988	3.125
Georgia	0.680	0.708	0.639	0.832	0.694	3.005	3.048	2.610	3.150	3.054
Malta	0.631	0.680	0.760	0.668	0.679	2.838	2.732	3.059	2.889	3.013
Turkey	0.635	0.671	0.647	0.744	0.680	2.738	2.716	2.665	2.838	3.185
Viet Nam	0.488	0.556	0.442	0.504	0.529	2.338	2.690	2.199	2.643	3.237

1. Data from participating country/economy rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.117. Standardised factor loadings and unstandardised intercepts for T3DIVP

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G47A	TT3G47B	TT3G47C	TT3G47D	TT3G47A	TT3G47B	TT3G47C	TT3G47D
ISCED level 2								
Alberta (Canada)	0.565	0.520	0.890	0.760	-0.709	-0.287	-0.725	-1.164
Australia	0.696	0.565	0.788	0.817	-0.879	-0.666	-0.474	-0.934
Austria	0.564	0.497	0.835	0.742	0.019	0.350	-0.682	-1.129
Belgium	0.696	0.584	0.813	0.727	-0.044	-0.015	-0.692	-0.249
Flemish Community (Belgium)	0.700	0.590	0.818	0.756	0.009	-0.028	-0.639	-0.360
Brazil	0.695	0.697	0.851	0.812	-0.717	-0.902	-0.866	-1.065
Bulgaria	0.574	0.645	0.893	0.757	-0.555	-0.262	-0.282	-0.496
Ciudad Autónoma de Buenos Aires (Argentina)	0.772	0.620	0.798	0.796	-0.604	-0.451	-1.263	-0.895
Chile	0.728	0.613	0.746	0.874	-0.706	-0.401	-1.047	-0.674
Colombia	0.737	0.775	0.827	0.774	-0.885	-0.797	-1.209	-1.011
Croatia	0.585	0.568	0.876	0.789	0.103	0.394	-0.499	-0.297
Cyprus	0.624	0.607	0.891	0.829	-0.642	-0.252	-0.446	-0.369
Czech Republic	0.562	0.452	0.794	0.771	0.326	0.565	-0.485	-0.677
Denmark	0.630	0.681	0.877	0.742	0.764	0.982	0.648	-0.092
England (United Kingdom)	0.616	0.611	0.859	0.810	-0.458	-0.142	-0.967	-0.857
Estonia	0.654	0.644	0.806	0.706	-0.446	-0.199	-0.365	-0.606
Finland	0.593	0.531	0.770	0.820	0.549	0.294	-0.585	-0.703
France	0.515	0.463	0.842	0.656	-0.071	0.489	-0.830	-0.524
Georgia	0.661	0.623	0.794	0.879	-0.543	-0.329	-0.879	-0.828
Hungary	0.558	0.496	0.849	0.763	0.042	0.309	-0.358	-0.257
Iceland	0.675	0.530	0.700	0.764	0.012	0.390	-0.120	0.611
Israel	0.617	0.607	0.852	0.759	-0.288	-0.671	-0.454	-0.148
Italy	0.589	0.526	0.795	0.749	-0.175	0.437	-0.457	-0.707
Japan	0.625	0.533	0.827	0.792	0.541	0.518	-0.041	0.266
Kazakhstan	0.685	0.674	0.746	0.847	-1.099	-1.404	-0.963	-0.510
Korea	0.779	0.657	0.854	0.823	0.185	0.303	-0.533	0.209
Latvia	0.464	0.411	0.900	0.737	-0.174	-0.117	-0.648	-0.754
Lithuania	0.652	0.580	0.909	0.708	-0.356	-0.475	-0.722	-0.525
Malta	0.609	0.506	0.888	0.757	-0.579	-0.147	-0.520	-0.541
Mexico	0.735	0.590	0.811	0.802	-0.370	0.216	-0.954	-0.729
Netherlands	0.624	0.583	0.790	0.699	0.235	0.536	-0.467	-0.001
New Zealand	0.451	0.481	0.825	0.575	-1.973	-0.940	-0.435	-1.026
Norway	0.511	0.489	0.828	0.796	0.748	0.863	-0.167	-0.768
Portugal	0.667	0.604	0.875	0.795	-0.003	0.213	-0.771	-0.638
Romania	0.641	0.619	0.586	0.705	-0.722	-0.459	-0.951	-0.700
Russian Federation	0.681	0.581	0.745	0.836	-0.439	-0.339	-0.658	-0.163
Saudi Arabia	0.729	0.857	0.800	0.792	-0.450	-0.036	-0.381	0.024
Shanghai (China)	0.760	0.650	0.889	0.846	-1.174	-1.143	-0.752	-0.615
Singapore	0.734	0.668	0.783	0.826	-1.430	-1.595	-1.128	-1.193
Slovak Republic	0.489	0.527	0.855	0.749	-0.173	0.340	-0.543	-0.508
Slovenia	0.587	0.404	0.744	0.764	0.128	0.286	-1.110	-0.389
South Africa[2]	0.710	0.670	0.940	0.736	-0.984	-0.647	-0.879	-0.912
Spain	0.702	0.593	0.876	0.718	-0.320	0.115	-0.780	-0.592
Sweden	0.464	0.499	0.875	0.747	0.632	0.639	-0.498	-0.817
Chinese Taipei	0.675	0.632	0.859	0.815	-0.744	-0.145	-0.832	-0.437

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TT3G47A	TT3G47B	TT3G47C	TT3G47D	TT3G47A	TT3G47B	TT3G47C	TT3G47D
Turkey	0.753	0.812	0.871	0.855	0.232	0.597	-0.098	-0.011
United Arab Emirates	0.815	0.733	0.886	0.819	-1.120	-1.231	-0.992	-1.140
United States	0.607	0.538	0.922	0.750	-0.606	-0.052	-0.321	-0.434
Viet Nam	0.672	0.687	0.745	0.792	-1.497	-0.586	-1.275	-1.335
ISCED level 1								
Australia[1]	0.616	0.512	0.850	0.752	-0.646	-0.808	-0.459	-0.890
Flemish Community (Belgium)	0.506	0.487	0.790	0.851	0.009	-0.028	-0.639	-0.360
Ciudad Autónoma de Buenos Aires (Argentina)	0.668	0.652	0.844	0.799	-0.604	-0.451	-1.263	-0.895
Denmark	0.668	0.607	0.870	0.737	1.050	1.153	0.905	0.192
England (United Kingdom)	0.562	0.623	0.689	0.837	-0.458	-0.142	-0.967	-0.857
France	0.377	0.284	0.975	0.372	-0.071	0.489	-0.830	-0.524
Japan	0.639	0.551	0.797	0.753	0.541	0.518	-0.041	0.266
Korea	0.735	0.605	0.800	0.655	-0.213	-0.307	-1.276	-0.035
Netherlands[1]	0.588	0.495	0.700	0.838	0.439	0.696	-0.769	-0.128
Spain	0.711	0.639	0.818	0.826	-0.320	0.115	-0.780	-0.592
Sweden	0.462	0.450	0.954	0.727	0.632	0.639	-0.498	-0.817
Chinese Taipei	0.735	0.644	0.867	0.746	-0.744	-0.145	-0.832	-0.437
Turkey	0.799	0.823	0.915	0.893	0.232	0.597	-0.098	-0.011
United Arab Emirates	0.829	0.748	0.884	0.805	-1.120	-1.231	-0.992	-1.140
Viet Nam	0.622	0.705	0.745	0.726	-1.497	-0.586	-1.275	-1.335
ISCED level 3								
Alberta (Canada)	0.645	0.518	0.901	0.754	-0.709	-0.287	-0.725	-1.164
Brazil	0.728	0.663	0.853	0.793	-0.717	-0.902	-0.866	-1.065
Croatia	0.657	0.533	0.847	0.855	0.103	0.394	-0.499	-0.297
Denmark	0.698	0.707	0.748	0.774	0.991	0.869	1.192	-0.196
Portugal	0.696	0.636	0.882	0.799	-0.003	0.213	-0.771	-0.638
Slovenia	0.520	0.506	0.701	0.795	0.128	0.286	-1.110	-0.389
Sweden	0.545	0.456	0.818	0.744	0.632	0.639	-0.498	-0.817
Chinese Taipei	0.719	0.732	0.814	0.831	-0.744	-0.145	-0.832	-0.437
Turkey	0.795	0.840	0.890	0.882	0.232	0.597	-0.098	-0.011
United Arab Emirates	0.841	0.759	0.887	0.872	-1.120	-1.231	-0.992	-1.140
Viet Nam	0.792	0.698	0.759	0.723	-1.497	-0.586	-1.275	-1.335
TALIS-PISA link								
Australia	0.652	0.475	0.887	0.684	-0.945	-0.767	-0.579	-0.966
Ciudad Autónoma de Buenos Aires (Argentina)	0.727	0.533	0.769	0.824	-0.632	-0.327	-1.300	-0.973
Colombia	0.774	0.636	0.913	0.780	-0.744	-0.675	-1.221	-0.996
Czech Republic	0.545	0.589	0.840	0.797	0.287	0.500	-0.348	-0.551
Denmark	0.823	0.797	0.797	0.612	0.968	1.071	0.853	-0.146
Georgia	0.713	0.718	0.820	0.912	-0.594	-0.332	-0.711	-0.867
Malta	0.678	0.588	0.842	0.813	-0.399	0.075	-0.414	-0.428
Turkey	0.771	0.874	0.864	0.852	0.191	0.659	-0.138	-0.090
Viet Nam	0.589	0.555	0.813	0.785	-1.632	-0.520	-1.195	-1.167

1. Data from participating country/economy were rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Excluded scale: Teaching practices

One scale was excluded from the teacher population. This was due to poor model fit of the pooled model, as well as at the country/economy level. Table 11.118 presents the item wording for this scale.

Table 11.118. Item wording for teaching practices

Teaching practices	
How often do you use the following methods of assessing student learning in the <target class>?	
Response options: "Never or almost never" (1), "Occasionally" (2), "Frequently" (3), "Always" (4)	
TT3G43A	I administer my own assessment
TT3G43B	I provide written feedback on student work in addition to a <mark, i.e. numeric score or letter grade>
TT3G43C	I let students evaluate their own progress
TT3G43D	I observe students when working on particular tasks and provide immediate feedback

11.4.1. Complex scales from the principal questionnaire

Job satisfaction: Job satisfaction, composite (T3PJOBSA); Job satisfaction with work environment (T3PJSENV); Job satisfaction with profession (T3PJSPRO); Workload stress (T3PWLOAD)

11.58. Measured items

Two subscales and one composite scale measuring teacher job satisfaction were derived from the following question stem:

- "We would like to know how you generally feel about your job. How strongly do you agree or disagree with the following statements?" (TC3G44), which was followed by items about the school used for the subscale *Job satisfaction with work environment* (T3PJSENV), and items on the principal profession used for the subscale *Job satisfaction with profession* (T3PJSPRO).

These two subscales formed the multidimensional scale *Job satisfaction, composite* (T3PJOBSA).

An additional scale related to job satisfaction was developed from the question stem:

- "Thinking about your job at this school, to what extent are the following sources of stress in your work?" (TC3G43). The question was followed with items about principal workload that were used the scale *Workload stress* (T3PWLOAD).

These scales are presented in Table 11.119.

11.59. Model improvements

Model improvements were included for both subscales. A correlation between items TC3G44I and TC3G44J was added for T3PJSENV, while a correlation between items TC3G44D and TC3G44F was added for T3PJSPRO.

11.60. Excluded populations

The Sweden ISCED level 3 population was excluded for the subscale T3PJSENV because, during the model analysis at the country/economy level, it produced a Heywood case (the estimated residual variance of an item was negative; for more information see Heywood

(1931[36])). As a consequence, there is not a reliability coefficient for this population for this scale in Table 11.120, nor are there standardised parameters in Table 11.121.

The Portugal ISCED level 2 population was excluded from the final scale modelling for the scale T3PWLOAD because specific parameters within each of these populations caused model instability. Sweden's ISCED level 2 population was excluded from the model after model analysis at the country/economy level due to a non-converge issue. These populations, therefore, do not have reliability coefficients for this scale in XX11.2 or standardised parameters in XX11.11. In addition, XX11.5 does not have fit statistics for Sweden ISCED level 2.

11.61. Scale reliability

Table 11.120 presents the reliabilities for all populations in each of the four scales. Here it can be seen that the reliability coefficients for the subscales T3PJSENV and T3PJSPRO are mostly above 0.700, suggesting high reliability, while acceptable reliability can be observed for T3PJSENV for Kazakhstan and the Slovak Republic ISCED level 2 populations, and the Korea ISCED level 1 population. Most coefficients for the scale T3PWLOAD exhibit acceptable to high reliability, while reliabilities are low in the Iceland and Latvia ISCED level 2 populations, and the France ISCED level 1 population.

11.62. Model fits

Tables 11.121 and 11.122 present the model fit indices for the subscales T3PJSENV and T3PJSPRO respectively. The model fit for T3PJSENV is acceptable for most populations, with the exception of Colombia at the ISCED level 2. Although the model fails at the ISCED level 2 level in Bulgaria and Iceland, Sweden ISCED level 1, as well as at the ISCED level 3 level and for the TALIS-PISA link population in Turkey, when these participating countries/economies were included in the respective cross-country measurement invariance testing, the models worked well because the addition of the other groups benefited the overall model.

Model fits for T3PJSPRO were almost perfect in almost all participating countries/economies as evident in Table 11.122, and were also acceptable in all participating countries/economies.

The fit indices for the scale T3PWLOAD are not presented because the scale was based on three items. In addition, because the scale reached only configural invariance for ISCED level 2 (see Table 11.125), the populations from the participating countries/economies that did not meet the technical standards, the participating countries/economies with late data delivery, and the TALIS-PISA link populations also had free parameters, which meant the model was just identified for those populations, resulting in a perfect model fit.

11.63. Invariance testing

Table 11.123 presents the results from the invariance analyses for the subscale T3PJSENV. Configural invariance was established for all population levels. The difference for the ISCED level 1 and 2 levels between the configural and metric models was above the cut-off criteria. For ISCED level 3, the configural model did not converge, as it was under-identified. However, because the metric model did not exhibit acceptable fit indices, the model was considered configural invariant only.

The measurement invariance results for the subscale T3PJSPRO presented in Table 11.124 show that this scale was configural invariant at the ISCED level 1 and 2 levels, and metric

invariant at the ISCED level 3 level. Therefore, the invariance level for the composite scale T3PJOBSA was configural for all ISCED levels.

Finally, Table 11.125 presents the invariance results for the scale T3PWLOAD. It reached configural invariance for ISCED level 2 and metric invariance for ISCED levels 1 and 3. Because the configural models were perfect, if the metric model exhibited acceptable fit, the model was considered metric invariant.

11.64. Item parameters

The unstandardised item parameters are not reported because the scales all reached configural invariance for the ISCED level 2 populations and the item parameters were country-specific.

Table 11.126 presents the standardised factor loadings and unstandardised intercepts for subscale T3PJSENV. Most factor loadings for items TC3G44E and TC3G44G are above 0.600, while item TC3G44E is below 0.450 in the Viet Nam TALIS-PISA link population. Most of the factor loadings for item TC3G44J suggest moderate strength between the item and the latent construct, while the relationship is weak in a good number of populations. Item TC3G44I has many low and moderate factor loadings. These results suggest the scale does not work well for several populations, especially for the Austria ISCED level 2 population.Table 11.127 presents similar results for subscale T3PJSPRO. Item TC3G44B exhibits the strongest factor loadings. Although most factor loadings for item TC3G44A are above 0.600, a good number of loadings are between 0.450 and 0.600, with the loadings for the Columbia, Kazakhstan, Latvia and Romania ISCED level 2 populations particularly weak. The factor loadings for both items TC3G44D and TC3G44F are moderate for most populations, but also weak for a fair number of populations. Of note, the factor loading for item TC3G44F for Lithuania's ISCED level 2 population is negative, suggesting a negative relationship with the latent factor.

Table 11.128 presents the standardised factor loadings and unstandardised intercepts for scale T3PWLOAD. While item TC3G43B has strong factor loadings for most populations, moderate and even weak factor loading are also present. In comparison, item TC3G43A has more moderate and weak factor loadings, while item TC3G44C has mostly moderate and weak factor loadings.

Table 11.119. Item wording for job satisfaction scales

T3PJOBSA: Job satisfaction, composite	
T3PJSENV: Job satisfaction with work environment (subscale)	
TC3G44: We would like to know how you generally feel about your job. How strongly do you agree or disagree with the following statements?	
Response options: "Strongly disagree" (1), "Disagree" (2), "Agree" (3), "Strongly agree" (4).	
TC3G44E	I enjoy working at this school
TC3G44G	I would recommend this school as a good place to work
TC3G44I	I am satisfied with my performance in this school
TC3G44J	All in all, I am satisfied with my job
T3PJSPRO: Job satisfaction with profession (subscale)	
TC3G44: We would like to know how you generally feel about your job. How strongly do you agree or disagree with the following statements?	
Response options: "Strongly disagree" (1), "Disagree" (2), "Agree" (3), "Strongly agree" (4).	
TC3G44A	The advantages of this profession clearly outweigh the disadvantages
TC3G44B	If I could decide again, I would still choose this job/position
TC3G44D*	I regret that I decided to become a principal
TC3G44F*	I wonder whether it would have been better to choose another profession
T3PWLOAD: Workload stress	
TC3G43: Thinking about your job at this school, to what extent are the following sources of stress in your work?	
Response options: "Not at all" (1), "To some extent" (2), "Quite a bit" (3), "A lot" (4).	
TC3G43A	Having too much teacher appraisal and feedback work to do
TC3G43B	Having too much administrative work to do (e.g. filling out forms)
TC3G43C	Having extra duties due to absent school staff

* The response options for these items were reverse coded.
Source: OECD, TALIS 2018 database.

Table 11.120 Reliability coefficients for job satisfaction scales

Participating countries/economies	T3PJSENV	T3PJSPRO	T3PJOBSA	T3PWLOAD
	Omega coefficient[3]		Stratified Cronbach's alpha	Omega coefficient
ISCED level 2				
Alberta (Canada)[4]	0.861	-	-	0.986
Australia[1]	0.769	0.839	0.873	0.659
Austria	0.964	0.876	0.942	0.585
Belgium	0.740	0.799	0.837	0.717
Flemish Community (Belgium)	0.774	0.778	0.852	0.551
Brazil	0.760	0.797	0.857	0.869
Bulgaria	0.796	0.970	0.913	0.624
Ciudad Autónoma de Buenos Aires (Argentina)	0.686	0.976	0.881	0.679
Chile	0.752	0.682	0.801	0.726
Colombia[4]	0.962	-	-	0.771
Croatia	0.771	0.854	0.865	0.982
Cyprus[4]	0.929	-	-	0.745
Czech Republic	0.843	0.724	0.863	0.464
Denmark	0.901	0.953	0.948	0.563
England (United Kingdom)	0.760	0.893	0.893	0.686
Estonia	0.801	0.753	0.859	0.759
Finland	0.769	0.960	0.918	0.893
France	0.834	0.839	0.889	0.984

Participating countries/economies	T3PJSENV	T3PJSPRO	T3PJOBSA	T3PWLOAD
	Omega coefficient[3]		Stratified Cronbach's alpha	Omega coefficient
Georgia	0.832	0.769	0.867	0.869
Hungary[4]	0.746	-	-	0.593
Iceland	0.731	0.850	0.868	0.432
Israel	0.846	0.733	0.873	0.607
Italy	0.861	0.846	0.890	0.581
Japan	0.790	0.808	0.866	0.986
Kazakhstan	0.598	0.654	0.748	0.689
Korea	0.830	0.949	0.925	0.988
Latvia	0.666	0.794	0.772	0.444
Lithuania[4]	0.712	-	-	0.745
Malta	0.937	0.846	0.939	0.484
Mexico	0.760	0.819	0.863	0.854
Netherlands[4]	0.852	-	-	0.604
New Zealand	0.984	0.821	0.921	0.797
Norway	0.723	0.885	0.867	0.548
Portugal[5]	0.785	0.805	0.849	-
Romania	0.845	0.897	0.910	0.796
Russian Federation	0.699	0.953	0.886	0.752
Saudi Arabia	0.757	0.801	0.848	0.771
Shanghai (China)	0.796	0.908	0.910	0.554
Singapore	0.817	0.711	0.860	0.738
Slovak Republic	0.590	0.674	0.740	0.543
Slovenia	0.682	0.803	0.832	0.728
South Africa[2,4]	-	0.689	-	0.545
Spain[4]	0.711	-	-	0.591
Sweden[5]	0.815	0.951	0.930	-
Chinese Taipei	0.810	0.872	0.892	0.702
Turkey	0.774	0.789	0.856	0.745
United Arab Emirates	0.808	0.916	0.916	0.724
United States	0.755	0.876	0.892	0.988
Viet Nam	0.812	0.872	0.880	0.752
ISCED level 1				
Australia[1]	0.819	0.897	0.912	0.638
Flemish Community (Belgium)	0.799	0.835	0.876	0.458
Ciudad Autónoma de Buenos Aires (Argentina)	0.774	0.874	0.874	0.599
Denmark	0.752	0.955	0.893	0.709
England (United Kingdom)	0.824	0.845	0.892	0.687
France	0.792	0.792	0.845	0.372
Japan	0.654	0.776	0.808	0.988
Korea	0.594	0.801	0.811	0.806
Netherlands[1]	0.714	0.796	0.852	0.679
Spain[4]	0.666	-	-	0.494
Sweden	0.712	0.929	0.899	0.608
Chinese Taipei	0.841	0.962	0.928	0.704
Turkey	0.817	0.912	0.912	0.794
United Arab Emirates	0.753	0.887	0.885	0.674
Viet Nam	0.781	0.773	0.850	0.776
ISCED level 3				
Alberta (Canada)	0.733	0.880	0.868	0.569

Participating countries/economies	T3PJSENV	T3PJSPRO	T3PJOBSA	T3PWLOAD
	Omega coefficient[3]		Stratified Cronbach's alpha	Omega coefficient
Brazil	0.759	0.803	0.850	0.988
Croatia	0.835	0.903	0.912	0.487
Denmark	0.914	0.885	0.941	0.686
Portugal	0.615	0.884	0.832	0.984
Slovenia	0.806	0.776	0.870	0.984
Sweden[6]	-	0.837	-	0.526
Chinese Taipei	0.767	0.924	0.906	0.677
Turkey	0.740	0.711	0.824	0.646
United Arab Emirates	0.748	0.901	0.898	0.724
Viet Nam	0.796	0.663	0.831	0.651
TALIS-PISA link				
Australia	0.885	0.947	0.943	0.627
Ciudad Autónoma de Buenos Aires (Argentina)	0.814	0.755	0.868	0.534
Colombia	0.841	0.863	0.902	0.808
Czech Republic[4]	0.824	-	-	0.539
Denmark	0.922	0.912	0.947	0.646
Georgia[4]	0.823	-	-	0.872
Malta	0.837	0.824	0.901	0.540
Turkey	0.719	0.895	0.868	0.814
Viet Nam[4]	0.707	-	-	0.776

1. Data from the participating country/economy was rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
3. Omega coefficient was calculated based on unidimensional models for every single subscale of the multidimensional construct.
4. These participating countries'/economies' reliability coefficient estimation failed in the final scale model due to a negative residual variance for one or more items that could not be corrected; when this occurs for a subscale of a multidimensional scale, the multidimensional scale reliability coefficient is also missing; these countries/economies have untrustworthy scale scores for the corresponding ISCED level.
5. This participating country/economy was excluded from this scale.
Source: OECD, TALIS 2018 database.

Table 11.121. CFA model-data fit for scale T3PJSENV

Job satisfaction with work environment

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Alberta (Canada)	0.999	0.994	0.027	0.012
Australia[1]	1.000	1.135	0.000	0.002
Austria[3]	0.985	0.911	0.064	0.029
Belgium	1.000	1.070	0.000	0.002
Flemish Community (Belgium)	1.000	1.112	0.000	0.000
Brazil	1.000	1.019	0.000	0.006
Bulgaria[5]	-	-	-	-
Ciudad Autónoma de Buenos Aires (Argentina)	1.000	1.008	0.000	0.013
Chile	0.983	0.898	0.084	0.009
Colombia[3]	0.882	0.290	0.188	0.054
Croatia	1.000	1.022	0.000	0.007
Cyprus	1.000	1.056	0.000	0.003
Czech Republic	0.945	0.670	0.167	0.032

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Denmark	1.000	0.999	0.009	0.015
England (United Kingdom)	1.000	1.043	0.000	0.008
Estonia	1.000	1.033	0.000	0.005
Finland	0.985	0.913	0.110	0.019
France	0.993	0.957	0.071	0.012
Georgia	0.998	0.986	0.060	0.013
Hungary	0.991	0.947	0.073	0.013
Iceland[5]	-	-	-	-
Israel	1.000	1.023	0.000	0.004
Italy	0.955	0.729	0.178	0.023
Japan	1.000	1.023	0.000	0.010
Kazakhstan	1.000	1.033	0.000	0.007
Korea	0.967	0.800	0.117	0.016
Latvia	1.000	1.104	0.000	0.005
Lithuania	0.961	0.764	0.124	0.019
Malta	1.000	1.156	0.000	0.003
Mexico	1.000	1.042	0.000	0.004
Netherlands	0.986	0.919	0.127	0.012
New Zealand	1.000	1.011	0.000	0.015
Norway	1.000	1.213	0.000	0.001
Portugal	1.000	1.009	0.000	0.006
Romania	1.000	1.027	0.000	0.004
Russian Federation	1.000	1.146	0.000	0.001
Saudi Arabia	1.000	1.027	0.000	0.015
Shanghai (China)	0.984	0.902	0.129	0.014
Singapore	0.993	0.957	0.080	0.010
Slovak Republic	0.997	0.984	0.026	0.016
Slovenia	1.000	1.101	0.000	0.015
South Africa[2]	1.000	1.000	0.000	0.000
Spain	1.000	1.031	0.000	0.002
Sweden	0.961	0.766	0.171	0.024
Chinese Taipei	1.000	1.046	0.000	0.004
Turkey	1.000	1.033	0.000	0.003
United Arab Emirates	0.992	0.951	0.064	0.016
United States	1.000	1.090	0.000	0.001
Viet Nam	1.000	1.045	0.000	0.001
ISCED level 1				
Australia[1]	1.000	1.068	0.000	0.002
Flemish Community (Belgium)	1.000	1.059	0.000	0.004
Ciudad Autónoma de Buenos Aires (Argentina)	1.000	1.060	0.000	0.000
Denmark	0.961	0.764	0.115	0.032
England (United Kingdom)	1.000	1.090	0.000	0.005
France	0.964	0.781	0.126	0.023
Japan	0.937	0.621	0.136	0.024
Korea	1.000	1.156	0.000	0.009
Netherlands[1]	1.000	1.057	0.000	0.004
Spain	1.000	1.061	0.000	0.003
Sweden[4]	-	-	-	0.018
Chinese Taipei	1.000	1.021	0.000	0.003
Turkey	0.952	0.710	0.139	0.024
United Arab Emirates	0.983	0.897	0.106	0.011
Viet Nam	0.997	0.983	0.035	0.009

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 3				
Alberta (Canada)	0.975	0.851	0.126	0.017
Brazil	1.000	1.074	0.000	0.001
Croatia	0.991	0.943	0.122	0.009
Denmark	0.994	0.965	0.087	0.024
Portugal[4]	-	-	-	0.025
Slovenia	1.000	1.089	0.000	0.002
Sweden[6]	-	-	-	-
Chinese Taipei	0.908	0.451	0.244	0.030
Turkey[5]	-	-	-	-
United Arab Emirates	0.976	0.856	0.112	0.020
Viet Nam	1.000	1.042	0.000	0.001
TALIS-PISA link				
Australia	1.000	1.014	0.000	0.008
Ciudad Autónoma de Buenos Aires (Argentina)	1.000	1.098	0.000	0.001
Colombia	1.000	1.092	0.000	0.010
Czech Republic	1.000	1.069	0.000	0.001
Denmark	1.000	1.012	0.000	0.007
Georgia	1.000	1.037	0.000	0.013
Malta	1.000	1.073	0.000	0.011
Turkey[5]	-	-	-	-
Viet Nam	1.000	1.125	0.000	0.008

1. Data from the participating country/economy was rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
3. These participating country/economy had a negative residual variance on item TC3G44E in the initial model, resulting in the failure of the software to produce fit statistics for CFI, TLI and RMSEA. Several corrections attempted to fix this issue, and eventually resulted in the residual variance of item TC3G44E being set to greater than 0.01.
4. As the correction factor for this participating country/economy was negative, only the SRMR is reported.
5. Scale modelling failed in this participating country/economy.
6. This participating country/economy was excluded from this scale.
Source: OECD, TALIS 2018 database.

Table 11.122. CFA model-data fit for scale T3PJSPRO

Job satisfaction with profession

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Alberta (Canada)	0.998	0.990	0.043	0.011
Australia[1]	1.000	1.106	0.000	0.003
Austria	1.000	0.999	0.007	0.014
Belgium	1.000	1.043	0.000	0.003
Flemish Community (Belgium)	1.000	1.035	0.000	0.007
Brazil	1.000	1.103	0.000	0.012
Bulgaria	0.999	0.996	0.023	0.009
Ciudad Autónoma de Buenos Aires (Argentina)	1.000	1.007	0.000	0.012
Chile	1.000	1.117	0.000	0.015
Colombia	1.000	1.302	0.000	0.006
Croatia	0.969	0.815	0.124	0.022
Cyprus	1.000	1.125	0.000	0.002
Czech Republic	1.000	1.001	0.000	0.011
Denmark	1.000	1.039	0.000	0.006

Participating countries/economies	CFI	TLI	RMSEA	SRMR
England (United Kingdom)	1.000	1.064	0.000	0.003
Estonia	0.986	0.916	0.070	0.018
Finland	1.000	1.055	0.000	0.007
France	0.999	0.991	0.030	0.009
Georgia	0.991	0.945	0.057	0.010
Hungary	1.000	1.040	0.000	0.010
Iceland	0.993	0.955	0.090	0.012
Israel	1.000	1.039	0.000	0.006
Italy	0.988	0.931	0.118	0.016
Japan	0.984	0.901	0.107	0.021
Kazakhstan	1.000	1.095	0.000	0.009
Korea	1.000	1.018	0.000	0.003
Latvia	0.905	0.432	0.148	0.032
Lithuania	1.000	1.043	0.000	0.002
Malta	1.000	1.099	0.000	0.006
Mexico	0.955	0.732	0.118	0.015
Netherlands	1.000	1.107	0.000	0.001
New Zealand	0.998	0.986	0.034	0.017
Norway	1.000	1.034	0.000	0.006
Portugal	1.000	1.060	0.000	0.003
Romania	0.973	0.836	0.127	0.035
Russian Federation	0.968	0.808	0.077	0.038
Saudi Arabia	1.000	1.095	0.000	0.003
Shanghai (China)	1.000	1.086	0.000	0.002
Singapore	1.000	1.026	0.000	0.012
Slovak Republic	1.000	1.112	0.000	0.003
Slovenia	0.962	0.775	0.134	0.026
South Africa[2]	1.000	1.007	0.000	0.011
Spain	1.000	1.020	0.000	0.009
Sweden	0.978	0.870	0.186	0.011
Chinese Taipei	1.000	1.028	0.000	0.011
Turkey	0.989	0.932	0.066	0.019
United Arab Emirates	0.990	0.937	0.071	0.010
United States	0.977	0.860	0.090	0.030
Viet Nam	1.000	1.097	0.000	0.002
ISCED level 1				
Australia[1]	0.970	0.822	0.129	0.015
Flemish Community (Belgium)	1.000	1.045	0.000	0.001
Ciudad Autónoma de Buenos Aires (Argentina)	0.974	0.845	0.137	0.029
Denmark	0.955	0.730	0.179	0.030
England (United Kingdom)	1.000	1.056	0.000	0.005
France	1.000	1.065	0.000	0.012
Japan	1.000	1.059	0.000	0.001
Korea	1.000	1.036	0.000	0.011
Netherlands[1]	1.000	1.065	0.000	0.005
Spain	1.000	1.026	0.000	0.011
Sweden	1.000	1.019	0.000	0.005
Chinese Taipei	0.980	0.878	0.117	0.026
Turkey	1.000	1.049	0.000	0.010
United Arab Emirates	0.976	0.856	0.109	0.014
Viet Nam	1.000	1.083	0.000	0.005
ISCED level 3				

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Alberta (Canada)	0.995	0.971	0.061	0.013
Brazil	1.000	1.108	0.000	0.003
Croatia	1.000	1.050	0.000	0.002
Denmark	0.953	0.719	0.197	0.019
Portugal	0.994	0.962	0.063	0.015
Slovenia	0.944	0.663	0.166	0.016
Sweden	0.994	0.964	0.044	0.012
Chinese Taipei	1.000	1.046	0.000	0.006
Turkey	0.985	0.911	0.045	0.026
United Arab Emirates	1.000	1.032	0.000	0.002
Viet Nam	0.994	0.965	0.035	0.017
TALIS-PISA link				
Australia[3]	-	-	-	0.048
Ciudad Autónoma de Buenos Aires (Argentina)	0.936	0.618	0.151	0.024
Colombia	1.000	1.052	0.000	0.009
Czech Republic	1.000	1.056	0.000	0.010
Denmark	1.000	1.089	0.000	0.005
Georgia	0.913	0.479	0.183	0.029
Malta	1.000	1.098	0.000	0.015
Turkey	1.000	1.013	0.000	0.007
Viet Nam	1.000	1.023	0.000	0.005

1. Data from the participating country/economy was rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
3. As the correction factor for this participating country/economy was negative, only the SRMR is reported.
Source: OECD, TALIS 2018 database.

Table 11.123. Invariance test results for scale T3PJSENV

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level for ISCED level 2								
Configural	0.993	0.958	0.063	0.016				
Metric	0.957	0.935	0.079	0.170	0.036	0.023	-0.016	-0.154
Scalar	0.795	0.821	0.131	0.228	0.162	0.114	-0.052	-0.058
Invariance level for ISCED level 1								
Configural	0.997	0.984	0.033	0.015				
Metric	0.974	0.959	0.053	0.132	0.023	0.025	-0.020	-0.117
Scalar	0.748	0.769	0.126	0.213	0.226	0.190	-0.073	-0.081
Invariance level for ISCED level 3								
Configural	-	-	-	-				
Metric	0.928	0.884	0.102	0.155	-	-	-	-
Scalar	0.851	0.862	0.112	0.165	0.077	0.022	-0.010	-0.010

Source: OECD, TALIS 2018 database.

Table 11.124. Invariance test results for scale T3PJSPRO

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level for ISCED level 2								
Configural	0.997	0.980	0.040	0.015				
Metric	0.944	0.914	0.081	0.131	0.053	0.066	-0.041	-0.116
Scalar	0.681	0.721	0.146	0.241	0.263	0.193	-0.065	-0.110
Invariance level for ISCED level 1								
Configural	0.997	0.984	0.037	0.015				
Metric	0.938	0.901	0.092	0.151	0.059	0.083	-0.055	-0.136
Scalar	0.701	0.726	0.153	0.226	0.237	0.175	-0.061	-0.075
Invariance level for ISCED level 3								
Configural	0.996	0.976	0.041	0.015				
Metric	0.984	0.975	0.042	0.088	0.012	0.001	-0.001	-0.073
Scalar	0.831	0.843	0.105	0.120	0.153	0.132	-0.063	-0.032

Source: OECD, TALIS 2018 database.

Table 11.125. Invariance test results for scale T3PWLOAD

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level for ISCED level 2								
Configural	1.000	1.000	0.000	0.004				
Metric	0.924	0.883	0.097	0.086	0.076	0.117	-0.097	-0.082
Scalar	0.283	0.450	0.209	0.204	0.641	0.433	-0.112	-0.118
Invariance level for ISCED level 1								
Configural	1.000	1.000	0.000	0.000				
Metric	0.968	0.948	0.064	0.057	0.032	0.052	-0.064	-0.057
Scalar	0.203	0.353	0.228	0.204	0.765	0.595	-0.164	-0.147
Invariance level for ISCED level 3								
Configural	1.000	1.000	0.000	0.000				
Metric	0.947	0.913	0.080	0.070	0.053	0.087	-0.080	-0.070
Scalar	0.530	0.612	0.168	0.112	0.417	0.301	-0.088	-0.042

Source: OECD, TALIS 2018 database.

Table 11.126. Standardised factor loadings and unstandardised intercepts for scale T3PJSENV

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TC3G44E	TC3G44G	TC3G44I	TC3G44J	TC3G44E	TC3G44G	TC3G44I	TC3G44J
ISCED level 2								
Alberta (Canada)	0.880	0.830	0.453	0.595	3.526	3.528	3.265	3.279
Australia[1]	0.508	0.846	0.343	0.554	3.584	3.596	3.168	3.337
Austria	0.982	0.410	0.299	0.366	3.821	3.554	3.385	3.497
Belgium	0.805	0.604	0.493	0.422	3.496	3.433	2.962	3.157
Flemish Community (Belgium)	0.831	0.676	0.399	0.456	3.427	3.479	2.989	3.136
Brazil	0.761	0.747	0.459	0.588	3.613	3.539	3.215	3.305
Bulgaria	0.773	0.755	0.580	0.707	3.420	3.381	3.227	3.195
Ciudad Autónoma de Buenos Aires (Argentina)	0.708	0.687	0.355	0.465	3.527	3.513	3.291	3.348
Chile	0.695	0.771	0.499	0.614	3.640	3.647	3.378	3.546
Colombia	0.980	0.454	0.339	0.457	3.755	3.778	3.607	3.750

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TC3G44E	TC3G44G	TC3G44I	TC3G44J	TC3G44E	TC3G44G	TC3G44I	TC3G44J
Croatia	0.798	0.720	0.499	0.563	3.435	3.518	3.228	3.314
Cyprus	0.958	0.731	0.416	0.603	3.297	3.299	3.282	3.404
Czech Republic	0.901	0.591	0.308	0.562	3.498	3.522	3.108	3.191
Denmark	0.941	0.651	0.200	0.592	3.718	3.725	3.451	3.554
England (United Kingdom)	0.782	0.746	0.231	0.499	3.652	3.693	3.197	3.273
Estonia	0.844	0.723	0.408	0.534	3.422	3.498	2.982	3.249
Finland	0.799	0.697	0.465	0.601	3.281	3.482	3.176	3.201
France	0.861	0.796	0.349	0.543	3.378	3.302	3.100	3.212
Georgia	0.688	0.861	0.517	0.736	3.445	3.306	3.022	3.224
Hungary	0.737	0.784	0.216	0.376	3.764	3.580	3.110	3.184
Iceland	0.678	0.799	0.212	0.279	3.538	3.624	3.183	3.237
Israel	0.790	0.866	0.522	0.648	3.615	3.575	3.380	3.507
Italy	0.743	0.905	0.539	0.331	3.354	3.182	3.105	3.137
Japan	0.779	0.642	0.480	0.771	3.109	3.210	2.651	3.092
Kazakhstan	0.506	0.625	0.573	0.490	3.514	3.335	3.153	3.263
Korea	0.791	0.784	0.702	0.708	3.377	3.305	3.285	3.408
Latvia	0.750	0.601	0.358	0.224	3.677	3.409	3.058	3.116
Lithuania	0.707	0.738	0.319	0.461	3.643	3.475	3.135	3.249
Malta	0.965	0.577	0.421	0.622	3.400	3.616	3.247	3.265
Mexico	0.767	0.696	0.559	0.664	3.660	3.558	3.567	3.664
Netherlands	0.859	0.814	0.515	0.698	3.622	3.487	3.227	3.420
New Zealand	0.862	0.991	0.146	0.044	3.395	3.394	3.135	3.250
Norway	0.780	0.618	0.251	0.539	3.629	3.613	3.023	3.308
Portugal	0.686	0.848	0.377	0.386	3.734	3.697	3.278	3.292
Romania	0.707	0.880	0.484	0.701	3.614	3.493	3.327	3.355
Russian Federation	0.729	0.714	0.331	0.277	3.531	3.423	2.978	3.160
Saudi Arabia	0.843	0.529	0.269	0.456	3.158	3.066	3.472	3.364
Shanghai (China)	0.757	0.686	0.637	0.790	3.050	3.313	3.280	3.252
Singapore	0.789	0.803	0.538	0.705	3.651	3.535	3.389	3.595
Slovak Republic	0.491	0.676	0.430	0.369	3.459	3.455	3.036	3.114
Slovenia	0.694	0.693	0.175	0.481	3.323	3.411	3.179	3.279
South Africa[2]	1.008	0.605	0.600	0.400	3.276	3.150	2.969	3.132
Spain	0.752	0.642	0.434	0.557	3.688	3.750	3.355	3.459
Sweden	0.838	0.780	0.386	0.581	3.622	3.589	3.285	3.281
Chinese Taipei	0.815	0.753	0.647	0.664	3.338	3.363	3.199	3.247
Turkey	0.744	0.767	0.443	0.655	3.277	3.144	3.333	3.241
United Arab Emirates	0.770	0.768	0.591	0.747	3.524	3.407	3.417	3.459
United States	0.604	0.709	0.486	0.771	3.724	3.542	3.274	3.389
Viet Nam	0.745	0.853	0.480	0.496	3.333	3.332	3.240	3.315
ISCED level 1								
Australia[1]	0.816	0.785	0.548	0.648	3.516	3.612	3.262	3.379
Flemish Community (Belgium)	0.861	0.652	0.408	0.477	3.427	3.479	2.989	3.136
Ciudad Autónoma de Buenos Aires (Argentina)	0.748	0.793	0.413	0.567	3.527	3.513	3.291	3.348
Denmark	0.814	0.585	0.182	0.589	3.718	3.725	3.451	3.554
England (United Kingdom)	0.848	0.786	0.302	0.579	3.652	3.693	3.197	3.273
France	0.806	0.778	0.341	0.528	3.547	3.455	3.070	3.043
Japan	0.598	0.561	0.438	0.667	3.109	3.210	2.651	3.092
Korea	0.562	0.553	0.567	0.515	3.391	3.026	3.386	3.380

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TC3G44E	TC3G44G	TC3G44I	TC3G44J	TC3G44E	TC3G44G	TC3G44I	TC3G44J
Netherlands[1]	0.710	0.613	0.478	0.677	3.531	3.535	3.143	3.311
Spain	0.735	0.518	0.455	0.555	3.634	3.597	3.465	3.469
Sweden	0.734	0.666	0.380	0.534	3.622	3.589	3.285	3.281
Chinese Taipei	0.801	0.840	0.631	0.703	3.338	3.363	3.199	3.247
Turkey	0.780	0.816	0.474	0.684	3.277	3.144	3.333	3.241
United Arab Emirates	0.721	0.704	0.553	0.705	3.524	3.407	3.417	3.459
Viet Nam	0.735	0.807	0.558	0.542	3.333	3.332	3.240	3.315
ISCED level 3								
Alberta (Canada)	0.766	0.724	0.310	0.413	3.526	3.528	3.265	3.279
Brazil	0.758	0.758	0.429	0.540	3.613	3.539	3.215	3.305
Croatia	0.764	0.842	0.593	0.734	3.435	3.518	3.228	3.314
Denmark	0.926	0.842	0.252	0.826	3.718	3.725	3.451	3.554
Portugal	0.558	0.699	0.382	0.348	3.734	3.697	3.278	3.292
Slovenia	0.794	0.793	0.247	0.650	3.323	3.411	3.179	3.279
Sweden[3]	-	-	-	-	-	-	-	-
Chinese Taipei	0.718	0.769	0.574	0.617	3.338	3.363	3.199	3.247
Turkey	0.713	0.689	0.447	0.690	3.277	3.144	3.333	3.241
United Arab Emirates	0.694	0.696	0.556	0.721	3.524	3.407	3.417	3.459
Viet Nam	0.788	0.796	0.523	0.545	3.333	3.332	3.240	3.315
TALIS-PISA link								
Australia	0.916	0.783	0.350	0.696	3.657	3.657	3.292	3.358
Ciudad Autónoma de Buenos Aires (Argentina)	0.878	0.679	0.318	0.387	3.639	3.709	3.350	3.403
Colombia	0.702	0.726	0.823	0.744	3.734	3.730	3.512	3.763
Czech Republic	0.890	0.538	0.295	0.538	3.483	3.327	3.054	3.128
Denmark	0.919	0.897	0.333	0.822	3.595	3.610	3.288	3.398
Georgia	0.679	0.883	0.224	0.433	3.508	3.512	3.105	3.291
Malta	0.888	0.533	0.470	0.704	3.461	3.668	3.242	3.311
Turkey	0.731	0.489	0.661	0.565	3.550	3.269	3.570	3.413
Viet Nam	0.137	0.790	0.596	0.635	3.253	3.276	3.211	3.377

1. Data from the participating country/economy was rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
3. This participating country/economy was excluded from this scale.

Source: OECD, TALIS 2018 database.

Table 11.127. Standardised factor loadings and unstandardised intercepts for scale T3PJSPRO

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TC3G44A	TC3G44B	TC3G44D	TC3G44F	TC3G44A	TC3G44B	TC3G44D	TC3G44F
ISCED level 2								
Alberta (Canada)	0.810	1.031	0.293	0.576	3.383	3.395	3.514	3.186
Australia[1]	0.692	0.887	0.578	0.338	3.451	3.408	3.552	3.425
Austria	0.717	0.913	0.577	0.514	3.353	3.383	3.582	3.703
Belgium	0.493	0.846	0.692	0.540	2.525	3.080	3.414	3.202
Flemish Community (Belgium)	0.544	0.780	0.726	0.641	2.639	3.061	3.420	3.064
Brazil	0.636	0.860	0.417	0.439	2.927	3.336	3.571	3.308
Bulgaria	0.536	0.984	0.652	0.629	2.280	2.720	3.102	2.821
Ciudad Autónoma de Buenos Aires (Argentina)	0.755	0.988	0.595	0.536	3.173	3.427	3.555	3.513

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TC3G44A	TC3G44B	TC3G44D	TC3G44F	TC3G44A	TC3G44B	TC3G44D	TC3G44F
Chile	0.764	0.531	0.461	0.338	3.344	3.583	3.694	3.668
Colombia	0.335	1.536	0.206	0.171	3.550	3.752	3.697	3.518
Croatia	0.627	0.910	0.449	0.412	2.828	3.052	3.441	3.152
Cyprus	0.569	1.164	0.335	0.418	3.287	3.318	3.342	3.267
Czech Republic	0.701	0.638	0.607	0.559	2.751	3.177	3.555	3.241
Denmark	0.744	0.974	0.514	0.476	3.548	3.519	3.713	3.322
England (United Kingdom)	0.809	0.919	0.578	0.657	3.148	3.208	3.355	3.020
Estonia	0.529	0.820	0.493	0.475	3.074	3.227	3.786	3.370
Finland	0.720	0.978	0.510	0.606	3.335	3.253	3.541	3.135
France	0.545	0.887	0.638	0.694	2.709	3.271	3.613	3.378
Georgia	0.696	0.837	0.247	0.099	3.189	3.262	3.389	2.884
Hungary	0.626	1.009	0.477	0.360	3.112	3.246	3.605	3.149
Iceland	0.863	0.793	0.677	0.634	3.387	3.108	3.441	3.043
Israel	0.738	0.631	0.610	0.601	3.382	3.406	3.597	3.400
Italy	0.664	0.870	0.755	0.735	2.546	3.070	3.304	3.106
Japan	0.543	0.874	0.543	0.512	2.714	2.697	3.539	3.275
Kazakhstan	0.293	0.591	0.371	0.738	2.937	3.124	3.383	3.301
Korea	0.843	0.968	0.646	0.570	3.145	3.195	3.422	3.218
Latvia	0.436	0.848	0.624	0.599	2.653	3.092	3.373	3.051
Lithuania	0.657	1.007	0.538	-0.424	3.278	3.186	3.444	1.973
Malta	0.704	0.764	0.772	0.726	2.694	3.045	3.329	2.799
Mexico	0.768	0.858	0.336	0.410	3.473	3.675	3.715	3.552
Netherlands	0.679	1.021	0.459	0.442	3.403	3.327	3.706	3.445
New Zealand	0.715	0.762	0.668	0.746	3.033	3.129	3.429	3.014
Norway	0.832	0.902	0.275	0.708	3.195	3.261	3.388	3.121
Portugal	0.644	0.862	0.489	0.490	3.020	3.208	3.555	3.228
Romania	0.447	0.942	0.615	0.363	2.557	3.032	3.425	3.431
Russian Federation	0.504	0.975	0.567	0.474	2.904	3.112	3.362	3.498
Saudi Arabia	0.556	0.872	0.468	0.435	2.475	2.724	2.980	2.559
Shanghai (China)	0.527	0.950	0.508	0.360	2.570	2.822	3.209	3.087
Singapore	0.728	0.614	0.358	0.641	3.655	3.635	3.683	3.434
Slovak Republic	0.484	0.702	0.604	0.484	2.556	3.175	3.355	2.995
Slovenia	0.636	0.867	0.420	0.439	2.992	3.175	3.470	3.319
South Africa[2]	0.744	0.649	0.372	0.356	2.964	2.902	3.405	2.769
Spain	0.612	1.090	0.303	0.298	3.233	3.393	3.514	3.612
Sweden	0.882	0.968	0.572	0.534	3.250	3.170	3.625	3.118
Chinese Taipei	0.623	0.923	0.459	0.426	2.873	3.091	3.347	2.712
Turkey	0.692	0.836	0.363	0.536	2.867	3.123	3.225	2.907
United Arab Emirates	0.765	0.948	0.458	0.523	3.291	3.333	3.614	3.341
United States	0.769	0.915	0.506	0.357	3.231	3.300	3.750	3.438
Viet Nam	0.552	0.926	0.453	0.375	3.112	3.351	3.587	3.282
ISCED level 1								
Australia[1]	0.798	0.929	0.400	0.541	3.399	3.419	3.540	3.180
Flemish Community (Belgium)	0.505	0.793	0.813	0.604	2.639	3.061	3.420	3.064
Ciudad Autónoma de Buenos Aires (Argentina)	0.480	0.847	0.677	0.846	3.113	3.460	3.508	3.472
Denmark	0.794	0.975	0.537	0.420	3.548	3.519	3.713	3.322
England (United Kingdom)	0.758	0.879	0.564	0.521	3.148	3.208	3.355	3.020
France	0.545	0.836	0.567	0.621	2.709	3.271	3.613	3.378

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TC3G44A	TC3G44B	TC3G44D	TC3G44F	TC3G44A	TC3G44B	TC3G44D	TC3G44F
Japan	0.537	0.842	0.580	0.486	2.714	2.697	3.539	3.275
Korea	0.697	0.850	0.539	0.410	3.145	3.195	3.422	3.218
Netherlands[1]	0.755	0.777	0.492	0.682	3.198	3.134	3.576	3.312
Spain	0.629	1.086	0.311	0.347	3.233	3.393	3.514	3.612
Sweden	0.882	0.947	0.619	0.565	3.250	3.170	3.625	3.118
Chinese Taipei	0.649	0.980	0.500	0.410	2.873	3.091	3.347	2.712
Turkey	0.679	0.949	0.420	0.500	2.867	3.123	3.225	2.907
United Arab Emirates	0.755	0.926	0.475	0.497	3.291	3.333	3.614	3.341
Viet Nam	0.509	0.854	0.436	0.419	3.112	3.351	3.587	3.282
ISCED level 3								
Alberta (Canada)	0.731	0.923	0.510	0.445	3.383	3.395	3.514	3.186
Brazil	0.589	0.868	0.480	0.440	2.927	3.336	3.571	3.308
Croatia	0.677	0.942	0.469	0.490	2.828	3.052	3.441	3.152
Denmark	0.837	0.907	0.634	0.509	3.548	3.519	3.713	3.322
Portugal	0.676	0.928	0.458	0.509	3.020	3.208	3.555	3.228
Slovenia	0.715	0.822	0.356	0.478	2.992	3.175	3.470	3.319
Sweden	0.813	0.854	0.536	0.394	3.250	3.170	3.625	3.118
Chinese Taipei	0.701	0.956	0.509	0.464	2.873	3.091	3.347	2.712
Turkey	0.552	0.795	0.356	0.418	2.867	3.123	3.225	2.907
United Arab Emirates	0.747	0.938	0.476	0.519	3.291	3.333	3.614	3.341
Viet Nam	0.457	0.768	0.367	0.369	3.112	3.351	3.587	3.282
TALIS-PISA link								
Australia	0.729	0.970	0.486	0.461	3.438	3.429	3.533	3.205
Ciudad Autónoma de Buenos Aires (Argentina)	0.729	0.763	0.404	0.528	3.160	3.548	3.626	3.439
Colombia	0.628	0.901	0.518	0.741	3.550	3.688	3.768	3.705
Czech Republic	0.477	1.188	0.328	0.381	2.811	3.168	3.549	3.273
Denmark	0.742	0.944	0.627	0.585	3.504	3.444	3.603	3.227
Georgia	0.565	1.183	0.304	0.318	3.338	3.319	3.466	3.051
Malta	0.662	0.724	0.762	0.684	2.778	3.140	3.380	2.942
Turkey	0.731	0.926	0.689	0.655	2.897	3.347	3.389	3.165
Viet Nam	0.691	1.014	0.626	0.659	3.129	3.379	3.509	3.364

1. Data from the participating country/economy was rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.128. Standardised factor loadings and unstandardised intercepts for the scale T3PWLOAD

Participating countries/economies	Standardised factor loadings			Unstandardised intercepts		
	TC3G43A	TC3G43B	TC3G43C	TC3G43A	TC3G43B	TC3G43C
ISCED level 2						
Alberta (Canada)	0.611	0.993	0.448	1.856	2.546	1.825
Australia[1]	0.703	0.619	0.504	1.745	2.985	1.684
Austria	0.523	0.616	0.547	1.977	3.324	2.300
Belgium	0.231	0.830	0.450	2.328	3.281	2.725
Flemish Community (Belgium)	0.370	0.701	0.306	2.440	3.508	2.830
Brazil	0.606	0.922	0.484	2.454	2.777	2.869
Bulgaria	0.595	0.582	0.613	2.096	3.149	2.079
Ciudad Autónoma de Buenos Aires (Argentina)	0.536	0.766	0.474	2.008	2.661	2.427

Participating countries/economies	Standardised factor loadings			Unstandardised intercepts		
	TC3G43A	TC3G43B	TC3G43C	TC3G43A	TC3G43B	TC3G43C
Chile	0.482	0.760	0.702	2.055	2.766	2.287
Colombia	0.696	0.749	0.729	2.587	2.933	3.068
Croatia	0.512	0.991	0.466	2.177	3.252	2.453
Cyprus	0.600	0.816	0.510	2.401	2.775	2.275
Czech Republic	0.610	0.254	0.413	1.939	3.632	2.271
Denmark	0.507	0.659	0.385	1.886	2.970	2.235
England (United Kingdom)	0.603	0.769	0.373	1.934	2.956	2.273
Estonia	0.614	0.805	0.638	1.928	2.692	2.267
Finland	0.429	0.943	0.378	1.671	2.908	2.333
France	0.509	0.992	0.425	2.037	3.241	2.826
Georgia	0.918	0.696	0.468	2.115	2.290	1.845
Hungary	0.683	0.534	0.396	1.954	3.256	1.923
Iceland	0.572	0.373	0.313	1.595	2.815	2.935
Israel	0.550	0.665	0.490	2.494	2.978	2.513
Italy	0.491	0.431	0.676	2.132	3.420	2.418
Japan	0.587	0.993	0.500	2.432	2.547	1.615
Kazakhstan	0.621	0.735	0.544	1.744	2.403	1.754
Korea	0.677	0.994	0.602	2.203	2.487	1.779
Latvia	0.466	0.520	0.361	2.672	3.185	2.614
Lithuania	0.824	0.603	0.425	2.252	2.967	2.325
Malta	0.456	0.531	0.471	2.254	3.154	1.945
Mexico	0.481	0.562	0.914	1.732	2.543	2.330
Netherlands	0.534	0.711	0.311	1.538	2.513	1.675
New Zealand	0.484	0.877	0.463	1.978	2.823	1.854
Norway	0.294	0.669	0.481	2.038	2.850	2.184
Portugal						
Romania	0.630	0.839	0.682	2.241	2.984	2.585
Russian Federation	0.465	0.742	0.778	1.845	2.746	2.132
Saudi Arabia	0.658	0.698	0.789	2.338	3.042	2.659
Shanghai (China)	0.547	0.644	0.308	2.665	2.743	1.782
Singapore	0.702	0.781	0.474	1.746	1.980	1.396
Slovak Republic	0.297	0.699	0.348	2.310	3.319	2.238
Slovenia	0.529	0.814	0.496	2.245	3.221	2.516
South Africa[2]	0.579	0.545	0.462	2.395	3.186	2.496
Spain	0.435	0.720	0.346	2.079	3.317	1.961
Sweden						
Chinese Taipei	0.595	0.776	0.478	2.102	2.543	1.770
Turkey	0.608	0.822	0.451	2.120	2.580	1.832
United Arab Emirates	0.518	0.816	0.454	2.004	2.250	1.914
United States	0.677	0.994	0.103	2.453	2.740	1.767
Viet Nam	0.606	0.824	0.494	2.372	2.741	2.165
ISCED level 1						
Australia[1]	0.689	0.528	0.570	2.009	3.122	1.940
Flemish Community (Belgium)	0.328	0.626	0.276	2.440	3.508	2.830
Ciudad Autónoma de Buenos Aires (Argentina)	0.488	0.707	0.392	1.773	2.588	2.640
Denmark	0.534	0.799	0.460	1.886	2.970	2.235
England (United Kingdom)	0.510	0.792	0.373	1.934	2.956	2.273
France	0.235	0.573	0.207	1.797	3.473	2.724
Japan	0.604	0.994	0.493	2.432	2.547	1.615
Korea	0.600	0.870	0.574	2.203	2.487	1.779

Participating countries/economies	Standardised factor loadings			Unstandardised intercepts		
	TC3G43A	TC3G43B	TC3G43C	TC3G43A	TC3G43B	TC3G43C
Netherlands[1]	0.223	0.803	0.442	1.661	2.922	2.016
Spain	0.377	0.645	0.305	2.079	3.317	1.961
Sweden	0.436	0.739	0.327	1.919	3.270	2.481
Chinese Taipei	0.615	0.770	0.486	2.102	2.543	1.770
Turkey	0.629	0.857	0.544	2.120	2.580	1.832
United Arab Emirates	0.509	0.772	0.441	2.004	2.250	1.914
Viet Nam	0.567	0.851	0.512	2.372	2.741	2.165
ISCED level 3						
Alberta (Canada)	0.477	0.683	0.360	2.047	2.611	2.060
Brazil	0.583	0.994	0.489	2.510	2.933	2.852
Croatia	0.381	0.625	0.351	2.325	3.041	2.323
Denmark	0.685	0.714	0.448	1.886	2.970	2.235
Portugal	0.547	0.992	0.462	2.557	3.366	2.793
Slovenia	0.571	0.992	0.482	2.245	3.221	2.516
Sweden	0.469	0.646	0.313	2.044	2.991	2.316
Chinese Taipei	0.587	0.751	0.467	2.102	2.543	1.770
Turkey	0.568	0.715	0.482	2.120	2.580	1.832
United Arab Emirates	0.519	0.816	0.452	2.004	2.250	1.914
Viet Nam	0.496	0.753	0.433	2.372	2.741	2.165
TALIS-PISA link						
Australia	0.628	0.660	0.450	1.928	3.080	1.818
Ciudad Autónoma de Buenos Aires (Argentina)	0.564	0.484	0.523	1.892	2.780	2.059
Colombia	0.675	0.866	0.528	2.609	3.153	3.007
Czech Republic	0.389	0.681	0.329	1.916	3.589	2.263
Denmark	0.683	0.445	0.643	2.100	2.669	2.230
Georgia	0.786	0.911	0.488	2.072	2.237	1.763
Malta	0.397	0.646	0.462	2.316	3.138	1.983
Turkey	0.889	0.496	0.457	2.246	2.656	1.782
Viet Nam	0.750	0.725	0.721	2.248	2.559	2.020

1. Data from the participating country/economy was rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

School leadership: School leadership (T3PLEADS); Participation among stakeholders (T3PLEADP)

11.65. Measured items

Two scales concerning school leadership were developed from these question stems:

- "Please indicate how frequently you engaged in the following activities in this school during the last 12 months" (TC3G22), which was followed by items regarding principals' actions that were used to form the scale *School leadership* (T3PLEADS).
- "How strongly do you agree or disagree with these statements as applied to this school?" (TC3G26), which was followed by items about school decision making that were used for the scale *Participation among stakeholders* (T3PLEADP).

Table 11.129 provides information on these scales.

11.66. Scale reliability

Table 11.130 presents the reliability for each scale, both of which show high reliability coefficients for nearly all populations. The Hungary ISCED level 2 population is the only population with a low omega coefficient for the scale T3PLEADS. Acceptable reliability is evident for the T3PLEADP scale for the following populations: the Czech Republic, Denmark, Finland, Italy, Singapore, the Slovak Republic and Sweden ISCED level 2; Denmark, France, and the Netherlands ISCED level 1; Denmark and Sweden ISCED level 3; and Turkey TALIS-PISA link. The Japan ISCED level 2 and the Flemish Community (Belgium) ISCED level 1 populations exhibit low reliability for this scale.

11.67. Model fits

Table 11.131 presents the model fit indices for the scale T3PLEADS. Because this scale has just three items, all populations not receiving fixed parameters exhibit a perfect model fit. The fit is poor, however, for the Australia ISCED level 1 population and the Georgia, Turkey and Viet Nam TALIS-PISA link populations.

The results for the scale T3PLEADP are presented in Table 11.132. Here, a fair number of populations exhibit poor model fit, including the Australia, Columbia, Cyprus,**Error! Bookmark not defined.** Czech Republic, Denmark, Iceland, Italy, Mexico, Singapore and Slovak Republic ISCED level 2 populations; the Denmark, France, Netherlands, Turkey and Viet Nam ISCED level 1 populations; and the Slovenia ISCED level 3 and the Ciudad Autónoma de Buenos Aires (Argentina), Columbia, Czech Republic, Denmark and Georgia TALIS-PISA link populations.

11.68. Invariance testing

As is evident in Table 11.133, the T3PLEADS scale reached the metric invariance level for ISCED levels 1 and 2 and scalar invariance for ISCED level 3. ISCED level 3 can be deemed scalar invariant because the fit indices are acceptable. Many within-country invariance results are also scalar (see, for comparative purposes, scale T3EFFPD from the teacher questionnaire).

Table 11.134 presents the results from the measurement invariance testing for the scale T3PLEADP. Here it can be seen that the scale reaches metric invariance for all ISCED levels because the metric model fit indices are more favourable than those in the configural model.

11.69. Item parameters

Table 11.135 presents the unstandardised factor loadings for scales T3PLEADS and T3PLEADP, while Table 11.136 presents the standardised factor loadings and the unstandardised intercepts for scale T3PLEADS. Most of the factor loadings are strong for each item in all populations. While item TC3G22D has the largest number of moderate strength factor loadings, they are nonetheless few.

Table 11.137 presents the standardised factor loadings and unstandardised intercepts for the scale T3PLEADP. The factor loadings for items TC3G26B and TC3G26C are strong in almost all populations, but one weak factor loading is evident for the Netherlands ISCED level 1 population on item TC3G26B. A mix of moderate to strong factor loadings can be observed for item TC3G26A. Factor loadings for item TC3G26D are moderate to low in many populations. Nearly all the factor loadings for item TC3G26F are weak. The Shanghai (China) ISCED level 2 and Turkey ISCED level 1 and 2 populations are the only

ones to exhibit factor loadings above 0.450, a pattern that suggests only a moderate relationship with the latent construct.

Table 11.129. Item wording for school leadership

T3PLEADS: School leadership	
TC3G22: Please indicate how frequently you engaged in the following activities in this school during the last 12 months.	
Response options: "Never or rarely" (1), "Sometimes" (2), "Often" (3), Very often" (4).	
TC3G22D	I took actions to support co-operation among teachers to develop new teaching practices
TC3G22E	I took actions to ensure that teachers take responsibility for improving their teaching skills
TC3G22F	I took actions to ensure that teachers feel responsible for their students' learning outcomes
T3PLEADP: Participation among stakeholders, principals	
TC3G26: How strongly do you agree or disagree with these statements as applied to this school?	
Response options: "Strongly disagree" (1), "Disagree" (2), "Agree" (3), "Strongly agree" (4).	
TC3G26A	This school provides staff with opportunities to actively participate in school decisions
TC3G26B	This school provides parents or guardians with opportunities to actively participate in school decisions
TC3G26C	This school provides students with opportunities to actively participate in school decisions
TC3G26D	This school has a culture of shared responsibility for school issues
TC3G26F	There is a collaborative school culture which is characterised by mutual support

Source: OECD, TALIS 2018 database.

Table 11.130. Omega coefficients for the school leadership scales

Participating countries/economies	T3PLEADS	T3PLEADP
	Omega coefficient	
ISCED level 2		
Alberta (Canada)	0.929	0.796
Australia[1]	0.962	0.852
Austria	0.846	0.753
Belgium	0.778	0.803
Flemish Community (Belgium)	0.835	0.781
Brazil	0.859	0.884
Bulgaria	0.771	0.709
Ciudad Autónoma de Buenos Aires (Argentina)	0.828	0.815
Chile	0.867	0.887
Colombia	0.906	0.887
Croatia	0.823	0.887
Cyprus	0.899	0.874
Czech Republic	0.736	0.650
Denmark	0.910	0.663
England (United Kingdom)	0.943	0.726
Estonia	0.834	0.805
Finland	0.755	0.696
France	0.819	0.854
Georgia	0.780	0.887
Hungary	0.558	0.845
Iceland	0.841	0.701
Israel	0.912	0.778
Italy	0.884	0.681
Japan	0.746	0.599
Kazakhstan	0.702	0.752
Korea	0.916	0.828

Participating countries/economies	T3PLEADS	T3PLEADP
	Omega coefficient	
Latvia	0.728	0.797
Lithuania	0.743	0.874
Malta	0.916	0.773
Mexico	0.835	0.774
Netherlands	0.845	0.755
New Zealand	0.884	0.778
Norway	0.814	0.769
Portugal	0.856	0.852
Romania	0.865	0.878
Russian Federation	0.750	0.927
Saudi Arabia	0.848	0.839
Shanghai (China)	0.922	0.899
Singapore	0.889	0.663
Slovak Republic	0.790	0.656
Slovenia	0.821	0.805
South Africa[2, 3]	0.819	-
Spain	0.817	0.908
Sweden	0.810	0.602
Chinese Taipei	0.814	0.701
Turkey	0.826	0.885
United Arab Emirates	0.901	0.889
United States	0.920	0.736
Viet Nam	0.733	0.796
ISCED level 1		
Australia[1]	0.920	0.835
Flemish Community (Belgium)	0.870	0.561
Ciudad Autónoma de Buenos Aires (Argentina)	0.867	0.812
Denmark	0.880	0.621
England (United Kingdom)	0.914	0.814
France	0.895	0.669
Japan	0.714	0.712
Korea	0.978	0.835
Netherlands[1]	0.801	0.677
Spain	0.823	0.794
Sweden	0.776	0.834
Chinese Taipei	0.874	0.755
Turkey	0.876	0.922
United Arab Emirates	0.914	0.854
Viet Nam	0.746	0.740
ISCED level 3		
Alberta (Canada)	0.856	0.785
Brazil	0.885	0.870
Croatia	0.906	0.845
Denmark	0.906	0.616
Portugal	0.854	0.738
Slovenia	0.778	0.759
Sweden	0.741	0.635
Chinese Taipei	0.803	0.856
Turkey	0.808	0.848
United Arab Emirates	0.914	0.863
Viet Nam	0.704	0.778

Participating countries/economies	T3PLEADS	T3PLEADP
	Omega coefficient	
TALIS-PISA link		
Australia	0.933	0.806
Ciudad Autónoma de Buenos Aires (Argentina)	0.812	0.712
Colombia	0.870	0.912
Czech Republic	0.815	0.846
Denmark	0.845	0.740
Georgia	0.841	0.882
Malta	0.897	0.787
Turkey	0.880	0.682
Viet Nam	0.884	0.960

1. Data from the participating country/economy was rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
3. This participating country/economy's reliability coefficient estimation failed in the final scale model due to a negative residual variance for one or more items that could not be corrected; this country/economy has untrustworthy scale scores for the corresponding ISCED level.
Source: OECD, TALIS 2018 database.

Table 11.131. CFA model-data fit for scale T3PLEADS

School leadership

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Australia[1]	0.994	0.994	0.024	0.180
ISCED level 1				
Australia[1]	0.880	0.880	0.131	0.314
Netherlands[1]	1.000	1.008	0.000	0.137
TALIS-PISA link				
Australia	0.999	0.999	0.013	0.079
Ciudad Autónoma de Buenos Aires (Argentina)	0.982	0.982	0.054	0.169
Colombia	1.000	1.025	0.000	0.118
Czech Republic	1.000	1.036	0.000	0.133
Denmark	0.981	0.981	0.093	0.177
Georgia	0.828	0.828	0.114	0.340
Malta	1.000	1.099	0.000	0.074
Turkey	0.896	0.896	0.113	0.446
Viet Nam	0.352	0.352	0.213	1.357

1. Data from the participating country/economy was rated as insufficient during the adjudication process.
Source: OECD, TALIS 2018 database.

Table 11.132. CFA model-data fit for scale T3PLEADP

Participation among stakeholders

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Alberta (Canada)	0.947	0.868	0.111	0.039
Australia[1]	0.877	0.846	0.072	0.138
Austria	0.999	0.999	0.011	0.025
Belgium	0.940	0.851	0.115	0.044
Flemish Community (Belgium)	0.934	0.834	0.109	0.046

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Brazil	1.000	1.024	0.000	0.010
Bulgaria	0.953	0.882	0.075	0.040
Ciudad Autónoma de Buenos Aires (Argentina)	0.950	0.876	0.110	0.049
Chile	0.997	0.991	0.032	0.022
Colombia	0.888	0.719	0.144	0.045
Croatia	0.991	0.978	0.054	0.029
Cyprus	0.892	0.730	0.198	0.088
Czech Republic[3]	0.546	-	0.255	0.080
Denmark	0.877	0.693	0.141	0.058
England (United Kingdom)	0.983	0.956	0.053	0.030
Estonia	0.969	0.922	0.086	0.030
Finland	0.995	0.987	0.031	0.031
France	0.920	0.801	0.140	0.046
Georgia	0.961	0.902	0.104	0.036
Hungary	0.967	0.919	0.094	0.048
Iceland	0.840	0.600	0.189	0.062
Israel	1.000	1.061	0.000	0.016
Italy	0.859	0.648	0.138	0.050
Japan	0.972	0.929	0.048	0.047
Kazakhstan	0.949	0.873	0.075	0.043
Korea	0.972	0.929	0.080	0.038
Latvia	1.000	1.063	0.000	0.024
Lithuania	0.973	0.931	0.088	0.027
Malta	0.982	0.956	0.063	0.068
Mexico	0.792	0.479	0.193	0.054
Netherlands	0.992	0.980	0.045	0.022
New Zealand	0.957	0.891	0.062	0.037
Norway	0.928	0.820	0.084	0.055
Portugal	1.000	1.007	0.000	0.021
Romania	0.960	0.899	0.103	0.043
Russian Federation	0.921	0.803	0.142	0.061
Saudi Arabia	0.991	0.977	0.039	0.040
Shanghai (China)	0.988	0.970	0.066	0.022
Singapore[3]	0.502	-	0.234	0.057
Slovak Republic	0.690	0.224	0.181	0.074
Slovenia	0.981	0.952	0.068	0.040
South Africa[2]	0.998	0.997	0.015	0.131
Spain	0.929	0.822	0.078	0.038
Sweden	0.947	0.867	0.057	0.047
Chinese Taipei	0.939	0.849	0.104	0.050
Turkey	0.985	0.962	0.056	0.026
United Arab Emirates	0.960	0.900	0.120	0.039
United States	1.000	1.000	0.000	0.038
Viet Nam	0.922	0.805	0.133	0.050
ISCED level 1				
Australia[1]	0.936	0.920	0.085	0.110
Flemish Community (Belgium)	0.919	0.797	0.082	0.044
Ciudad Autónoma de Buenos Aires (Argentina)	0.913	0.781	0.144	0.064
Denmark	0.849	0.623	0.162	0.082
England (United Kingdom)	0.973	0.932	0.093	0.026
France	0.819	0.548	0.148	0.057
Japan	0.921	0.803	0.107	0.047

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Korea	0.991	0.976	0.033	0.036
Netherlands[1]	0.383	0.229	0.162	0.397
Spain	0.987	0.968	0.032	0.025
Sweden	0.921	0.801	0.111	0.045
Chinese Taipei	0.929	0.822	0.118	0.044
Turkey	0.827	0.566	0.221	0.094
United Arab Emirates	0.977	0.944	0.091	0.031
Viet Nam	0.811	0.527	0.209	0.079
ISCED level 3				
Alberta (Canada)	0.905	0.762	0.146	0.046
Brazil	0.952	0.880	0.099	0.038
Croatia	0.933	0.832	0.127	0.062
Denmark	1.000	1.015	0.000	0.045
Portugal	1.000	1.026	0.000	0.022
Slovenia	0.866	0.665	0.140	0.069
Sweden	0.979	0.948	0.040	0.035
Chinese Taipei	0.969	0.923	0.091	0.049
Turkey	0.920	0.799	0.092	0.045
United Arab Emirates	0.983	0.958	0.072	0.028
Viet Nam	0.960	0.899	0.082	0.032
TALIS-PISA link				
Australia	0.940	0.933	0.072	0.202
Ciudad Autónoma de Buenos Aires (Argentina)	0.839	0.821	0.113	0.179
Colombia	0.876	0.862	0.124	0.215
Czech Republic	0.812	0.791	0.104	0.224
Denmark	0.271	0.190	0.206	0.466
Georgia	0.616	0.574	0.154	0.329
Malta	1.000	1.043	0.000	0.128
Turkey	1.000	1.042	0.000	0.143
Viet Nam	1.000	1.220	0.000	0.183

1. Data from the participating country/economy was rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
3. The poor fit of the model affected the TLI calculation, which is not reported.
Source: OECD, TALIS 2018 database.

Table 11.133. Invariance test results for scale T3PLEADS

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level for ISCED level 2								
Configural	1.000	1.000	0.000	0.000				
Metric	0.993	0.989	0.044	0.088	0.007	0.011	-0.044	-0.088
Scalar	0.880	0.908	0.125	0.132	0.113	0.081	-0.081	-0.044
Invariance level for ISCED level 1								
Configural	1.000	1.000	0.000	0.000				
Metric	0.997	0.995	0.032	0.080	0.003	0.005	-0.032	-0.080
Scalar	0.910	0.927	0.120	0.125	0.087	0.068	-0.088	-0.045
Invariance level for ISCED level 3								
Configural	1.000	1.000	0.000	0.000				
Metric	0.996	0.994	0.035	0.076	0.004	0.006	-0.035	-0.076
Scalar	0.966	0.972	0.077	0.099	0.030	0.022	-0.042	-0.023

Source: OECD, TALIS 2018 database.

Table 11.134. Invariance test results for scale T3PLEADP

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level for ISCED level 2								
Configural	0.953	0.883	0.096	0.044				
Metric	0.933	0.915	0.082	0.138	0.020	-0.032	0.014	-0.094
Scalar	0.744	0.784	0.131	0.199	0.189	0.131	-0.049	-0.061
Invariance level for ISCED level 1								
Configural	0.928	0.819	0.115	0.051				
Metric	0.905	0.876	0.096	0.130	0.023	-0.057	0.019	-0.079
Scalar	0.680	0.719	0.144	0.190	0.225	0.157	-0.048	-0.060
Invariance level for ISCED level 3								
Configural	0.960	0.899	0.089	0.042				
Metric	0.933	0.912	0.083	0.134	0.027	-0.013	0.006	-0.092
Scalar	0.727	0.757	0.138	0.214	0.206	0.155	-0.055	-0.080

Source: OECD, TALIS 2018 database.

Table 11.135. Unstandardised factor loadings for school leadership scales for all participating countries/economies for all populations

T3PLEADS		T3PLEADP	
TC3G22D	0.476	TC3G26A	0.329
TC3G22E	0.597	TC3G26B	0.454
TC3G22F	0.499	TC3G26C	0.436
		TC3G26D	0.282
		TC3G26F	0.195

Source: OECD, TALIS 2018 database.

Table 11.136. Standardised factor loadings and unstandardised intercepts for scale T3PLEADS

Participating countries/economies	Standardised factor loadings			Unstandardised intercepts		
	TC3G22D	TC3G22E	TC3G22F	TC3G22D	TC3G22E	TC3G22F
ISCED level 2						
Alberta (Canada)	0.790	0.949	0.842	2.798	2.801	2.929
Australia[1]	0.695	0.980	0.743	2.697	2.938	2.947
Austria	0.704	0.879	0.724	2.709	2.577	2.679
Belgium	0.608	0.822	0.677	2.554	2.516	2.545
Flemish Community (Belgium)	0.663	0.875	0.710	2.569	2.511	2.595
Brazil	0.736	0.887	0.746	2.798	2.801	2.929
Bulgaria	0.509	0.831	0.664	2.734	3.030	3.225
Ciudad Autónoma de Buenos Aires (Argentina)	0.723	0.849	0.729	2.748	2.741	2.784
Chile	0.757	0.890	0.761	3.049	3.107	3.182
Colombia	0.705	0.930	0.831	3.157	3.074	3.186
Croatia	0.695	0.845	0.735	2.798	2.801	2.929
Cyprus	0.766	0.917	0.829	2.699	2.699	2.783
Czech Republic	0.558	0.803	0.584	2.664	2.753	2.775
Denmark	0.704	0.939	0.785	2.798	2.801	2.929
England (United Kingdom)	0.711	0.965	0.805	2.648	2.829	3.043
Estonia	0.632	0.881	0.684	2.413	2.499	2.548

Participating countries/economies	Standardised factor loadings			Unstandardised intercepts		
	TC3G22D	TC3G22E	TC3G22F	TC3G22D	TC3G22E	TC3G22F
Finland	0.646	0.798	0.620	2.736	2.517	2.295
France	0.744	0.814	0.752	2.615	2.554	2.642
Georgia	0.599	0.832	0.648	2.819	2.977	3.159
Hungary	0.504	0.566	0.556	2.631	2.615	2.804
Iceland	0.632	0.887	0.693	2.591	2.591	2.667
Israel	0.655	0.945	0.758	2.812	2.858	2.991
Italy	0.717	0.919	0.712	2.765	2.683	2.680
Japan	0.620	0.767	0.687	2.302	2.454	2.287
Kazakhstan	0.520	0.740	0.663	3.211	3.201	3.392
Korea	0.682	0.942	0.825	2.583	2.694	2.709
Latvia	0.508	0.751	0.712	2.818	2.914	3.034
Lithuania	0.557	0.793	0.652	2.685	2.934	3.092
Malta	0.693	0.948	0.720	2.604	2.677	2.728
Mexico	0.724	0.851	0.760	2.899	3.062	3.248
Netherlands	0.556	0.891	0.725	2.294	2.891	2.941
New Zealand	0.705	0.914	0.781	2.664	2.796	2.916
Norway	0.654	0.846	0.719	2.727	2.511	2.844
Portugal	0.677	0.886	0.768	2.798	2.801	2.929
Romania	0.694	0.894	0.774	3.051	3.091	3.210
Russian Federation	0.556	0.795	0.673	2.366	3.013	3.108
Saudi Arabia	0.695	0.864	0.791	2.975	2.933	3.139
Shanghai (China)	0.751	0.945	0.817	3.133	3.185	3.214
Singapore	0.670	0.926	0.727	2.565	2.880	3.031
Slovak Republic	0.502	0.840	0.712	2.762	2.900	2.945
Slovenia	0.627	0.868	0.690	2.798	2.801	2.929
South Africa[2]	0.675	0.823	0.785	2.873	3.041	3.238
Spain	0.705	0.856	0.649	2.799	2.605	2.808
Sweden	0.616	0.862	0.660	2.798	2.801	2.929
Chinese Taipei	0.626	0.831	0.773	2.798	2.801	2.929
Turkey	0.658	0.853	0.756	2.798	2.801	2.929
United Arab Emirates	0.700	0.931	0.790	2.798	2.801	2.929
United States	0.735	0.937	0.866	2.688	2.778	2.899
Viet Nam	0.514	0.791	0.641	2.798	2.801	2.929
ISCED level 1						
Australia[1]	0.650	0.949	0.783	2.841	2.960	3.073
Flemish Community (Belgium)	0.623	0.906	0.777	2.569	2.511	2.595
Ciudad Autónoma de Buenos Aires (Argentina)	0.696	0.896	0.770	2.748	2.741	2.784
Denmark	0.665	0.905	0.815	2.798	2.801	2.929
England (United Kingdom)	0.704	0.943	0.776	2.648	2.829	3.043
France	0.723	0.925	0.766	2.295	1.782	1.788
Japan	0.586	0.757	0.625	2.302	2.454	2.287
Korea	0.651	0.989	0.792	2.583	2.694	2.709
Netherlands[1]	0.607	0.843	0.708	2.547	2.849	2.942
Spain	0.729	0.840	0.720	2.799	2.605	2.808
Sweden	0.660	0.817	0.636	2.798	2.801	2.929
Chinese Taipei	0.724	0.892	0.815	2.798	2.801	2.929
Turkey	0.772	0.898	0.767	2.798	2.801	2.929
United Arab Emirates	0.724	0.939	0.815	2.798	2.801	2.929
Viet Nam	0.616	0.779	0.662	2.798	2.801	2.929
ISCED level 3						

Participating countries/economies	Standardised factor loadings			Unstandardised intercepts		
	TC3G22D	TC3G22E	TC3G22F	TC3G22D	TC3G22E	TC3G22F
Alberta (Canada)	0.717	0.852	0.831	2.798	2.801	2.929
Brazil	0.715	0.907	0.815	2.798	2.801	2.929
Croatia	0.709	0.938	0.765	2.798	2.801	2.929
Denmark	0.669	0.937	0.794	2.798	2.801	2.929
Portugal	0.647	0.900	0.672	2.798	2.801	2.929
Slovenia	0.571	0.833	0.657	2.798	2.801	2.929
Sweden	0.682	0.767	0.603	2.798	2.801	2.929
Chinese Taipei	0.630	0.851	0.667	2.798	2.801	2.929
Turkey	0.659	0.850	0.678	2.798	2.801	2.929
United Arab Emirates	0.708	0.942	0.808	2.798	2.801	2.929
Viet Nam	0.512	0.739	0.672	2.798	2.801	2.929
TALIS-PISA link						
Australia	0.639	0.959	0.793	2.716	2.920	3.000
Ciudad Autónoma de Buenos Aires (Argentina)	0.675	0.832	0.744	2.986	2.866	2.897
Colombia	0.732	0.880	0.824	3.092	3.101	3.259
Czech Republic	0.677	0.853	0.689	2.682	2.678	2.691
Denmark	0.736	0.853	0.786	2.213	2.474	2.576
Georgia	0.645	0.879	0.731	2.707	2.662	2.925
Malta	0.706	0.931	0.728	2.631	2.650	2.664
Turkey	0.830	0.886	0.773	2.779	2.795	2.859
Viet Nam	0.722	0.878	0.870	2.854	2.942	3.121

1. Data from the participating country/economy was rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.137. Standardised factor loadings and unstandardised intercepts for scale T3PLEADP

Participating countries/economies	Standardised factor loadings					Unstandardised intercepts				
	TC3G26A	TC3G26B	TC3G26C	TC3G26D	TC3G26F	TC3G26A	TC3G26B	TC3G26C	TC3G26D	TC3G26F
ISCED level 2										
Alberta (Canada)	0.606	0.750	0.779	0.572	0.359	3.446	3.178	3.078	3.228	3.340
Australia[1]	0.679	0.700	0.739	0.508	0.370	3.257	2.856	2.848	3.068	3.230
Austria	0.638	0.746	0.662	0.490	0.324	3.650	3.060	2.988	3.373	3.366
Belgium	0.637	0.747	0.809	0.432	0.326	3.217	2.706	2.834	2.907	3.052
Flemish Community (Belgium)	0.563	0.722	0.807	0.351	0.288	3.317	2.937	3.033	2.916	2.969
Brazil	0.650	0.891	0.833	0.604	0.399	3.403	3.170	3.087	3.200	3.145
Bulgaria	0.487	0.747	0.651	0.307	0.250	3.438	3.118	2.929	2.807	3.121
Ciudad Autónoma de Buenos Aires (Argentina)	0.681	0.782	0.785	0.520	0.339	3.011	2.429	2.569	2.892	3.187
Chile	0.729	0.886	0.850	0.551	0.439	3.255	2.959	2.960	3.050	3.332
Colombia	0.670	0.898	0.848	0.502	0.361	3.476	3.418	3.334	3.062	3.123
Croatia	0.696	0.908	0.811	0.423	0.371	3.301	3.093	3.023	2.805	3.176
Cyprus	0.712	0.788	0.892	0.536	0.399	3.238	2.720	2.914	3.137	3.288
Czech Republic	0.502	0.661	0.584	0.396	0.273	3.392	2.975	2.957	3.066	3.491
Denmark	0.554	0.611	0.669	0.442	0.339	3.377	2.834	2.902	3.219	3.320
England (United Kingdom)	0.598	0.651	0.703	0.506	0.338	3.180	2.804	3.066	3.154	3.275
Estonia	0.648	0.807	0.731	0.480	0.375	3.526	3.208	3.210	3.067	3.234

Participating countries/economies	Standardised factor loadings					Unstandardised intercepts				
	TC3G26A	TC3G26B	TC3G26C	TC3G26D	TC3G26F	TC3G26A	TC3G26B	TC3G26C	TC3G26D	TC3G26F
Finland	0.575	0.648	0.663	0.468	0.273	3.254	2.711	2.954	3.195	3.174
France	0.684	0.870	0.792	0.441	0.300	3.233	3.001	2.861	2.745	2.956
Georgia	0.639	0.905	0.831	0.541	0.388	3.392	3.258	3.243	3.322	3.353
Hungary	0.651	0.868	0.744	0.537	0.340	3.550	3.146	2.962	3.175	3.327
Iceland	0.514	0.711	0.642	0.415	0.310	3.457	2.989	2.957	3.011	3.275
Israel	0.690	0.668	0.753	0.566	0.371	3.201	2.697	2.811	3.168	3.282
Italy	0.588	0.727	0.495	0.356	0.280	3.147	2.930	2.181	3.003	3.115
Japan	0.508	0.572	0.556	0.380	0.297	3.112	2.394	2.292	2.965	3.256
Kazakhstan	0.630	0.702	0.685	0.552	0.369	3.263	3.144	2.896	3.190	3.405
Korea	0.624	0.810	0.802	0.524	0.382	3.679	3.409	3.245	3.373	3.538
Latvia	0.561	0.792	0.785	0.338	0.335	3.423	3.273	3.157	2.590	3.186
Lithuania	0.681	0.889	0.807	0.548	0.408	3.507	3.278	3.319	3.283	3.326
Malta	0.571	0.780	0.697	0.539	0.325	3.411	2.849	2.949	3.242	3.238
Mexico	0.594	0.718	0.762	0.546	0.386	3.367	3.049	2.889	3.312	3.248
Netherlands	0.624	0.753	0.693	0.393	0.307	3.120	2.889	2.855	2.872	2.983
New Zealand	0.529	0.740	0.769	0.554	0.284	3.368	3.117	3.031	3.157	3.350
Norway	0.426	0.714	0.803	0.414	0.246	3.497	2.927	2.971	2.990	3.465
Portugal	0.636	0.862	0.798	0.519	0.350	3.353	3.065	3.030	3.177	3.165
Romania	0.692	0.904	0.759	0.530	0.362	3.474	3.217	2.929	3.241	3.525
Russian Federation	0.765	0.941	0.861	0.590	0.416	3.494	3.274	3.175	3.330	3.185
Saudi Arabia	0.629	0.844	0.796	0.473	0.348	3.223	2.829	2.817	3.138	3.348
Shanghai (China)	0.739	0.898	0.854	0.651	0.457	3.458	3.253	3.172	3.393	3.409
Singapore	0.580	0.552	0.648	0.459	0.288	3.233	2.536	2.848	3.161	3.347
Slovak Republic	0.511	0.696	0.516	0.340	0.327	3.325	2.956	2.638	2.594	3.152
Slovenia	0.536	0.793	0.790	0.469	0.400	3.496	3.136	2.992	3.282	3.292
South Africa[2]	0.607	0.947	0.808	0.528	0.440	3.476	3.270	3.108	3.272	3.194
Spain	0.731	0.927	0.825	0.539	0.391	3.450	3.154	3.072	3.086	3.263
Sweden	0.502	0.534	0.599	0.415	0.218	3.333	2.651	2.849	3.031	3.145
Chinese Taipei	0.513	0.704	0.669	0.399	0.285	3.385	2.926	2.794	3.132	3.206
Turkey	0.681	0.886	0.847	0.601	0.456	3.473	3.124	3.108	3.273	3.250
United Arab Emirates	0.708	0.883	0.868	0.544	0.412	3.284	3.098	3.060	3.355	3.449
United States	0.640	0.756	0.564	0.473	0.311	3.220	2.844	2.946	3.177	3.236
Viet Nam	0.612	0.807	0.693	0.556	0.380	3.460	2.938	2.664	3.142	3.273
ISCED level 1										
Australia[1]	0.656	0.864	0.713	0.497	0.322	3.410	3.107	2.918	3.139	3.300
Flemish Community (Belgium)	0.419	0.597	0.523	0.331	0.219	3.423	2.920	2.808	3.104	3.200
Ciudad Autónoma de Buenos Aires (Argentina)	0.600	0.763	0.811	0.477	0.383	3.138	2.432	2.463	3.034	3.345
Denmark	0.531	0.621	0.651	0.405	0.288	3.451	2.873	2.785	3.154	3.237
England (United Kingdom)	0.644	0.766	0.805	0.524	0.357	3.180	2.804	3.066	3.154	3.275
France	0.538	0.693	0.611	0.364	0.293	3.341	2.802	2.638	2.779	3.318
Japan	0.581	0.697	0.590	0.532	0.338	3.247	2.634	2.333	2.992	3.519
Korea	0.699	0.863	0.677	0.425	0.365	3.679	3.409	3.245	3.373	3.538
Netherlands[1]	0.608	0.432	0.692	0.489	0.424	3.327	2.875	2.627	3.213	3.201
Spain	0.678	0.813	0.639	0.494	0.348	3.532	3.235	2.825	3.214	3.272
Sweden	0.648	0.708	0.862	0.501	0.355	3.486	2.667	3.050	3.081	3.243
Chinese Taipei	0.573	0.777	0.656	0.480	0.327	3.410	2.955	2.545	3.229	3.318
Turkey	0.676	0.867	0.936	0.611	0.485	3.473	3.124	3.108	3.273	3.250
United Arab Emirates	0.679	0.864	0.786	0.532	0.385	3.284	3.098	3.060	3.355	3.449

Participating countries/economies	Standardised factor loadings					Unstandardised intercepts				
	TC3G26A	TC3G26B	TC3G26C	TC3G26D	TC3G26F	TC3G26A	TC3G26B	TC3G26C	TC3G26D	TC3G26F
Viet Nam	0.610	0.730	0.628	0.518	0.428	3.460	2.938	2.664	3.142	3.273
ISCED level 3										
Alberta (Canada)	0.617	0.803	0.681	0.499	0.322	3.446	3.178	3.078	3.228	3.340
Brazil	0.678	0.848	0.862	0.551	0.339	3.403	3.170	3.087	3.200	3.145
Croatia	0.596	0.856	0.799	0.385	0.431	3.301	3.093	3.023	2.805	3.176
Denmark	0.424	0.423	0.702	0.356	0.286	3.252	1.849	3.072	3.175	3.258
Portugal	0.536	0.730	0.709	0.456	0.309	3.353	3.065	3.030	3.177	3.165
Slovenia	0.500	0.760	0.748	0.368	0.283	3.340	3.117	3.184	3.291	3.301
Sweden	0.454	0.480	0.711	0.357	0.226	3.422	2.277	3.035	3.175	3.238
Chinese Taipei	0.632	0.863	0.813	0.503	0.383	3.257	2.910	2.886	3.224	3.175
Turkey	0.688	0.828	0.819	0.541	0.409	3.473	3.124	3.108	3.273	3.250
United Arab Emirates	0.661	0.863	0.833	0.505	0.377	3.284	3.098	3.060	3.355	3.449
Viet Nam	0.526	0.796	0.683	0.546	0.410	3.460	2.938	2.664	3.142	3.273
TALIS-PISA link										
Australia	0.685	0.765	0.765	0.519	0.381	3.252	3.050	3.021	3.050	3.237
Ciudad Autónoma de Buenos Aires (Argentina)	0.581	0.662	0.682	0.458	0.329	3.086	2.608	2.712	3.040	3.143
Colombia	0.720	0.899	0.909	0.458	0.340	3.545	3.386	3.397	3.103	3.091
Czech Republic	0.688	0.871	0.710	0.505	0.386	3.316	3.047	2.957	3.115	3.434
Denmark	0.562	0.617	0.785	0.352	0.305	3.548	2.672	2.763	2.961	3.154
Georgia	0.702	0.889	0.834	0.502	0.428	3.371	3.228	3.223	3.366	3.301
Malta	0.597	0.790	0.716	0.534	0.344	3.432	2.891	2.964	3.256	3.189
Turkey	0.626	0.722	0.709	0.442	0.363	3.425	3.121	3.156	3.306	3.277
Viet Nam	0.646	0.876	0.589	0.472	0.390	3.629	3.106	2.751	3.125	3.361

1. Data from the participating country/economy was rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

School climate: Academic pressure (T3PACAD); Stakeholder involvement, partnership (T3PCOM); Lack of special needs personnel (T3PLACSN); School delinquency and violence (T3PDELI)

11.70. Measured items

Four scales concerning school climate were derived from these question stems:

- "To what extent do the following statements apply to this school?" (TC3G27), followed by items concerning curriculum and student achievement that were used for the scale *Academic Pressure* (T3PACAD), and items about community involvement in education for the scale *Stakeholder involvement, partnership* (T3PCOM).
- "To what extent is this school's capacity to provide quality instruction currently hindered by any of the following issues?" (TC3G29), followed by items regarding lack of specific teacher competencies that were used for the scale *Lack of special needs personnel* (T3PLACSN).
- "In this school, how often do the following occur amongst students?" (TC3G30), which was followed by items about student delinquencies that were used to form the scale *School delinquency and violence* (T3PDELI).

The scales are presented in Table 11.138.

11.71. Excluded populations

The ISCED levels 1, 2 and 3 populations from Denmark and Sweden were excluded from the scale T3PCOM due to non-convergence during the measurement invariance testing across participating countries/economies within each ISCED level. Therefore, these populations do not have reliability coefficients for this scale in Table 11.139 or item parameters in Table 11.150.

11.72. Scale reliability

Table 11.139, which presents the reliability coefficients for all populations for each scale, shows that most of the coefficients are high for all scales, with a few acceptable results as well. However, a low reliability coefficient can be observed for the Croatia ISCED level 3 population in the T3PACAD scale. Coefficients below 0.600 are evident in the scale T3PCOM for the Czech Republic, Italy, Latvia and Slovenia ISCED level 2 populations, and for the Japan ISCED level 1 and Slovenia ISCED level 3 populations. The reliabilities in the scale T3PLACSN are low for the Finland and Norway ISCED level 2 populations and for the France ISCED level 1 population.

11.73. Model fits

The scale T3PACAD has only three items, which resulted in a perfect model fit for most populations, as evident in Table 11.140. However, a poor fit can be observed for several populations with fixed parameters, including the South Africa ISCED level 2, Australia ISECD level 1 and Georgia and Viet Nam TALIS-PISA link populations.

Similarly, as seen in Table 11.141, the scale T3PCOM contains just three items, resulting in a perfect model fit for most populations, and an acceptable fit in all populations with fixed parameters.

Again, perfect model fits are evident for the scale T3PLACSN, which also has only three items, as seen in Table 11.142. However, the fit is poor for Australia and the Netherlands ISCED level 2 populations and for the Ciudad Autónoma de Buenos Aires (Argentina), Columbia, Malta and Viet Nam TALIS-PISA link populations.

Table 11.143 presents the fit indices for the scale T3PDELI. The model fits are perfect for approximately half the populations and acceptable for the other half. However, a poor fit can be observed for the Columbia, Czech Republic, Singapore and Viet Nam ISCED level 2 populations, and for the Czech Republic, Turkey and Viet Nam TALIS-PISA link populations.

11.74. Invariance testing

Table 11.144 presents the invariance results for the scale T3PACAD. The scale reached metric invariance for all three ISCED levels because the configural models are perfect and the metric models acceptable (or just below acceptable for ISCED level 2).

The same can be said for the scales T3PCOM and T3PLACSN, presented in

Table 11.145 and 11.146 respectively. The scales were metric invariant for all the ISCED levels for the same reason, with the exception of the ISCED level 1 and 3 levels of T3PCOM, where the configural model did not converge but the metric model was just below acceptable, and the ISCED level 3 level of T3PLACSN, where the metric model was

just below acceptable. Since the metric models were very near acceptable fit, each of these cases was considered metric invariant. Lastly, Table 11.147 presents the results for the scale T3PDELI, which reached configural invariance for all ISCED levels.

11.75. Item parameters

Table 11.148 presents the unstandardised factor loadings for scales T3PACAD, T3PCOM and T3PLACSN, while Tables 11.149, 11.150, 11.151 and 11.152 present the standardised factor loadings and the unstandardised intercepts for the scales T3PACAD, T3PCOM, T3PLACSN and T3PDELI respectively.

The factor loadings for items TC3G27A and TC3G27B are above 0.600 in most populations, with moderate strength observed for a few populations. Item TC3G27C exhibits only moderate factor loadings for most populations, while the Austria, Bulgaria, Hungary, Lithuania, Norway and Viet Nam ISCED level 2 populations, the Croatia ISCED level 3 population and the Denmark TALIS-PISA link population exhibit weak factor loadings for this item.

Factor loadings for item TC3G27E in scale T3PSOM are mostly strong. Although item TC3G27D also exhibits mostly strong factor loadings, there are more moderate and some weak loadings. Item TC3G27G, however, exhibits weak loadings in most populations, which suggests that the overall scale, with just three items, does not function well in these populations.

Factor loadings for the T3PLACSN scale items TC3G29K and TC3G29L are mostly strong, with a few moderate cases and one weak factor loading for the Australia ISCED level 2 population for TC3G29K. In comparison, factor loadings for item TC3G29B are mostly of moderate strength or weak in the following populations: Croatia, the Czech Republic, Finland, Hungary, Latvia, Malta, Mexico, Norway, Singapore, Slovenia, South Africa and Turkey ISCED level 2; Ciudad Autónoma de Buenos Aires (Argentina), France, Chinese Taipei, and Turkey ISCED level 1, and Croatia, Sweden and Chinese Taipei ISCED level 3.

Items TC3G30B and TC3G30C for the scale T3PDELI exhibit mostly strong relationships, with the latent construct having a few factor loadings of moderate strength and weak relationships for the Lithuania ISCED level 2 and the Netherlands ISCED level 1 populations for item TC3G30B, and the Viet Nam ISCED levels 2 and 1 populations for TC3G30C. In comparison, item TC3G30A exhibits strong yet more moderate relationships, with weak factor loadings in the Belgium and Columbia ISCED level 2 and the Viet Nam ISCED level 1 populations. Item TC3G30D exhibits strong and moderate relationships, but the largest number of weak relationships compared to other items in the scale are those observed for the following populations: Alberta (Canada), Chile, the Czech Republic, Georgia, Israel, Kazakhstan, Mexico and Viet Nam ISCED level 2; Chinese Taipei and Viet Nam ISCED level 1; Alberta (Canada) ISCED level 3; and Georgia TALIS-PISA link.

Table 11.138. Item wording for school climate scale items

T3PACAD: Academic pressure	
TC3G27: To what extent do the following statements apply to this school?	
Response options: "Not at all" (1), "To some extent" (2), "Quite a bit" (3), "A lot" (4).	
TC3G27A	Teachers understand the school's curricular goals
TC3G27B	Teachers succeed in implementing the school's curriculum
TC3G27C	Teachers hold high expectations for student achievement
TC3G27F*	Students have a desire to do well in school
T3PCOM: Stakeholder involvement, partnership	
TC3G27: To what extent do the following statements apply to this school?	
Response options: "Not at all" (1), "To some extent" (2), "Quite a bit" (3), "A lot" (4).	
TC3G27D	Parents or guardians support student achievement
TC3G27E	Parents or guardians are involved in school activities
TC3G27G	The school co-operates with the local community
T3PLACSN: Lack of special needs personnel	
TC3G29: To what extent is this school's capacity to provide quality instruction currently hindered by any of the following issues?	
Response options: "Not at all" (1), "To some extent" (2), "Quite a bit" (3), "A lot" (4).	
TC3G29B	Shortage of teachers with competence in teaching students with special needs
TC3G29K	Shortage of teachers with competence in teaching students in a multicultural or multilingual setting
TC3G29L	Shortage of teachers with competence in teaching students from <socio-economically disadvantaged homes>
T3PDELI: School delinquency and violence	
TC3G30: In this school, how often do the following occur amongst students?	
Response options: "Never" (1), "Less than monthly" (2), "Monthly" (3), "Weekly" (4), "Daily" (5).	
TC3G30A	Vandalism and theft
TC3G30B	Intimidation or bullying among students (or other forms of verbal abuse)
TC3G30C	Physical injury caused by violence among students
TC3G30D	Intimidation or verbal abuse of teachers or staff

* This item was deleted from the scale and is not included in any of the results presented for this scale.
Source: OECD, TALIS 2018 database.

Table 11.139. Omega coefficients for school climate scales

Participating countries/economies	T3PACAD	T3PCOM	T3PLACSN	T3PDELI
	Omega coefficient			
ISCED level 2				
Alberta (Canada)	0.854	0.863	0.760	0.702
Australia[1]	0.787	0.771	0.982	0.882
Austria	0.663	0.676	0.837	0.699
Belgium	0.769	0.741	0.891	0.740
Flemish Community (Belgium)	0.815	0.830	0.901	0.755
Brazil	0.745	0.828	0.805	0.897
Bulgaria	0.684	0.893	0.895	0.852
Ciudad Autónoma de Buenos Aires (Argentina)	0.901	0.895	0.823	0.837
Chile	0.806	0.916	0.769	0.760
Colombia	0.839	0.837	0.783	0.897
Croatia	0.707	0.787	0.738	0.709
Cyprus	0.819	0.783	0.901	0.859
Czech Republic	0.689	0.501	0.769	0.721
Denmark[3]	0.776	-	0.837	0.815

Participating countries/economies	T3PACAD	T3PCOM	T3PLACSN	T3PDELI
	Omega coefficient			
England (United Kingdom)	0.845	0.776	0.766	0.810
Estonia	0.711	0.659	0.780	0.748
Finland	0.789	0.686	0.496	0.792
France	0.640	0.671	0.623	0.719
Georgia	0.759	0.976	0.621	0.789
Hungary	0.699	0.740	0.712	0.796
Iceland	0.810	0.893	0.812	0.814
Israel	0.774	0.867	0.814	0.830
Italy	0.776	0.434	0.803	0.736
Japan	0.640	0.717	0.712	0.821
Kazakhstan	0.776	0.832	0.797	0.854
Korea	0.897	0.941	0.869	0.854
Latvia	0.771	0.524	0.689	0.848
Lithuania	0.638	0.719	0.787	0.686
Malta	0.841	0.734	0.702	0.830
Mexico	0.794	0.663	0.692	0.897
Netherlands	0.863	0.711	0.850	0.801
New Zealand	0.899	0.728	0.887	0.839
Norway	0.728	0.764	0.524	0.699
Portugal	0.651	0.646	0.745	0.808
Romania	0.867	0.951	0.931	0.797
Russian Federation	0.865	0.978	0.717	0.976
Saudi Arabia	0.861	0.850	0.878	0.889
Shanghai (China)	0.743	0.895	0.719	0.759
Singapore	0.843	0.835	0.711	0.706
Slovak Republic	0.839	0.759	0.815	0.750
Slovenia	0.773	0.590	0.797	0.750
South Africa[2]	0.626	0.704	0.612	0.865
Spain	0.845	0.785	0.741	0.778
Sweden[3]	0.882	-	0.773	0.764
Chinese Taipei	0.880	0.857	0.604	0.815
Turkey	0.943	0.867	0.640	0.837
United Arab Emirates	0.893	0.897	0.878	0.799
United States	0.882	0.914	0.723	0.846
Viet Nam	0.607	0.794	0.796	0.661
ISCED level 1				
Australia[1]	0.824	0.757	0.824	0.882
Flemish Community (Belgium)	0.781	0.734	0.876	0.790
Ciudad Autónoma de Buenos Aires (Argentina)	0.806	0.681	0.760	0.834
Denmark[3]	0.808	-	0.783	0.837
England (United Kingdom)	0.867	0.861	0.752	0.821
France	0.689	0.814	0.537	0.766
Japan	0.780	0.593	0.726	0.789
Korea	0.904	0.986	0.723	0.810
Netherlands[1]	0.916	0.752	0.872	0.743
Spain	0.843	0.924	0.745	0.740
Sweden[3]	0.889	-	0.759	0.835
Chinese Taipei	0.810	0.935	0.731	0.778
Turkey	0.846	0.931	0.659	0.714
United Arab Emirates	0.878	0.925	0.878	0.817
Viet Nam	0.908	0.953	0.819	0.955

Participating countries/economies	T3PACAD	T3PCOM	T3PLACSN	T3PDELI
	Omega coefficient			
ISCED level 3				
Alberta (Canada)	0.885	0.863	0.794	0.741
Brazil	0.764	0.925	0.803	0.863
Croatia	0.557	0.605	0.797	0.721
Denmark[3]	0.778	-	0.857	0.810
Portugal	0.724	0.650	0.808	0.796
Slovenia	0.714	0.537	0.839	0.745
Sweden[3]	0.856	-	0.694	0.835
Chinese Taipei	0.872	0.785	0.699	0.828
Turkey	0.846	0.980	0.724	0.850
United Arab Emirates	0.848	0.901	0.880	0.773
Viet Nam	0.629	0.852	0.646	0.712
TALIS-PISA link				
Australia	0.760	0.823	0.792	0.856
Ciudad Autónoma de Buenos Aires (Argentina)	0.841	0.891	0.821	0.792
Colombia	0.880	0.908	0.646	0.839
Czech Republic	0.709	0.692	0.878	0.667
Denmark	0.962	0.832	0.817	0.941
Georgia	0.821	0.872	0.806	0.850
Malta	0.821	0.785	0.819	0.815
Turkey	0.812	0.974	0.850	0.869
Viet Nam	0.867	0.974	0.687	0.846

1. Data from the participating country/economy was rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
3. This participating country/economy was excluded from the scale.
Source: OECD, TALIS 2018 database.

Table 11.140. CFA model-data fit for scale T3PACAD

Academic pressure

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Australia[1]	1.000	1.049	0.000	0.051
South Africa[2]	0.943	0.914	0.091	0.217
ISCED level 1				
Australia[1]	0.855	0.855	0.196	0.387
Netherlands[1]	1.000	1.002	0.000	0.145
TALIS-PISA link				
Australia	1.000	1.060	0.000	0.107
Ciudad Autónoma de Buenos Aires (Argentina)	0.944	0.944	0.107	0.289
Colombia	1.000	1.098	0.000	0.158
Czech Republic	1.000	1.017	0.000	0.094
Denmark	1.000	1.059	0.000	0.184
Georgia	0.902	0.902	0.094	0.405
Malta	1.000	1.060	0.000	0.158
Turkey	0.937	0.937	0.073	0.247
Viet Nam	0.670	0.670	0.194	0.649

1. Data from the participating country/economy was rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.141. CFA model-data fit for scale T3PCOM

Stakeholder involvement

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Australia[1]	1.000	1.006	0.000	0.151
Italy[3]	0.916	1.000	0.000	0.023
Lithuania[3]	0.878	1.000	0.000	0.043
South Africa[2]	0.998	0.995	0.033	0.039
ISCED level 1				
Australia[1]	1.000	1.021	0.000	0.078
Netherlands[1]	1.000	1.073	0.000	0.034
ISCED level 3				
Croatia[3]	0.944	0.831	0.067	0.032
TALIS-PISA link				
Australia	0.995	0.995	0.024	0.163
Ciudad Autónoma de Buenos Aires (Argentina)	1.000	1.037	0.000	0.129
Colombia	1.000	1.023	0.000	0.204
Czech Republic	0.947	0.947	0.042	0.168
Denmark	0.984	0.984	0.038	0.201
Georgia	0.938	0.938	0.080	0.153
Malta	1.000	1.237	0.000	0.075
Turkey	1.000	1.028	0.000	0.128
Viet Nam	0.958	0.969	0.077	0.421

1. Data from the participating country/economy was rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
3. Models in this county/economy included programmatic modifications.
Source: OECD, TALIS 2018 database.

Table 11.142. CFA model-data fit for scale T3PLACSN

Lack of special needs personnel

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Australia[1]	0.957	0.935	0.063	0.076
South Africa[2]	1.000	1.007	0.000	0.052
ISCED level 1				
Australia[1]	0.914	0.914	0.102	0.179
Netherlands[1]	0.930	0.930	0.088	0.238
TALIS-PISA link				
Australia	0.981	0.981	0.051	0.102
Ciudad Autónoma de Buenos Aires (Argentina)	0.809	0.809	0.124	0.285
Colombia	0.607	0.607	0.204	0.286
Czech Republic	0.974	0.974	0.049	0.123
Denmark	0.973	0.973	0.052	0.159
Georgia	1.000	1.159	0.000	0.181
Malta	0.911	0.911	0.092	0.245
Turkey	1.000	1.111	0.000	0.067
Viet Nam	0.885	0.885	0.122	0.226

1. Data from the participating country/economy was rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.143. CFA model-data fit for scale T3PDELI

School delinquency and violence

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Alberta (Canada)	1.000	1.001	0.000	0.030
Australia[1]	0.991	0.972	0.068	0.019
Austria	1.000	1.017	0.000	0.016
Belgium	0.984	0.951	0.066	0.026
Flemish Community (Belgium)	0.990	0.971	0.059	0.022
Brazil	1.000	1.021	0.000	0.005
Bulgaria	0.997	0.990	0.043	0.017
Ciudad Autónoma de Buenos Aires (Argentina)	0.993	0.980	0.062	0.020
Chile	1.000	1.086	0.000	0.008
Colombia	0.850	0.549	0.296	0.074
Croatia	0.972	0.916	0.058	0.039
Cyprus	1.000	1.021	0.000	0.014
Czech Republic	0.757	0.271	0.237	0.063
Denmark	1.000	1.048	0.000	0.004
England (United Kingdom)	1.000	1.030	0.000	0.012
Estonia	0.985	0.955	0.076	0.025
Finland	1.000	1.056	0.000	0.011
France	0.947	0.842	0.122	0.034
Georgia	1.000	1.047	0.000	0.013
Hungary	1.000	1.022	0.000	0.015
Iceland	1.000	1.048	0.000	0.010
Israel	1.000	1.042	0.000	0.012
Italy	1.000	1.048	0.000	0.008
Japan	1.000	1.042	0.000	0.002
Kazakhstan	1.000	1.052	0.000	0.009
Korea	0.982	0.947	0.082	0.029
Latvia	0.982	0.946	0.086	0.027
Lithuania	0.991	0.974	0.029	0.036
Malta	1.000	1.026	0.000	0.018
Mexico	0.980	0.941	0.111	0.023
Netherlands	1.000	1.046	0.000	0.004
New Zealand	1.000	1.147	0.000	0.010
Norway	1.000	1.119	0.000	0.004
Portugal	1.000	1.042	0.000	0.004
Romania	0.991	0.974	0.055	0.025
Russian Federation	1.000	1.029	0.000	0.023
Saudi Arabia[3]	-	-	-	0.055
Shanghai (China)	0.982	0.946	0.058	0.029
Singapore	0.887	0.662	0.185	0.039
Slovak Republic	1.000	1.025	0.000	0.016
Slovenia	0.980	0.939	0.066	0.032
South Africa[2]	0.992	0.977	0.064	0.019
Spain	1.000	1.027	0.000	0.006
Sweden	1.000	1.094	0.000	0.007
Chinese Taipei	1.000	1.012	0.000	0.013
Turkey	1.000	1.039	0.000	0.012
United Arab Emirates	1.000	1.006	0.000	0.009
United States[3]	-	-	-	0.122

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Viet Nam	0.880	0.641	0.097	0.060
ISCED level 1				
Australia[1]	0.997	0.990	0.045	0.015
Flemish Community (Belgium)	0.995	0.984	0.038	0.021
Ciudad Autónoma de Buenos Aires (Argentina)	0.981	0.942	0.070	0.028
Denmark	0.994	0.982	0.050	0.021
England (United Kingdom)	0.972	0.915	0.098	0.039
France	1.000	1.050	0.000	0.010
Japan	1.000	1.042	0.000	0.008
Korea	0.998	0.995	0.028	0.019
Netherlands[1]	0.953	0.720	0.176	0.021
Spain	0.995	0.984	0.027	0.023
Sweden	0.996	0.989	0.043	0.018
Chinese Taipei	1.000	1.014	0.000	0.017
Turkey	1.000	1.150	0.000	0.015
United Arab Emirates	0.999	0.996	0.022	0.011
Viet Nam	0.961	0.884	0.038	0.038
ISCED level 3				
Alberta (Canada)	1.000	1.135	0.000	0.014
Brazil	1.000	1.027	0.000	0.009
Croatia	0.942	0.825	0.118	0.047
Denmark	0.940	0.820	0.192	0.039
Portugal	0.988	0.964	0.072	0.021
Slovenia	0.990	0.969	0.068	0.021
Sweden	0.954	0.863	0.203	0.031
Chinese Taipei	0.979	0.938	0.088	0.026
Turkey	1.000	1.020	0.000	0.012
United Arab Emirates	0.989	0.966	0.064	0.018
Viet Nam	0.968	0.904	0.091	0.027
TALIS-PISA link				
Australia	0.990	0.970	0.077	0.025
Ciudad Autónoma de Buenos Aires (Argentina)	0.927	0.780	0.178	0.055
Colombia	0.978	0.935	0.096	0.024
Czech Republic	0.866	0.597	0.131	0.042
Denmark	1.000	1.102	0.000	0.013
Georgia	0.943	0.830	0.109	0.052
Malta	0.968	0.903	0.137	0.031
Turkey	0.887	0.660	0.203	0.034
Viet Nam	0.697	0.091	0.369	0.058

1. Data from the participating country/economy was rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
3. As the correction factor for this country/economy was negative, only the SRMR is reported.
Source: OECD, TALIS 2018 database.

Table 11.144. Invariance test results for scale T3PACAD

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level for ISCED level 2								
Configural	1.000	1.000	0.000	0.000				
Metric	0.966	0.947	0.085	0.137	0.034	0.053	-0.085	-0.137
Scalar	0.774	0.827	0.154	0.217	0.192	0.120	-0.069	-0.080
Invariance level for ISCED level 1								
Configural	1.000	1.000	0.000	0.000				
Metric	0.973	0.955	0.079	0.134	0.027	0.045	-0.079	-0.134
Scalar	0.823	0.856	0.142	0.241	0.15	0.099	-0.063	-0.107
Invariance level for ISCED level 3								
Configural	1.000	1.000	0.000	0.000				
Metric	0.993	0.989	0.039	0.099	0.007	0.011	-0.039	-0.099
Scalar	0.825	0.856	0.142	0.152	0.168	0.133	-0.103	-0.053

Source: OECD, TALIS 2018 database.

Table 11.145. Invariance test results for scale T3PCOM

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level for ISCED level 2								
Configural	1.000	1.000	0.000	0.001				
Metric	0.970	0.954	0.068	0.095	0.030	0.046	-0.068	-0.094
Scalar	0.468	0.592	0.204	0.329	0.502	0.362	-0.136	-0.234
Invariance level for ISCED level 1								
Configural	-	-	-	-				
Metric	0.960	0.935	0.085	0.093	-	-	-	-
Scalar	0.611	0.684	0.188	0.220	0.349	0.251	-0.103	-0.127
Invariance level for ISCED level 3								
Configural	-	-	-	-				
Metric	0.945	0.909	0.103	0.148	-	-	-	-
Scalar	0.496	0.584	0.220	0.529	0.449	0.325	-0.117	-0.381

Source: OECD, TALIS 2018 database.

Table 11.146. Invariance test results for scale T3PLACSN

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level for ISCED level 2								
Configural	1.000	1.000	0.000	0.000				
Metric	0.981	0.971	0.059	0.068	0.019	0.029	-0.059	-0.068
Scalar	0.728	0.792	0.156	0.165	0.253	0.179	-0.097	-0.097
Invariance level for ISCED level 1								
Configural	1.000	1.000	0.000	0.000				
Metric	0.983	0.972	0.051	0.063	0.017	0.028	-0.051	-0.063
Scalar	0.732	0.782	0.142	0.150	0.251	0.190	-0.091	-0.087
Invariance level for ISCED level 3								
Configural	1.000	1.000	0.000	0.000				
Metric	0.959	0.932	0.086	0.078	0.041	0.068	-0.086	-0.078
Scalar	0.869	0.892	0.108	0.116	0.090	0.040	-0.022	-0.038

Source: OECD, TALIS 2018 database.

Table 11.147. Invariance test results for scale T3PDELI

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level for ISCED level 2								
Configural	0.971	0.913	0.092	0.031				
Metric	0.895	0.872	0.111	0.143	0.076	0.041	-0.019	-0.112
Scalar	0.650	0.733	0.161	0.194	0.245	0.139	-0.050	-0.051
Invariance level for ISCED level 1								
Configural	0.998	0.993	0.025	0.022				
Metric	0.945	0.931	0.075	0.106	0.053	0.062	-0.050	-0.084
Scalar	0.727	0.783	0.133	0.164	0.218	0.148	-0.058	-0.058
Invariance level for ISCED level 3								
Configural	0.990	0.970	0.059	0.024				
Metric	0.961	0.950	0.077	0.099	0.029	0.02	-0.018	-0.075
Scalar	0.825	0.859	0.129	0.131	0.136	0.091	-0.052	-0.032

Source: OECD, TALIS 2018 database.

Table 11.148. Unstandardised factor loadings for school climate scales for all participating countries/economies for all populations

T3PACAD		T3PCOM		T3PLACSN	
TC3G27A	0.417	TC3G27D	0.441	TC3G29B	0.454
TC3G27B	0.497	TC3G27E	0.602	TC3G29K	0.608
TC3G27C	0.379	TC3G27G	0.261	TC3G29L	0.648

Source: OECD, TALIS 2018 database.

Table 11.149. Standardised factor loadings and unstandardised intercepts for scale T3PACAD

Participating countries/economies	Standardised factor loadings			Unstandardised intercepts		
	TC3G27A	TC3G27B	TC3G27C	TC3G27A	TC3G27B	TC3G27C
ISCED level 2						
Alberta (Canada)	0.726	0.896	0.622	3.342	3.433	3.591
Australia[1]	0.614	0.849	0.582	3.184	3.159	3.227
Austria	0.581	0.743	0.423	3.410	3.223	3.258
Belgium	0.699	0.819	0.503	3.362	3.325	3.384
Flemish Community (Belgium)	0.744	0.861	0.498	3.360	3.254	3.251
Brazil	0.675	0.790	0.543	3.466	3.279	3.290
Bulgaria	0.600	0.758	0.449	3.363	2.981	2.579
Ciudad Autónoma de Buenos Aires (Argentina)	0.762	0.937	0.607	3.125	3.056	2.872
Chile	0.772	0.825	0.606	3.326	3.074	3.078
Colombia	0.712	0.888	0.540	3.655	3.402	3.538
Croatia	0.585	0.786	0.474	3.154	3.313	2.804
Cyprus	0.744	0.856	0.593	3.430	3.363	3.191
Czech Republic	0.578	0.765	0.488	3.377	3.238	2.960
Denmark	0.682	0.823	0.578	3.459	3.217	3.463
England (United Kingdom)	0.657	0.890	0.677	3.600	3.611	3.561
Estonia	0.629	0.776	0.476	3.197	3.263	2.983
Finland	0.667	0.851	0.493	3.129	3.111	2.950
France	0.565	0.712	0.467	3.418	3.568	3.550
Georgia	0.712	0.798	0.522	3.156	2.973	2.863

Participating countries/economies	Standardised factor loadings			Unstandardised intercepts		
	TC3G27A	TC3G27B	TC3G27C	TC3G27A	TC3G27B	TC3G27C
Hungary	0.633	0.765	0.438	3.369	3.314	2.905
Iceland	0.641	0.874	0.509	3.129	2.978	3.183
Israel	0.692	0.831	0.479	3.239	3.170	3.268
Italy	0.729	0.811	0.541	3.247	3.166	3.089
Japan	0.600	0.700	0.453	3.026	3.168	2.785
Kazakhstan	0.673	0.829	0.553	3.328	3.202	3.098
Korea	0.816	0.924	0.673	3.326	3.298	3.128
Latvia	0.700	0.824	0.480	3.652	3.662	3.355
Lithuania	0.562	0.728	0.382	3.330	3.242	3.112
Malta	0.744	0.880	0.630	3.367	3.389	3.477
Mexico	0.733	0.818	0.636	3.250	2.872	2.831
Netherlands	0.788	0.898	0.574	2.932	2.769	2.607
New Zealand	0.796	0.922	0.776	3.424	3.328	3.484
Norway	0.565	0.814	0.436	3.073	2.922	3.014
Portugal	0.599	0.710	0.472	3.347	3.421	3.170
Romania	0.767	0.907	0.573	3.536	3.482	3.064
Russian Federation	0.736	0.909	0.548	3.483	3.398	2.930
Saudi Arabia	0.704	0.910	0.558	3.654	3.616	3.268
Shanghai (China)	0.705	0.781	0.504	3.344	3.262	3.242
Singapore	0.765	0.872	0.661	3.446	3.382	3.424
Slovak Republic	0.716	0.886	0.576	3.272	3.189	2.765
Slovenia	0.648	0.837	0.500	3.269	3.299	3.088
South Africa[2]	0.610	0.714	0.504	3.466	3.380	3.387
Spain	0.712	0.890	0.613	3.198	2.992	2.845
Sweden	0.729	0.921	0.651	3.428	3.227	3.210
Chinese Taipei	0.811	0.909	0.619	3.017	3.002	3.093
Turkey	0.837	0.965	0.606	3.286	3.245	2.945
United Arab Emirates	0.773	0.929	0.625	3.534	3.460	3.174
United States	0.763	0.912	0.729	3.227	3.087	3.132
Viet Nam	0.624	0.637	0.426	3.794	3.705	3.438
ISCED level 1						
Australia[1]	0.653	0.879	0.600	3.369	3.315	3.283
Flemish Community (Belgium)	0.748	0.811	0.531	3.360	3.254	3.251
Ciudad Autónoma de Buenos Aires (Argentina)	0.722	0.854	0.509	3.125	3.056	2.872
Denmark	0.743	0.849	0.541	3.459	3.217	3.463
England (United Kingdom)	0.763	0.899	0.688	3.600	3.611	3.561
France	0.618	0.749	0.488	3.542	3.452	3.575
Japan	0.673	0.834	0.548	3.026	3.168	2.785
Korea	0.708	0.943	0.587	3.326	3.298	3.128
Netherlands[1]	0.710	0.950	0.547	3.244	3.100	3.116
Spain	0.702	0.890	0.601	3.198	2.992	2.845
Sweden	0.726	0.928	0.625	3.428	3.227	3.210
Chinese Taipei	0.719	0.850	0.604	3.017	3.002	3.093
Turkey	0.801	0.875	0.540	3.286	3.245	2.945
United Arab Emirates	0.778	0.913	0.627	3.534	3.460	3.174
Viet Nam	0.835	0.934	0.637	3.794	3.705	3.438
ISCED level 3						
Alberta (Canada)	0.758	0.917	0.711	3.533	3.535	3.474
Brazil	0.617	0.837	0.472	3.466	3.279	3.290
Croatia	0.520	0.656	0.342	3.154	3.313	2.804

Participating countries/economies	Standardised factor loadings			Unstandardised intercepts		
	TC3G27A	TC3G27B	TC3G27C	TC3G27A	TC3G27B	TC3G27C
Denmark	0.775	0.791	0.494	3.459	3.217	3.463
Portugal	0.633	0.780	0.538	3.347	3.421	3.170
Slovenia	0.650	0.773	0.462	3.269	3.299	3.088
Sweden	0.847	0.857	0.604	3.428	3.227	3.210
Chinese Taipei	0.804	0.901	0.641	3.017	3.002	3.093
Turkey	0.735	0.893	0.530	3.286	3.245	2.945
United Arab Emirates	0.762	0.888	0.573	3.534	3.460	3.174
Viet Nam	0.622	0.662	0.469	3.794	3.705	3.438
TALIS-PISA link						
Australia	0.604	0.827	0.543	3.259	3.340	3.295
Ciudad Autónoma de Buenos Aires (Argentina)	0.724	0.889	0.519	3.258	3.232	3.006
Colombia	0.507	0.929	0.627	3.702	3.455	3.558
Czech Republic	0.641	0.765	0.497	3.279	3.113	2.824
Denmark	0.760	0.980	0.153	3.372	3.288	3.451
Georgia	0.744	0.861	0.571	3.285	3.091	3.036
Malta	0.727	0.858	0.632	3.361	3.426	3.531
Turkey	0.763	0.835	0.614	3.149	3.300	2.925
Viet Nam	0.794	0.895	0.659	3.614	3.641	3.293

1. Data from the participating country/economy was rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.150. Standardised factor loadings and unstandardised intercepts for scale T3PCOM

Participating countries/economies	Standardised factor loadings			Unstandardised intercepts		
	TC3G27D	TC3G27E	TC3G27G	TC3G27D	TC3G27E	TC3G27G
ISCED level 2						
Alberta (Canada)	0.652	0.919	0.383	2.939	2.558	3.149
Australia[1]	0.664	0.842	0.355	3.053	2.407	3.092
Austria	0.614	0.762	0.276	2.581	2.428	2.698
Belgium	0.634	0.821	0.315	2.840	2.415	2.752
Flemish Community (Belgium)	0.715	0.886	0.367	2.747	2.532	2.708
Brazil	0.672	0.890	0.412	2.894	2.718	3.411
Bulgaria	0.569	0.941	0.345	2.478	2.388	2.876
Ciudad Autónoma de Buenos Aires (Argentina)	0.627	0.941	0.348	2.467	2.192	2.400
Chile	0.668	0.953	0.373	2.341	2.562	2.836
Colombia	0.720	0.888	0.493	2.790	2.807	3.474
Croatia	0.648	0.860	0.338	2.492	2.400	3.180
Cyprus	0.500	0.872	0.316	2.934	2.470	2.983
Czech Republic	0.437	0.648	0.200	2.483	2.297	2.700
Denmark[3]	-	-	-	-	-	-
England (United Kingdom)	0.658	0.844	0.449	3.038	2.717	3.147
Estonia	0.570	0.758	0.304	2.683	2.499	2.928
Finland	0.569	0.785	0.293	2.736	2.266	2.694
France	0.647	0.741	0.299	3.188	2.743	3.051
Georgia	0.761	0.988	0.417	2.384	2.369	2.736

Participating countries/economies	Standardised factor loadings			Unstandardised intercepts		
	TC3G27D	TC3G27E	TC3G27G	TC3G27D	TC3G27E	TC3G27G
Hungary	0.621	0.820	0.371	2.788	2.663	3.319
Iceland	0.566	0.942	0.326	2.661	2.258	2.624
Israel	0.599	0.923	0.430	3.055	2.561	2.877
Italy	0.365	0.597	0.237	2.672	2.937	3.530
Japan	0.623	0.800	0.322	2.596	2.713	2.743
Kazakhstan	0.635	0.896	0.394	2.735	2.781	2.902
Korea	0.721	0.968	0.433	2.930	2.800	3.127
Latvia	0.470	0.656	0.241	3.049	3.062	3.375
Lithuania	0.551	0.818	0.311	2.715	2.611	3.274
Malta	0.574	0.826	0.321	3.005	2.525	2.513
Mexico	0.572	0.766	0.241	2.202	2.250	2.567
Netherlands	0.617	0.796	0.309	2.735	2.453	2.607
New Zealand	0.587	0.810	0.434	3.058	2.897	3.288
Norway	0.544	0.855	0.300	2.743	2.381	2.307
Portugal	0.577	0.734	0.369	2.862	2.762	3.610
Romania	0.754	0.973	0.492	2.487	2.428	3.519
Russian Federation	0.691	0.989	0.440	2.669	2.676	3.016
Saudi Arabia	0.647	0.908	0.430	2.646	2.314	3.240
Shanghai (China)	0.734	0.937	0.464	3.129	2.887	3.145
Singapore	0.671	0.896	0.406	3.297	2.625	2.875
Slovak Republic	0.647	0.836	0.319	2.346	2.205	2.881
Slovenia	0.459	0.724	0.266	2.952	2.369	3.382
South Africa[2]	0.551	0.719	0.746	2.557	2.461	3.108
Spain	0.650	0.858	0.343	2.717	2.358	2.915
Sweden[3]	-	-	-	-	-	-
Chinese Taipei	0.634	0.916	0.346	2.736	2.464	2.950
Turkey	0.686	0.918	0.428	2.692	2.463	3.009
United Arab Emirates	0.689	0.940	0.473	2.968	2.833	3.367
United States	0.781	0.948	0.473	2.835	2.607	3.293
Viet Nam	0.707	0.847	0.484	3.103	2.883	3.515
ISCED level 1						
Australia[1]	0.589	0.841	0.375	2.993	2.722	3.162
Flemish Community (Belgium)	0.663	0.806	0.339	2.747	2.532	2.708
Ciudad Autónoma de Buenos Aires (Argentina)	0.607	0.767	0.324	2.467	2.192	2.400
Denmark[3]	-	-	-	-	-	-
England (United Kingdom)	0.724	0.911	0.418	3.038	2.717	3.147
France	0.700	0.874	0.361	3.085	2.760	2.880
Japan	0.545	0.698	0.287	2.615	3.004	3.071
Korea	0.748	0.993	0.513	2.930	2.800	3.127
Netherlands[1]	0.685	0.814	0.383	2.686	2.782	2.677
Spain	0.689	0.957	0.400	2.728	2.585	3.128
Sweden[3]	-	-	-	-	-	-
Chinese Taipei	0.720	0.964	0.437	2.856	2.709	3.152
Turkey	0.722	0.962	0.453	2.736	2.617	2.897
United Arab Emirates	0.703	0.958	0.480	2.968	2.833	3.367
Viet Nam	0.714	0.975	0.496	3.188	3.015	3.427
ISCED level 3						

Participating countries/economies	Standardised factor loadings			Unstandardised intercepts		
	TC3G27D	TC3G27E	TC3G27G	TC3G27D	TC3G27E	TC3G27G
Alberta (Canada)	0.669	0.917	0.399	2.939	2.558	3.149
Brazil	0.711	0.958	0.474	2.894	2.718	3.411
Croatia	0.570	0.707	0.228	2.607	2.232	3.079
Denmark[3]	-	-	-	-	-	-
Portugal	0.558	0.739	0.402	2.771	2.587	3.733
Slovenia	0.479	0.667	0.233	3.087	2.282	2.981
Sweden[3]	-	-	-	-	-	-
Chinese Taipei	0.647	0.860	0.303	2.857	2.482	2.940
Turkey	0.602	0.990	0.446	2.622	2.298	2.568
United Arab Emirates	0.697	0.942	0.487	2.968	2.833	3.367
Viet Nam	0.640	0.909	0.479	3.071	2.850	3.188
TALIS-PISA link						
Australia	0.610	0.892	0.367	2.986	2.425	3.072
Ciudad Autónoma de Buenos Aires (Argentina)	0.611	0.939	0.329	2.666	2.285	2.388
Colombia	0.662	0.948	0.415	2.779	2.699	3.463
Czech Republic	0.627	0.771	0.355	2.377	2.316	2.640
Denmark	0.785	0.873	0.381	3.030	2.801	3.020
Georgia	0.704	0.923	0.348	2.333	2.350	2.526
Malta	0.616	0.862	0.352	3.095	2.563	2.543
Turkey	0.554	0.986	0.372	2.853	2.299	2.436
Viet Nam	0.661	0.986	0.457	3.023	2.826	3.339

1. Data from the participating country/economy was rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
3. This participating country/economy was excluded from the scale.
Source: OECD, TALIS 2018 database.

Table 11.151. Standardised factor loadings and unstandardised intercepts for scale T3PLACSN

Participating countries/economies	Standardised factor loadings			Unstandardised intercepts		
	TC3G29B	TC3G29K	TC3G29L	TC3G29B	TC3G29K	TC3G29L
ISCED level 2						
Alberta (Canada)	0.492	0.745	0.786	1.811	1.437	1.378
Australia[1]	0.568	0.393	0.991	1.858	1.447	1.474
Austria	0.495	0.827	0.853	1.684	1.736	1.696
Belgium	0.559	0.795	0.926	2.568	2.069	2.060
Flemish Community (Belgium)	0.541	0.822	0.931	2.418	1.977	1.905
Brazil	0.575	0.815	0.787	2.776	2.558	2.344
Bulgaria	0.526	0.891	0.900	1.896	1.536	1.599
Ciudad Autónoma de Buenos Aires (Argentina)	0.465	0.733	0.872	2.008	1.546	1.460
Chile	0.567	0.673	0.819	2.105	1.811	1.763
Colombia	0.593	0.755	0.798	3.019	3.036	2.521
Croatia	0.414	0.726	0.774	2.115	1.326	1.394
Cyprus	0.529	0.794	0.935	1.866	1.708	1.564
Czech Republic	0.420	0.557	0.853	2.160	1.799	1.417
Denmark	0.570	0.835	0.838	2.128	1.751	1.843
England (United Kingdom)	0.513	0.734	0.797	1.968	1.455	1.601

Participating countries/economies	Standardised factor loadings			Unstandardised intercepts		
	TC3G29B	TC3G29K	TC3G29L	TC3G29B	TC3G29K	TC3G29L
Estonia	0.498	0.743	0.815	2.519	1.657	1.782
Finland	0.319	0.515	0.580	1.872	1.541	1.398
France	0.511	0.513	0.696	2.879	2.324	2.619
Georgia	0.453	0.616	0.658	1.633	1.579	1.687
Hungary	0.438	0.628	0.784	2.129	1.616	1.803
Iceland	0.547	0.803	0.822	1.871	1.968	1.495
Israel	0.595	0.754	0.846	2.324	2.159	2.061
Italy	0.504	0.750	0.842	2.465	2.552	2.285
Japan	0.488	0.624	0.777	2.476	1.762	1.911
Kazakhstan	0.612	0.736	0.827	1.686	2.068	1.541
Korea	0.572	0.758	0.910	1.568	1.848	1.736
Latvia	0.403	0.610	0.767	2.027	1.507	1.537
Lithuania	0.516	0.718	0.832	1.881	1.449	1.730
Malta	0.421	0.694	0.741	2.202	1.736	1.633
Mexico	0.430	0.670	0.740	2.242	1.645	1.781
Netherlands	0.485	0.786	0.889	2.085	1.462	1.419
New Zealand	0.559	0.750	0.928	2.041	1.965	1.709
Norway	0.369	0.479	0.626	1.931	1.758	1.419
Portugal	0.543	0.677	0.790	2.461	2.267	2.115
Romania	0.629	0.898	0.947	2.463	1.776	1.927
Russian Federation	0.469	0.602	0.793	1.760	1.440	1.331
Saudi Arabia	0.641	0.843	0.895	2.627	2.293	2.243
Shanghai (China)	0.548	0.653	0.763	2.078	2.245	1.844
Singapore	0.386	0.709	0.749	2.022	1.244	1.313
Slovak Republic	0.451	0.764	0.856	2.129	1.628	1.587
Slovenia	0.446	0.649	0.865	2.103	1.676	1.574
South Africa[2]	0.386	0.639	0.644	2.695	2.194	2.221
Spain	0.539	0.736	0.748	2.019	1.795	1.759
Sweden	0.473	0.761	0.796	2.113	1.800	1.649
Chinese Taipei	0.467	0.583	0.651	1.443	2.100	1.868
Turkey	0.435	0.588	0.709	2.200	1.951	1.895
United Arab Emirates	0.649	0.850	0.892	2.426	2.113	1.919
United States	0.491	0.745	0.716	2.042	1.680	1.544
Viet Nam	0.554	0.707	0.842	2.761	2.325	2.256
ISCED level 1						
Australia[1]	0.597	0.783	0.848	1.940	1.517	1.597
Flemish Community (Belgium)	0.594	0.855	0.891	2.418	1.977	1.905
Ciudad Autónoma de Buenos Aires (Argentina)	0.412	0.681	0.823	2.367	1.600	1.481
Denmark	0.576	0.663	0.837	2.128	1.751	1.843
England (United Kingdom)	0.543	0.690	0.792	1.684	1.567	1.485
France	0.414	0.498	0.619	2.879	2.324	2.619
Japan	0.495	0.638	0.788	2.476	1.762	1.911
Korea	0.541	0.690	0.750	1.568	1.848	1.736
Netherlands[1]	0.537	0.821	0.901	1.983	1.479	1.438
Spain	0.528	0.611	0.812	1.959	2.060	1.635
Sweden	0.512	0.735	0.787	2.113	1.800	1.649
Chinese Taipei	0.440	0.622	0.805	1.694	2.137	1.762
Turkey	0.433	0.636	0.711	2.200	1.951	1.895
United Arab Emirates	0.665	0.849	0.889	2.426	2.113	1.919
Viet Nam	0.610	0.734	0.856	2.761	2.325	2.256

Participating countries/economies	Standardised factor loadings			Unstandardised intercepts		
	TC3G29B	TC3G29K	TC3G29L	TC3G29B	TC3G29K	TC3G29L
ISCED level 3						
Alberta (Canada)	0.459	0.686	0.854	1.811	1.437	1.378
Brazil	0.558	0.703	0.852	2.776	2.558	2.344
Croatia	0.402	0.654	0.866	1.843	1.436	1.420
Denmark	0.528	0.795	0.891	2.128	1.751	1.843
Portugal	0.562	0.766	0.836	2.461	2.267	2.115
Slovenia	0.497	0.735	0.888	2.103	1.676	1.574
Sweden	0.378	0.653	0.758	2.113	1.800	1.649
Chinese Taipei	0.427	0.715	0.717	1.609	1.894	1.683
Turkey	0.476	0.660	0.782	2.200	1.951	1.895
United Arab Emirates	0.624	0.844	0.900	2.426	2.113	1.919
Viet Nam	0.460	0.578	0.716	2.761	2.325	2.256
TALIS-PISA link						
Australia	0.574	0.775	0.802	2.136	1.582	1.712
Ciudad Autónoma de Buenos Aires (Argentina)	0.501	0.759	0.862	2.013	1.533	1.522
Colombia	0.470	0.564	0.720	2.956	2.919	2.442
Czech Republic	0.495	0.661	0.927	2.137	1.842	1.453
Denmark	0.590	0.706	0.864	2.109	1.610	1.810
Georgia	0.577	0.755	0.838	1.697	1.553	1.609
Malta	0.481	0.803	0.840	2.193	1.756	1.640
Turkey	0.529	0.642	0.906	1.991	2.013	1.706
Viet Nam	0.527	0.635	0.729	2.624	2.538	2.234

1. Data from the participating country/economy was rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.152. Standardised factor loadings and unstandardised intercepts for scale T3PDELI

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TC3G30A	TC3G30B	TC3G30C	TC3G30D	TC3G30A	TC3G30B	TC3G30C	TC3G30D
ISCED level 2								
Alberta (Canada)	0.606	0.738	0.506	0.439	1.876	2.496	1.549	1.720
Australia[1]	0.719	0.732	0.838	0.862	2.062	2.947	1.928	2.062
Austria	0.529	0.601	0.614	0.656	1.898	2.573	1.768	1.700
Belgium	0.411	0.693	0.628	0.718	2.224	3.156	1.863	2.111
Flemish Community (Belgium)	0.451	0.651	0.756	0.659	2.258	3.272	1.855	2.256
Brazil	0.847	0.728	0.864	0.817	1.974	2.635	1.801	1.977
Bulgaria	0.794	0.694	0.771	0.790	2.161	2.752	1.915	1.709
Ciudad Autónoma de Buenos Aires (Argentina)	0.484	0.855	0.755	0.662	1.579	1.937	1.366	1.376
Chile	0.589	0.805	0.645	0.292	1.487	1.981	1.566	1.174
Colombia	0.402	0.717	0.876	0.896	1.907	2.231	1.663	1.620
Croatia	0.561	0.605	0.698	0.556	1.598	2.081	1.614	1.415
Cyprus	0.689	0.824	0.821	0.711	2.086	2.489	1.738	1.691
Czech Republic	0.669	0.721	0.559	0.441	1.968	2.117	1.542	1.344
Denmark	0.605	0.728	0.711	0.791	1.918	2.214	1.761	2.081
England (United Kingdom)	0.541	0.593	0.801	0.776	2.046	2.634	1.953	1.987
Estonia	0.576	0.683	0.519	0.745	1.828	2.557	1.615	2.085
Finland	0.543	0.838	0.584	0.590	2.301	3.018	2.017	2.112

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TC3G30A	TC3G30B	TC3G30C	TC3G30D	TC3G30A	TC3G30B	TC3G30C	TC3G30D
France	0.494	0.625	0.670	0.665	2.009	2.915	1.988	1.757
Georgia	0.611	0.807	0.722	0.396	1.172	1.544	1.220	1.045
Hungary	0.639	0.651	0.722	0.760	2.021	2.303	1.772	1.425
Iceland	0.744	0.649	0.739	0.741	1.806	2.164	1.860	2.022
Israel	0.639	0.853	0.755	0.368	2.071	2.621	2.157	1.423
Italy	0.549	0.681	0.646	0.662	1.502	2.093	1.316	1.433
Japan	0.547	0.713	0.828	0.693	1.364	1.608	1.394	1.265
Kazakhstan	0.476	0.909	0.632	0.381	1.400	1.316	1.184	1.109
Korea	0.697	0.822	0.828	0.634	1.668	1.766	1.581	1.396
Latvia	0.504	0.891	0.516	0.709	1.642	2.360	1.529	1.508
Lithuania	0.455	0.420	0.667	0.689	1.496	2.530	1.416	1.450
Malta	0.740	0.763	0.606	0.792	2.000	2.886	1.926	1.655
Mexico	0.856	0.832	0.879	0.449	1.952	2.320	1.805	1.282
Netherlands	0.708	0.673	0.547	0.798	2.190	2.586	1.638	1.897
New Zealand	0.614	0.639	0.631	0.874	1.880	3.034	1.831	1.955
Norway	0.637	0.564	0.664	0.521	2.009	2.588	1.793	1.967
Portugal	0.715	0.717	0.669	0.755	1.993	2.264	1.846	1.925
Romania	0.591	0.739	0.805	0.518	1.418	2.155	1.501	1.301
Russian Federation	0.520	0.987	0.485	0.637	1.369	1.362	1.185	1.234
Saudi Arabia	0.652	0.838	0.867	0.809	1.598	1.870	1.363	1.370
Shanghai (China)	0.646	0.780	0.605	0.480	1.388	1.346	1.160	1.097
Singapore	0.474	0.661	0.612	0.650	1.877	2.185	1.594	1.481
Slovak Republic	0.541	0.692	0.698	0.647	1.798	2.192	1.610	1.386
Slovenia	0.682	0.674	0.624	0.629	1.878	2.595	1.731	1.634
South Africa[2]	0.783	0.805	0.835	0.622	2.680	3.000	2.055	1.822
Spain	0.595	0.663	0.753	0.683	1.768	2.172	1.644	1.640
Sweden	0.535	0.483	0.744	0.751	2.251	2.903	1.878	1.992
Chinese Taipei	0.668	0.800	0.765	0.544	1.880	1.901	1.723	1.513
Turkey	0.729	0.787	0.747	0.730	1.788	2.073	1.808	1.385
United Arab Emirates	0.716	0.755	0.684	0.652	1.663	2.125	1.531	1.401
United States	0.771	0.512	0.873	0.587	1.824	2.828	1.690	1.911
Viet Nam	0.675	0.675	0.379	0.300	1.351	1.645	1.141	1.039
ISCED level 1								
Australia[1]	0.582	0.839	0.793	0.861	1.872	2.628	2.060	1.967
Flemish Community (Belgium)	0.473	0.627	0.649	0.824	1.776	2.915	2.056	1.854
Ciudad Autónoma de Buenos Aires (Argentina)	0.606	0.854	0.717	0.626	1.298	1.878	1.589	1.372
Denmark	0.565	0.777	0.794	0.770	1.744	2.347	2.027	2.408
England (United Kingdom)	0.568	0.823	0.752	0.648	1.487	2.075	1.850	1.637
France	0.538	0.713	0.759	0.562	1.477	2.535	1.649	1.394
Japan	0.595	0.656	0.762	0.715	1.350	1.877	1.457	1.252
Korea	0.651	0.629	0.818	0.681	1.302	1.661	1.321	1.187
Netherlands[1]	0.518	0.438	0.558	0.817	1.680	2.312	1.595	1.488
Spain	0.684	0.562	0.598	0.696	1.255	1.873	1.466	1.359
Sweden	0.627	0.620	0.816	0.801	1.860	2.638	1.964	2.012
Chinese Taipei	0.618	0.747	0.763	0.421	1.693	1.683	1.440	1.187
Turkey	0.630	0.571	0.577	0.677	1.788	2.073	1.808	1.385
United Arab Emirates	0.604	0.822	0.746	0.606	1.576	2.092	1.599	1.307
Viet Nam	0.340	0.977	0.200	0.198	1.117	1.249	1.057	1.014
ISCED level 3								
Alberta (Canada)	0.696	0.717	0.625	0.428	1.876	2.496	1.549	1.720

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TC3G30A	TC3G30B	TC3G30C	TC3G30D	TC3G30A	TC3G30B	TC3G30C	TC3G30D
Brazil	0.731	0.711	0.824	0.816	1.974	2.635	1.801	1.977
Croatia	0.560	0.706	0.630	0.569	1.720	1.933	1.421	1.444
Denmark	0.472	0.670	0.639	0.845	1.723	1.901	1.358	1.699
Portugal	0.718	0.720	0.671	0.694	1.993	2.264	1.846	1.925
Slovenia	0.640	0.649	0.673	0.630	1.757	2.019	1.311	1.495
Sweden	0.614	0.736	0.775	0.798	1.915	2.227	1.568	1.637
Chinese Taipei	0.699	0.799	0.776	0.596	1.911	1.882	1.747	1.628
Turkey	0.714	0.851	0.777	0.574	1.788	2.073	1.808	1.385
United Arab Emirates	0.657	0.737	0.640	0.654	1.644	2.013	1.484	1.423
Viet Nam	0.658	0.600	0.640	0.560	1.391	1.720	1.207	1.072
TALIS-PISA link								
Australia	0.756	0.751	0.834	0.715	2.036	2.920	2.000	2.261
Ciudad Autónoma de Buenos Aires (Argentina)	0.541	0.825	0.707	0.468	1.706	2.031	1.459	1.373
Colombia	0.716	0.828	0.744	0.651	1.809	2.063	1.456	1.426
Czech Republic	0.694	0.566	0.481	0.485	1.926	1.963	1.460	1.264
Denmark	0.497	0.967	0.691	0.604	1.833	2.184	1.663	1.975
Georgia	0.699	0.683	0.890	0.265	1.120	1.466	1.232	1.098
Malta	0.744	0.686	0.600	0.795	2.020	2.828	1.830	1.598
Turkey	0.869	0.832	0.628	0.636	1.385	1.556	1.449	1.133
Viet Nam	0.595	0.751	0.835	0.757	1.329	1.698	1.228	1.134

1. Data from the participating country/economy was rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Innovation: Organisational innovativeness (T3PORGIN)

11.76. Measured items

One scale measured innovation concepts with this question stem:

- "How strongly do you agree or disagree with the following statements?" (TC3G28), which was followed by items regarding school flexibility toward change that were used to form the scale *Organisational innovativeness* (T3PORGIN).

The scale is presented in Table 11.153.

11.77. Model improvements

A correlation between items TC3G28A and TC3G28B was added to scale T3PORGIN.

11.78. Scale reliability

Table 11.154 presents the reliability coefficients for scale T3PORGIN. For nearly all populations, the coefficient is strong, but it is acceptable for the Slovenia ISCED level 2 and Viet Nam ISCED level 3 populations and weak for the Viet Nam ISCED level 2 population.

11.79. Model fits

Table 11.155, which presents the model fit indices for the scale T3PORGIN, shows an acceptable model fit in all populations except the Malta ISCED level 2 population.

11.80. Invariance testing

The measurement invariance testing results for scale T3PORGIN are presented in Table 11.156. The configural models exhibit an acceptable fit for the ISCED levels 1 and 2 populations, with the difference between the configural and metric models greater than the acceptable cut-off criteria. The scale can therefore be considered configural invariant for the ISCED 1 and 2 levels. Although the difference between the configural and metric models for ISCED level 3 level is acceptable based on the cut-off criteria, use of a metric invariant ISCED level 3 model in the final model revealed that the scale performed very poorly. The ISCED level 3 level model was consequently relaxed to configural invariant, resulting in configural models for all ISCED levels for this scale.

11.81. Item parameters

The unstandardised item parameters for T3PORGIN are not reported here because the scale reached configural invariance and the item parameters were country-specific.

Table 11.157 presents the standardised factor loadings and unstandardised intercepts for the scale T3PORGIN. Factor loadings for items TC3G28C and TC3G28D are strong in nearly all populations and of moderate strength in a few populations; there are no weak factor loadings. Item TC3G28B exhibits not only strong relationships with the latent factor in most populations, but also moderate factor loadings for more populations in comparison with the other items in the scale, and weak relationships for the Viet Nam ISCED levels 2 and 3 populations. In addition to exhibiting some strong factor loadings, TC3G28A has, compared to other items in the scale, the largest number of moderate strength factor loadings. It also exhibits the largest number of weak relationships among the four items in the following populations: Kazakhstan, Korea, the Netherlands, Norway, Romania and Viet Nam ISCED level 2; Korea and the Netherlands ISCED level 1; Viet Nam ISCED level 3; and the Czech Republic and Georgia TALIS-PISA link.

Table 11.153. Item wording for the innovation scale

T3PORGIN: Organisational innovativeness	
TC3G28: How strongly do you agree or disagree with the following statements?	
Response options: “Strongly disagree” (1), “Disagree” (2), “Agree” (3), and “Strongly agree” (4).	
TC3G28A	This school quickly identifies the need to do things differently
TC3G28B	This school quickly responds to changes when needed
TC3G28C	This school readily accepts new ideas
TC3G28D	This school makes assistance readily available for the development of new ideas

Source: OECD, TALIS 2018 database.

Table 11.154. Omega coefficient for the scale on innovation

Participating countries/economies	T3PORGIN
	Omega coefficient
ISCED level 2	
Alberta (Canada)	0.830
Australia[1]	0.908
Austria	0.832
Belgium	0.792
Flemish Community (Belgium)	0.854
Brazil	0.891

Participating countries/economies	T3PORGIN
	Omega coefficient
Bulgaria	0.885
Ciudad Autónoma de Buenos Aires (Argentina)	0.857
Chile	0.891
Colombia	0.904
Croatia	0.863
Cyprus	0.903
Czech Republic	0.850
Denmark	0.910
England (United Kingdom)	0.846
Estonia	0.801
Finland	0.812
France	0.878
Georgia	0.830
Hungary	0.906
Iceland	0.910
Israel	0.889
Italy	0.916
Japan	0.856
Kazakhstan	0.796
Korea	0.859
Latvia	0.857
Lithuania	0.906
Malta	0.865
Mexico	0.845
Netherlands	0.767
New Zealand	0.893
Norway	0.839
Portugal	0.846
Romania	0.874
Russian Federation	0.852
Saudi Arabia	0.835
Shanghai (China)	0.876
Singapore	0.841
Slovak Republic	0.941
Slovenia	0.642
South Africa[2]	0.852
Spain	0.823
Sweden	0.852
Chinese Taipei	0.976
Turkey	0.891
United Arab Emirates	0.916
United States	0.874
Viet Nam	0.578
ISCED level 1	
Australia[1]	0.865
Flemish Community (Belgium)	0.785
Ciudad Autónoma de Buenos Aires (Argentina)	0.872
Denmark	0.937
England (United Kingdom)	0.920

Participating countries/economies	T3PORGIN
	Omega coefficient
France	0.874
Japan	0.780
Korea	0.935
Netherlands[1]	0.850
Spain	0.906
Sweden	0.914
Chinese Taipei	0.964
Turkey	0.908
United Arab Emirates	0.906
Viet Nam	0.746
ISCED level 3	
Alberta (Canada)	0.895
Brazil	0.846
Croatia	0.906
Denmark	0.931
Portugal	0.755
Slovenia	0.828
Sweden	0.843
Chinese Taipei	0.904
Turkey	0.887
United Arab Emirates	0.916
Viet Nam	0.640
TALIS-PISA link	
Australia	0.891
Ciudad Autónoma de Buenos Aires (Argentina)	0.914
Colombia	0.912
Czech Republic	0.794
Denmark	0.924
Georgia	0.834
Malta	0.857
Turkey	0.899
Viet Nam	0.882

1. Data from the participating country/economy was rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.155. CFA model-data fit for scale T3PORGIN

Organisational innovativeness

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Alberta (Canada)	1.000	1.052	0.000	0.001
Australia[1]	0.982	0.890	0.090	0.021
Austria	0.976	0.856	0.145	0.017
Belgium	0.992	0.953	0.075	0.019
Flemish Community (Belgium)	0.998	0.986	0.051	0.020
Brazil	0.983	0.899	0.115	0.018
Bulgaria	1.000	1.024	0.000	0.007
Ciudad Autónoma de Buenos Aires (Argentina)	1.000	1.050	0.000	0.001

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Chile	1.000	1.034	0.000	0.001
Colombia	1.000	1.105	0.000	0.002
Croatia	1.000	1.057	0.000	0.001
Cyprus	1.000	1.069	0.000	0.000
Czech Republic	0.990	0.942	0.082	0.012
Denmark	1.000	1.018	0.000	0.005
England (United Kingdom)	0.932	0.590	0.210	0.032
Estonia	1.000	1.009	0.000	0.007
Finland	1.000	1.056	0.000	0.000
France	0.984	0.902	0.148	0.015
Georgia	1.000	1.045	0.000	0.002
Hungary	1.000	1.026	0.000	0.002
Iceland	1.000	1.039	0.000	0.003
Israel	0.994	0.967	0.075	0.012
Italy	1.000	1.027	0.000	0.005
Japan	1.000	1.004	0.000	0.009
Kazakhstan	1.000	1.011	0.000	0.009
Korea	1.000	1.020	0.000	0.014
Latvia	1.000	1.071	0.000	0.008
Lithuania	0.945	0.670	0.215	0.030
Malta[3]	-	-	-	0.053
Mexico	1.000	1.046	0.000	0.001
Netherlands	1.000	1.051	0.000	0.008
New Zealand	1.000	1.005	0.000	0.008
Norway	1.000	1.031	0.000	0.011
Portugal	0.998	0.987	0.040	0.009
Romania	1.000	1.056	0.000	0.001
Russian Federation	1.000	1.006	0.000	0.012
Saudi Arabia	0.964	0.781	0.177	0.018
Shanghai (China)	0.992	0.954	0.088	0.011
Singapore	1.000	1.035	0.000	0.005
Slovak Republic	1.000	1.036	0.000	0.000
Slovenia	0.965	0.788	0.130	0.017
South Africa[2]	1.000	1.055	0.000	0.001
Spain	1.000	1.040	0.000	0.001
Sweden	1.000	1.033	0.000	0.005
Chinese Taipei	0.952	0.713	0.225	0.035
Turkey	1.000	1.005	0.000	0.007
United Arab Emirates	0.998	0.986	0.057	0.007
United States	1.000	1.017	0.000	0.011
Viet Nam	1.000	1.065	0.000	0.006
ISCED level 1				
Australia[1]	0.919	0.517	0.185	0.042
Flemish Community (Belgium)	1.000	1.047	0.000	0.001
Ciudad Autónoma de Buenos Aires (Argentina)	0.968	0.811	0.189	0.022
Denmark	1.000	1.003	0.000	0.004
England (United Kingdom)	1.000	1.005	0.000	0.006
France	0.980	0.882	0.141	0.022
Japan	0.991	0.944	0.077	0.011
Korea	0.964	0.785	0.131	0.007
Netherlands[1]	1.000	1.041	0.000	0.004
Spain	1.000	1.019	0.000	0.001

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Sweden	1.000	1.010	0.000	0.005
Chinese Taipei	0.987	0.921	0.099	0.022
Turkey	0.999	0.992	0.029	0.006
United Arab Emirates	1.000	1.005	0.000	0.004
Viet Nam	0.954	0.725	0.189	0.023
ISCED level 3				
Alberta (Canada)	1.000	1.035	0.000	0.004
Brazil	1.000	0.997	0.018	0.014
Croatia	1.000	1.027	0.000	0.003
Denmark	0.952	0.715	0.249	0.011
Portugal	0.948	0.686	0.169	0.027
Slovenia	1.000	1.048	0.000	0.006
Sweden	1.000	1.083	0.000	0.000
Chinese Taipei	0.981	0.885	0.158	0.019
Turkey	0.979	0.876	0.098	0.014
United Arab Emirates	0.999	0.994	0.032	0.007
Viet Nam	1.000	1.027	0.000	0.012
TALIS-PISA link				
Australia	0.979	0.876	0.202	0.022
Ciudad Autónoma de Buenos Aires (Argentina)	0.972	0.833	0.163	0.015
Colombia	1.000	1.065	0.000	0.002
Czech Republic	1.000	1.086	0.000	0.004
Denmark	0.998	0.989	0.052	0.008
Georgia	0.969	0.812	0.100	0.017
Malta[3]	-	-	-	0.051
Turkey	1.000	1.065	0.000	0.004
Viet Nam	0.984	0.903	0.107	0.020

1. Data from the participating country/economy was rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
3. As the correction factor for this participating country/economy was negative, only the SRMR is reported.
Source: OECD, TALIS 2018 database.

Table 11.156. Invariance test results for scale T3PORGIN

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level for ISCED level 2								
Configural	0.996	0.976	0.055	0.013				
Metric	0.973	0.958	0.073	0.170	0.023	0.018	-0.018	-0.157
Scalar	0.877	0.893	0.117	0.204	0.096	0.065	-0.044	-0.034
Invariance level for ISCED level 1								
Configural	0.996	0.974	0.061	0.012				
Metric	0.968	0.949	0.086	0.183	0.028	0.025	-0.025	-0.171
Scalar	0.892	0.901	0.120	0.219	0.076	0.048	-0.034	-0.036
Invariance level for ISCED level 3								
Configural	0.992	0.952	0.082	0.013				
Metric	0.976	0.962	0.073	0.129	0.016	-0.010	0.009	-0.116
Scalar	0.885	0.893	0.122	0.169	0.091	0.069	-0.049	-0.040

Source: OECD, TALIS 2018 database.

Table 11.157. Standardised factor loadings and unstandardised intercepts for scale T3PORGIN

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TC3G28A	TC3G28B	TC3G28C	TC3G28D	TC3G28A	TC3G28B	TC3G28C	TC3G28D
ISCED level 2								
Alberta (Canada)	0.606	0.655	0.769	0.851	3.017	3.079	3.038	3.140
Australia[1]	0.809	0.918	0.693	0.602	3.205	3.118	3.113	3.158
Austria	0.628	0.719	0.834	0.767	3.151	3.135	2.984	3.191
Belgium	0.550	0.748	0.689	0.764	2.941	2.833	2.795	2.886
Flemish Community (Belgium)	0.737	0.845	0.695	0.708	2.942	2.904	2.686	2.802
Brazil	0.696	0.791	0.869	0.871	3.312	3.208	3.199	3.343
Bulgaria	0.685	0.589	0.816	0.908	3.094	3.196	3.142	3.102
Ciudad Autónoma de Buenos Aires (Argentina)	0.574	0.722	0.804	0.863	3.036	3.023	3.184	3.102
Chile	0.746	0.702	0.846	0.893	3.280	3.260	3.197	3.249
Colombia	0.466	0.737	0.912	0.864	3.321	3.307	3.286	3.311
Croatia	0.657	0.761	0.864	0.778	3.125	2.999	3.075	3.045
Cyprus	0.556	0.778	0.917	0.845	3.267	3.237	3.210	3.261
Czech Republic	0.592	0.606	0.739	0.884	3.139	3.114	3.131	3.105
Denmark	0.675	0.666	0.903	0.907	3.169	3.151	3.301	3.343
England (United Kingdom)	0.655	0.789	0.845	0.739	3.361	3.360	3.310	3.284
Estonia	0.566	0.593	0.810	0.766	3.025	3.068	3.150	2.984
Finland	0.623	0.674	0.791	0.765	2.888	3.085	3.044	3.167
France	0.755	0.824	0.857	0.801	2.759	2.763	2.875	2.817
Georgia	0.473	0.559	0.858	0.782	3.040	3.185	3.166	3.177
Hungary	0.535	0.616	0.893	0.912	3.166	3.157	3.351	3.260
Iceland	0.559	0.609	0.925	0.879	3.032	3.172	3.312	3.301
Israel	0.677	0.662	0.872	0.886	3.156	3.169	3.342	3.338
Italy	0.836	0.848	0.866	0.746	2.725	2.780	2.708	2.709
Japan	0.596	0.641	0.824	0.863	2.966	2.999	2.756	2.766
Kazakhstan	0.408	0.650	0.804	0.750	3.024	3.179	3.203	3.262
Korea	0.373	0.665	0.894	0.759	3.306	3.329	3.442	3.472
Latvia	0.592	0.623	0.898	0.693	3.142	3.230	3.139	3.192
Lithuania	0.683	0.525	0.935	0.792	3.291	3.391	3.183	3.250
Malta	0.611	0.815	0.761	0.865	3.227	3.191	3.095	3.209
Mexico	0.603	0.729	0.776	0.844	3.217	3.119	2.903	3.011
Netherlands	0.346	0.603	0.778	0.736	2.974	2.872	2.538	2.812
New Zealand	0.845	0.874	0.747	0.864	3.212	3.217	3.169	3.192
Norway	0.372	0.564	0.861	0.807	2.914	2.966	2.768	2.871
Portugal	0.524	0.631	0.840	0.835	3.079	3.074	3.211	3.161
Romania	0.271	0.452	0.855	0.892	2.831	3.214	3.544	3.487
Russian Federation	0.661	0.696	0.823	0.835	2.977	3.104	2.953	3.010
Saudi Arabia	0.486	0.580	0.821	0.842	3.211	3.402	3.697	3.600
Shanghai (China)	0.765	0.833	0.835	0.832	3.231	3.293	3.209	3.368
Singapore	0.638	0.626	0.848	0.801	3.176	3.250	3.158	3.239
Slovak Republic	0.523	0.494	0.807	0.965	3.151	3.179	3.261	3.263
Slovenia	0.469	0.664	0.594	0.501	3.161	3.235	3.022	3.149
South Africa[2]	0.541	0.727	0.815	0.850	3.113	3.185	3.241	3.156
Spain	0.559	0.589	0.847	0.763	3.009	3.037	3.117	3.124
Sweden	0.609	0.784	0.835	0.794	3.002	3.000	3.145	3.124
Chinese Taipei	0.461	0.610	0.987	0.775	3.104	3.123	3.113	3.236
Turkey	0.683	0.762	0.892	0.856	3.199	3.267	3.146	3.278

Participating countries/economies	Standardised factor loadings				Unstandardised intercepts			
	TC3G28A	TC3G28B	TC3G28C	TC3G28D	TC3G28A	TC3G28B	TC3G28C	TC3G28D
United Arab Emirates	0.710	0.759	0.878	0.924	3.396	3.451	3.538	3.497
United States	0.704	0.892	0.631	0.834	3.173	3.133	3.045	3.202
Viet Nam	0.368	0.380	0.428	0.694	3.358	3.369	2.835	3.233
ISCED level 1								
Australia[1]	0.698	0.852	0.860	0.590	3.164	3.127	3.148	3.183
Flemish Community (Belgium)	0.718	0.813	0.653	0.578	2.942	2.904	2.686	2.802
Ciudad Autónoma de Buenos Aires (Argentina)	0.629	0.779	0.794	0.879	3.036	3.023	3.184	3.102
Denmark	0.706	0.679	0.911	0.949	3.169	3.151	3.301	3.343
England (United Kingdom)	0.818	0.853	0.896	0.900	3.361	3.360	3.310	3.284
France	0.678	0.807	0.830	0.836	2.759	2.763	2.875	2.817
Japan	0.547	0.591	0.737	0.788	2.966	2.999	2.756	2.766
Korea	0.400	0.624	0.960	0.830	3.306	3.329	3.442	3.472
Netherlands[1]	0.382	0.565	0.899	0.708	3.097	3.092	2.864	2.912
Spain	0.581	0.718	0.918	0.868	3.009	3.037	3.117	3.124
Sweden	0.656	0.742	0.908	0.907	3.002	3.000	3.145	3.124
Chinese Taipei	0.468	0.687	0.980	0.805	3.104	3.123	3.113	3.236
Turkey	0.701	0.819	0.836	0.917	3.199	3.267	3.146	3.278
United Arab Emirates	0.673	0.751	0.877	0.910	3.396	3.451	3.538	3.497
Viet Nam	0.452	0.452	0.689	0.795	3.358	3.369	2.835	3.233
ISCED level 3								
Alberta (Canada)	0.781	0.877	0.846	0.804	3.017	3.079	3.038	3.140
Brazil	0.623	0.726	0.859	0.759	3.312	3.208	3.199	3.343
Croatia	0.751	0.860	0.877	0.793	3.125	2.999	3.075	3.045
Denmark	0.651	0.649	0.928	0.931	3.169	3.151	3.301	3.343
Portugal	0.522	0.631	0.735	0.724	3.079	3.074	3.211	3.161
Slovenia	0.614	0.854	0.727	0.614	3.161	3.235	3.022	3.149
Sweden	0.538	0.697	0.839	0.812	3.002	3.000	3.145	3.124
Chinese Taipei	0.456	0.675	0.934	0.793	3.104	3.123	3.113	3.236
Turkey	0.710	0.771	0.850	0.880	3.199	3.267	3.146	3.278
United Arab Emirates	0.707	0.782	0.867	0.924	3.396	3.451	3.538	3.497
Viet Nam	0.366	0.403	0.534	0.732	3.358	3.369	2.835	3.233
TALIS-PISA link								
Australia	0.787	0.869	0.878	0.729	3.079	3.072	3.057	3.093
Ciudad Autónoma de Buenos Aires (Argentina)	0.492	0.610	0.946	0.745	3.026	3.051	3.240	3.240
Colombia	0.739	0.932	0.716	0.768	3.290	3.330	3.289	3.226
Czech Republic	0.375	0.609	0.817	0.742	3.059	3.125	3.053	2.993
Denmark	0.756	0.781	0.935	0.855	3.148	3.029	3.172	3.247
Georgia	0.413	0.627	0.877	0.708	3.070	3.249	3.127	3.127
Malta	0.619	0.793	0.774	0.852	3.241	3.180	3.090	3.200
Turkey	0.577	0.600	0.920	0.850	3.180	3.264	3.271	3.412
Viet Nam	0.583	0.525	0.794	0.915	3.277	3.325	2.910	3.154

1. Data from the participating country/economy was rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Equity and diversity: Diversity beliefs (T3PDIVB)

11.82. Measured items

The scale used to measure equity and diversity issues in schools drew on this question stem:

- "In your view, approximately how many teachers in this school would agree with the following statements?" (TC3G40). The question was followed by items about student diversity that were used to form the scale *Diversity beliefs* (T3PDIVB).

The scale is presented in Table 11.158.

11.83. Model improvements

A correlation between items TC3G40A and TC3G40B was added to the scale model T3PDIVB in order to improve it.

11.84. Scale reliability

The reliability coefficients for scale T3PDIVB, presented in Table 11.159, exhibit strong reliability in all populations with the exception of the Russian Federation ISCED level 2 population, which exhibited only acceptable reliability.

11.85. Model fits

Table 11.160 shows that the model fit indices for T3PDIVB are acceptable in most populations, with exceptions observed for the Australia and Netherlands ISCED level 1 populations, and the Australia, Ciudad Autónoma de Buenos Aires (Argentina), Czech Republic, Denmark, Georgia, Viet Nam and TALIS-PISA link populations.

11.86. Invariance testing

The measurement invariance results for scale T3PDIVB are presented in Table 11.161. Scalar invariance was achieved in the ISCED level 1 and 2 populations, while the ISCED level 3 population was configural invariant. Although the difference between the metric and scalar models in ISCED levels 1 and 2 did not meet the cut-off criteria, all within country cross-ISCED level measurement invariance tests resulted in scalar models. Also, because the fit indices are nearly acceptable, the model was deemed scalar invariant for both the ISCED levels 1 and 2 populations.

11.87. Item parameters

The scale T3PDIVB reached the scalar invariance level for the ISCED level 2 populations. Table 11.162 presents the unstandardised item parameters (factor loadings and intercepts) for ISCED level 2.

Table 11.163 presents the standardised factor loadings for scale T3PDIVB. The unstandardised intercepts are not presented for the countries/economies in this table because the scale is scalar invariant and the intercepts are the same for all populations (the values are presented in Table 11.162). The factor loadings for items TC3G40C and TC3G40D are all above 0.600 in all populations. Additionally, both items TC3G40A and TC3G40B exhibit strong relationships with the latent construct in nearly all populations. However, one weak factor loading can be observed in the England (United Kingdom)

ISCED level 2 population for item TC3G40A. In summary, the relationship between the items and the latent construct is strong in nearly all populations.

Table 11.158. Item wording for equity and diversity scale

T3PDIVB: Diversity beliefs	
TC3G40: In your view, approximately how many teachers in this school would agree with the following statements?	
Response options: "None or almost none" (1), "Some" (2), "Many" (3), "All or almost all" (4).	
TC3G40A	It is important to be responsive to differences in students' cultural backgrounds
TC3G40B	It is important for students to learn that people from other cultures can have different values
TC3G40C	Respecting other cultures is something that children and young people should learn as early as possible
TC3G40D	Children and young people should learn that people of different cultures have a lot in common

Source: OECD, TALIS 2018 database.

Table 11.159. Omega coefficient for the equity and diversity scale

Participating countries/economies	T3PDIVB
	Omega coefficient
ISCED level 2	
Alberta (Canada)	0.974
Australia[1]	0.945
Austria	0.872
Belgium	0.893
Flemish Community (Belgium)	0.899
Brazil	0.941
Bulgaria	0.910
Ciudad Autónoma de Buenos Aires (Argentina)	0.924
Chile	0.964
Colombia	0.920
Croatia	0.929
Cyprus	0.895
Czech Republic	0.850
Denmark	0.939
England (United Kingdom)	0.841
Estonia	0.870
Finland	0.901
France	0.918
Georgia	0.869
Hungary	0.922
Iceland	0.922
Israel	0.904
Italy	0.904
Japan	0.891
Kazakhstan	0.857
Korea	0.955
Latvia	0.933
Lithuania	0.845
Malta	0.937
Mexico	0.872
Netherlands	0.893

Participating countries/economies	T3PDIVB
	Omega coefficient
New Zealand	0.968
Norway	0.904
Portugal	0.901
Romania	0.812
Russian Federation	0.699
Saudi Arabia	0.904
Shanghai (China)	0.941
Singapore	0.773
Slovak Republic	0.867
Slovenia	0.870
South Africa[2]	0.874
Spain	0.912
Sweden	0.865
Chinese Taipei	0.960
Turkey	0.958
United Arab Emirates	0.903
United States	0.970
Viet Nam	0.906
ISCED level 1	
Australia[1]	0.955
Flemish Community (Belgium)	0.880
Ciudad Autónoma de Buenos Aires (Argentina)	0.939
Denmark	0.910
England (United Kingdom)	0.839
France	0.929
Japan	0.903
Korea	0.904
Netherlands[1]	0.912
Spain	0.924
Sweden	0.889
Chinese Taipei	0.941
Turkey	0.953
United Arab Emirates	0.912
Viet Nam	0.857
ISCED level 3	
Alberta (Canada)	0.924
Brazil	0.945
Croatia	0.867
Denmark	0.925
Portugal	0.885
Slovenia	0.832
Sweden	0.887
Chinese Taipei	0.968
Turkey	0.941
United Arab Emirates	0.906
Viet Nam	0.852
TALIS-PISA link	
Australia	0.943
Ciudad Autónoma de Buenos Aires (Argentina)	0.924

Participating countries/economies	T3PDIVB
	Omega coefficient
Colombia	0.906
Czech Republic	0.812
Denmark	0.939
Georgia	0.904
Malta	0.933
Turkey	0.865
Viet Nam	0.884

1. Data from the participating country/economy was rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Table 11.160. CFA model-data fit for scale T3PDIVB

Diversity beliefs

Participating countries/economies	CFI	TLI	RMSEA	SRMR
ISCED level 2				
Alberta (Canada)	1.000	1.006	0.000	0.000
Australia[1]	1.000	1.012	0.000	0.415
Austria	0.991	0.944	0.077	0.012
Belgium	0.997	0.979	0.056	0.010
Flemish Community (Belgium)	1.000	1.010	0.000	0.009
Brazil	1.000	1.013	0.000	0.008
Bulgaria	0.970	0.822	0.138	0.021
Ciudad Autónoma de Buenos Aires (Argentina)	0.993	0.957	0.076	0.014
Chile	1.000	1.033	0.000	0.002
Colombia	1.000	1.033	0.000	0.015
Croatia	1.000	1.067	0.000	0.000
Cyprus	0.960	0.761	0.212	0.028
Czech Republic	0.997	0.980	0.057	0.017
Denmark	0.973	0.840	0.169	0.010
England (United Kingdom)	0.998	0.989	0.024	0.015
Estonia	1.000	1.032	0.000	0.001
Finland	1.000	1.031	0.000	0.005
France	1.000	1.027	0.000	0.002
Georgia	0.999	0.996	0.024	0.007
Hungary	0.978	0.869	0.146	0.020
Iceland	1.000	1.002	0.000	0.013
Israel	0.944	0.665	0.204	0.015
Italy	1.000	1.013	0.000	0.008
Japan	0.971	0.825	0.153	0.017
Kazakhstan	0.997	0.982	0.028	0.012
Korea	1.000	1.045	0.000	0.003
Latvia	1.000	1.009	0.000	0.003
Lithuania	0.986	0.916	0.111	0.016
Malta	0.990	0.942	0.121	0.010
Mexico	1.000	1.009	0.000	0.006
Netherlands	1.000	1.038	0.000	0.004
New Zealand	1.000	1.009	0.000	0.003

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Norway	1.000	1.036	0.000	0.003
Portugal	1.000	1.020	0.000	0.004
Romania	1.000	1.055	0.000	0.003
Russian Federation[3]	-	-	-	0.045
Saudi Arabia	1.000	1.017	0.000	0.004
Shanghai (China)	1.000	1.023	0.000	0.003
Singapore	1.000	1.057	0.000	0.010
Slovak Republic	0.992	0.950	0.065	0.007
Slovenia	1.000	1.043	0.000	0.004
South Africa[2]	0.957	0.971	0.064	0.241
Spain	0.991	0.949	0.057	0.010
Sweden	0.973	0.839	0.097	0.022
Chinese Taipei	1.000	1.036	0.000	0.002
Turkey	0.967	0.800	0.134	0.012
United Arab Emirates	0.999	0.997	0.020	0.006
United States	0.983	0.895	0.103	0.012
Viet Nam	0.997	0.982	0.049	0.007
ISCED level 1				
Australia[1]	0.890	0.918	0.106	0.578
Flemish Community (Belgium)	1.000	1.018	0.000	0.007
Ciudad Autónoma de Buenos Aires (Argentina)	1.000	1.020	0.000	0.006
Denmark	0.949	0.692	0.246	0.021
England (United Kingdom)	0.959	0.754	0.108	0.008
France	1.000	1.056	0.000	0.003
Japan	0.980	0.883	0.143	0.011
Korea	0.988	0.927	0.075	0.013
Netherlands[1]	0.501	0.667	0.191	1.098
Spain	0.973	0.837	0.101	0.013
Sweden	0.968	0.809	0.114	0.020
Chinese Taipei	0.995	0.973	0.067	0.008
Turkey	0.987	0.920	0.148	0.014
United Arab Emirates	1.000	1.012	0.000	0.001
Viet Nam	1.000	1.015	0.000	0.009
ISCED level 3				
Alberta (Canada)	1.000	1.025	0.000	0.016
Brazil	1.000	1.057	0.000	0.001
Croatia	1.000	1.117	0.000	0.005
Denmark	1.000	1.031	0.000	0.013
Portugal	1.000	1.021	0.000	0.002
Slovenia	1.000	1.055	0.000	0.006
Sweden	1.000	1.034	0.000	0.004
Chinese Taipei	1.000	1.016	0.000	0.003
Turkey	0.999	0.991	0.037	0.003
United Arab Emirates	1.000	1.001	0.000	0.006
Viet Nam	0.953	0.718	0.175	0.025
TALIS-PISA link				
Australia	0.884	0.923	0.108	0.704
Ciudad Autónoma de Buenos Aires (Argentina)	0.557	0.705	0.164	0.261

Participating countries/economies	CFI	TLI	RMSEA	SRMR
Colombia	0.915	0.943	0.063	0.498
Czech Republic	0.551	0.701	0.180	0.476
Denmark	0.723	0.816	0.137	0.562
Georgia	0.604	0.703	0.170	0.800
Malta	1.000	1.017	0.000	0.110
Turkey	0.914	0.935	0.082	0.144
Viet Nam	0.605	0.704	0.182	0.227

1. Data from the participating country/economy was rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
3. As the correction factor for this participating country/economy was negative, only the SRMR is reported.
Source: OECD, TALIS 2018 database.

Table 11.161. Invariance test results for scale T3PDIVB

	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Invariance level for ISCED level 2								
Configural	0.992	0.951	0.075	0.013				
Metric	0.975	0.961	0.067	0.155	0.017	-0.010	0.008	-0.142
Scalar	0.910	0.921	0.096	0.180	0.065	0.040	-0.029	-0.025
Invariance level for ISCED level 1								
Configural	0.988	0.929	0.091	0.011				
Metric	0.965	0.945	0.08	0.165	0.023	-0.016	0.011	-0.154
Scalar	0.911	0.919	0.097	0.195	0.054	0.026	-0.017	-0.030
Invariance level for ISCED level 3								
Configural	0.999	0.996	0.023	0.010				
Metric	0.981	0.970	0.065	0.136	0.018	0.026	-0.042	-0.126
Scalar	0.954	0.957	0.077	0.147	0.027	0.013	-0.012	-0.011

Source: OECD, TALIS 2018 database.

Table 11.162. Unstandardised factor loadings and intercepts for scale T3DIVB for all participating countries/economies for all populations

	T3PDIVB	
	Unstandardised factor loadings	Unstandardised intercepts
TC3G40A	0.482	3.471
TC3G40B	0.500	3.486
TC3G40C	0.525	3.567
TC3G40D	0.526	3.546

Source: OECD, TALIS 2018 database.

Table 11.163. Standardised factor loadings for scale T3PDIVB

Participating countries/economies	Standardised factor loadings			
	TC3G40A	TC3G40B	TC3G40C	TC3G40D
ISCED level 2				
Alberta (Canada)	0.812	0.911	0.932	0.979
Australia[1]	0.870	0.850	0.911	0.916
Austria	0.666	0.716	0.868	0.840
Belgium	0.667	0.768	0.795	0.911
Flemish Community (Belgium)	0.686	0.771	0.765	0.921

Participating countries/economies	Standardised factor loadings			
	TC3G40A	TC3G40B	TC3G40C	TC3G40D
Brazil	0.771	0.656	0.948	0.916
Bulgaria	0.615	0.833	0.896	0.884
Ciudad Autónoma de Buenos Aires (Argentina)	0.786	0.763	0.931	0.870
Chile	0.797	0.786	0.937	0.972
Colombia	0.673	0.797	0.900	0.914
Croatia	0.833	0.699	0.906	0.919
Cyprus	0.722	0.722	0.902	0.853
Czech Republic	0.685	0.779	0.819	0.778
Denmark	0.751	0.810	0.941	0.919
England (United Kingdom)	0.440	0.616	0.879	0.739
Estonia	0.708	0.744	0.827	0.863
Finland	0.693	0.758	0.865	0.898
France	0.708	0.799	0.891	0.920
Georgia	0.675	0.740	0.791	0.884
Hungary	0.763	0.893	0.875	0.900
Iceland	0.782	0.857	0.889	0.910
Israel	0.738	0.752	0.898	0.885
Italy	0.777	0.831	0.909	0.808
Japan	0.737	0.805	0.847	0.882
Kazakhstan	0.452	0.464	0.860	0.859
Korea	0.878	0.862	0.957	0.916
Latvia	0.552	0.836	0.936	0.902
Lithuania	0.575	0.688	0.840	0.823
Malta	0.789	0.835	0.957	0.806
Mexico	0.645	0.640	0.861	0.870
Netherlands	0.751	0.789	0.849	0.872
New Zealand	0.849	0.909	0.972	0.943
Norway	0.636	0.637	0.865	0.919
Portugal	0.759	0.738	0.917	0.820
Romania	0.602	0.632	0.791	0.811
Russian Federation	0.494	0.453	0.730	0.657
Saudi Arabia	0.747	0.744	0.901	0.881
Shanghai (China)	0.585	0.687	0.922	0.950
Singapore	0.485	0.531	0.811	0.698
Slovak Republic	0.603	0.693	0.837	0.870
Slovenia	0.664	0.742	0.850	0.849
South Africa[2]	0.604	0.728	0.870	0.852
Spain	0.678	0.714	0.915	0.893
Sweden	0.672	0.684	0.881	0.785
Chinese Taipei	0.729	0.749	0.972	0.926
Turkey	0.825	0.811	0.967	0.930
United Arab Emirates	0.754	0.729	0.888	0.887
United States	0.829	0.764	0.885	0.982
Viet Nam	0.798	0.795	0.919	0.787
ISCED level 1				
Australia[1]	0.843	0.865	0.952	0.941
Flemish Community (Belgium)	0.714	0.761	0.831	0.863
Ciudad Autónoma de Buenos Aires (Argentina)	0.756	0.686	0.915	0.944
Denmark	0.797	0.849	0.914	0.813
England (United Kingdom)	0.502	0.507	0.844	0.835
France	0.579	0.611	0.946	0.891

Participating countries/economies	Standardised factor loadings			
	TC3G40A	TC3G40B	TC3G40C	TC3G40D
Japan	0.732	0.782	0.870	0.902
Korea	0.627	0.847	0.852	0.897
Netherlands[1]	0.797	0.879	0.826	0.896
Spain	0.801	0.816	0.883	0.924
Sweden	0.710	0.502	0.901	0.853
Chinese Taipei	0.794	0.852	0.939	0.920
Turkey	0.880	0.869	0.949	0.926
United Arab Emirates	0.779	0.750	0.897	0.896
Viet Nam	0.732	0.660	0.863	0.755
ISCED level 3				
Alberta (Canada)	0.730	0.879	0.905	0.869
Brazil	0.778	0.795	0.941	0.933
Croatia	0.600	0.640	0.881	0.824
Denmark	0.791	0.869	0.937	0.804
Portugal	0.768	0.806	0.869	0.848
Slovenia	0.650	0.716	0.821	0.786
Sweden	0.770	0.729	0.880	0.834
Chinese Taipei	0.790	0.872	0.957	0.970
Turkey	0.821	0.850	0.926	0.936
United Arab Emirates	0.762	0.788	0.890	0.880
Viet Nam	0.719	0.668	0.837	0.801
TALIS-PISA link				
Australia	0.820	0.867	0.924	0.938
Ciudad Autónoma de Buenos Aires (Argentina)	0.789	0.727	0.944	0.806
Colombia	0.741	0.790	0.890	0.892
Czech Republic	0.621	0.742	0.726	0.803
Denmark	0.813	0.871	0.952	0.820
Georgia	0.598	0.825	0.826	0.877
Malta	0.777	0.809	0.955	0.796
Turkey	0.861	0.799	0.811	0.801
Viet Nam	0.634	0.664	0.922	0.660

1. Data from the participating country/economy was rated as insufficient during the adjudication process.
2. Participating country/economy with late data collection.
Source: OECD, TALIS 2018 database.

Excluded scales: Distributed leadership; Diversity practices, school; Diversity policies, school; Equity beliefs.

Four scales were deleted from the principal population. The reasons for deleting them varied. The *Distributed leadership* scale contained items also in the scale *Participation among stakeholders* (T3PLEADP), which was considered by experts to more completely measure the same latent construct. For the scale *Diversity practices, school*, items were more closely related than they should be according to the model, resulting in local dependencies among the items. The scale for *Diversity policies, school* exhibited both local dependencies and highly skewed items, which meant that nearly all responses were observed at one end of the response scale. The items in the fourth scale, *Equity beliefs*, were also highly skewed.

The item wording for the scales are presented in the following tables: Table 11.164 for the scale *Distributed leadership*, Table 11.165 for the scale *Diversity practices, school*, Table 11.166 for *Diversity policies, school*, and Table 11.167 for *Equity beliefs*.

Table 11.164. Item wording for distributed leadership scale

Distributed leadership	
TC3G26. How strongly do you agree or disagree with these statements as applied to this school?	
Response options: "Strongly disagree" (1), "Disagree" (2), "Agree" (3), "Strongly agree" (4).	
TC3G26A	This school provides staff with opportunities to actively participate in school decisions
TC3G26B	This school provides parents or guardians with opportunities to actively participate in school decisions
TC3G26C	This school provides students with opportunities to actively participate in school decisions

Source: OECD, TALIS 2018 database.

Table 11.165. Item wording for diversity practices, school scale

Diversity practices, school	
TC3G38: In this school, are the following policies and practices in relation to diversity implemented?	
Response options: "Yes" (1), "No" (2)	
TC3G38A	Supporting activities or organisations that encourage students' expression of diverse ethnic and cultural identities (e.g. artistic groups)
TC3G38B	Organising multicultural events (e.g. cultural diversity day)
TC3G38C	Teaching students how to deal with ethnic and cultural discrimination
TC3G38D	Adopting teaching and learning practices that integrate global issues throughout the curriculum

Source: OECD, TALIS 2018 database.

Table 11.166. Item wording for diversity policies, school scale

Diversity policies, school	
TC3G39: In this school, are the following policies and practices implemented?	
Response options: "Yes" (1), "No" (2)	
TC3G39A	Teaching students to be inclusive of different socio-economic backgrounds
TC3G39B	Explicit policies against gender discrimination
TC3G39C	Explicit policies against socio-economic discrimination
TC3G39D	Additional support for students from disadvantaged backgrounds

Source: OECD, TALIS 2018 database.

Table 11.167. Item wording for equity beliefs scale

Equity beliefs	
TC3G41: In your view, approximately how many teachers in this school would agree with the following statements?	
Response options: "None or almost none" (1), "Some" (2), "Many" (3), "All or almost all" (4).	
TC3G41A	Schools should encourage students from different socio-economic backgrounds to work together
TC3G41B	Students should learn how to avoid gender discrimination
TC3G41C	It is important to treat female and male students equally
TC3G41D	It is important to treat students from all socio-economic backgrounds in the same manner

Source: OECD, TALIS 2018 database.

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Notes

[1] The question specifies to consider only teachers whose main activity is the provision of instruction to students.

[2] Personnel for pedagogical support include: (a) teacher aides or other non-teaching professionals who provide instruction or support teachers in providing instruction; (b) professional curricular/instructional specialists; and (c) educational media specialists, psychologists and nurses.

[3] School administrative or management personnel include principals, assistant principals and other management staff whose main activity is administration or management.

[4] These indices are composed of items assessing decision making process and numbers of resources, which are not latent constructs and, therefore, not appropriate for CFA.

[5] The models used in the scaling procedure account for random measurement error, but also recognise that variables are measured with certain but not complete precision.

[6] A pooled sample is a dataset where all the countries/economies from ISCED level 2 are put together and analysed as one group. All factor loadings and item intercepts are freely estimated and the latent variances is fixed to one.

[7] Constrained models were used for "insufficient" populations (see Chapter 10 for more details), that is, countries/economies with late data submission and TALIS-PISA link populations. These models are based on the parameters of the final scale models (see the section "Scale score estimation" for further details).

[8] For practical reasons, the two most recent versions of Mplus were used (versions 8 and 7.3).

[9] The evaluation procedures in the field trial were based on continuous and categorical models so as to assess the comparability of the results. This procedure was chosen because the majority of TALIS items are ordinal. However, in both previous cycles (TALIS 2008 and 2013), linear models were used to estimate complex indices based on ordinal scale items. In TALIS 2018, both models were used to evaluate the scales, followed by a comparison of their results. The results were very similar although there were minor differences in terms of the performance and the measurement invariance level of the scale. Practical challenges related to a possible change in approach (i.e. from continuous CFA to categorical CFA modelling) between TALIS cycles resulted in the decision to implement the linear measurement model for TALIS 2018 scaling. This approach is supported by simulation studies (Van de Vijver et al., 2019[26]).

[10] Weighted least square parameter estimates using a diagonal weight matrix with standard errors and mean- and variance-adjusted chi-square test statistic that use a full weight matrix (Muthén and Muthén, 1998-2017[30])

[11] So that each participating country/economy contributes equally to parameter estimation (that is, a population should not have more or less influence on parameter estimates due to its size) countries'/economies' sampling weights were rescaled to sum up to the same number of teachers and principals. This way, each participating country/economy makes an equal contribution to the estimates (Gonzalez, 2012[37]). The teacher and principal weights for each participating country/economy in each ISCED level were rescaled so that the total sum of the weights (i.e. number of teachers and principals in the population) was equal to 3,000 and 200 respectively. This way, participating countries/economies make an equal contribution in parameter estimation regardless of the sizes of their samples or populations. The SPSS macro provided by Gonzalez (Gonzalez, 2012[37]) was used for rescaling.

[12] A more detailed examination of the model parameters (factor loadings, residual variances) was part of further model analyses.

[13] Principal axis factoring (PAF) is a form of EFA that is commonly adopted to examine the internal factor structure of constructs. Unlike principal component Analysis (PCA), which is a linear combination of variables, PAF is a measurement model of latent constructs. Oblimin rotation was chosen over Varimax rotation due to the assumption that the extracted factors within the constructs in TALIS 2018 are correlated with one another (Brown, 2006[14]; Chen, Cleary and Lui, 2014[38]).

[14] Participating countries/economies that did not meet the Technical standards, participating countries/economies with late data collection, and TALIS-PISA link populations were not included in this stage of the analysis. For a detailed explanation see the sub-section*Description of scales and their parameters* and Table 11.7.

[15] Thirteen countries/economies participated at the ISCED level 1, 48 countries/economies at ISCED level 2, 11 countries/economies at ISCED level 3.

[16] The measurement parameters describe measurement characteristics of observed variables (items). Factor loadings indicate the strength of the relationship between the item and the latent factor, intercepts indicate the predicted values for an item when the value of the latent factor is zero, and residual variances presents the portion of item variance that is not attributable to variance in the latent factor.

[17] For these models, a minimum number of parameters are constrained for reasons of model identification. In the analysis, the latent variances was set to one for each group allowing for free estimation of factor loadings and intercepts.

[18] In strict invariance, not only the factor loadings and item intercepts but also the residual variances of the items have to be equal across groups. This requirement means that that the portion of the item variance not attributable to variance in the latent construct is the same across groups. However, this assumption is very hard to meet in practice especially in large-scale assessments where many groups are compared. In line with previous TALIS cycles, the current cycle did not test these models.

[19] To be specific, for a certain ISCED level, *p* CFA models were created, where *p* is the number of countries/economies within that ISCED level.

[20] During TALIS 2018, one, two or three models were estimated for each participating country/economy, in accordance with the number of populations that each participating country/economy participated in for the current cycle. For example, some participating countries/economies participated in each of the three ISCED levels, meaning three models were estimated. Other countries/economies participated in ISCED level 2 and one other, either ISCED level 1 or ISCED level 3, meaning two models (either ISCED level 2 and ISCED level 1 or ISCED level 2 and ISCED level 3) were estimated.

[21] Configural, metric, and scalar models are in essence nested models; the scalar model is nested in the metric model, and the metric model is nested in the configural model. Therefore, the χ^2 difference test can be adopted to evaluate which model fits the data best. If the χ^2 difference value is significant, the less restrictive model (the model with more freely estimated parameters) fits the data better than the nested more restrictive model (the model with fixed/constrained parameters). If the χ^2 difference value is not significant, then both models fit the data equally well. However, because χ^2 is sensitive to sample size, which were particularly large for TALIS, the change of the model fit indices (e.g., CFI, TLI, RMSEA, SRMR/WRMR) were used to evaluate the measurement invariance of each scale.

[22] For scale measured with categorical variables, the standardised factor loadings come from the STDYX standardisation of Mplus, while for scales measured with binary items they come from the STDY standardisation (Muthén and Muthén, 1998-2017, pp. 799-802[30]).

[23] The mean score does not always rise and fall in this way. Certain aggregate scores are observed much less than others. In this example, with the scale TPERUT, aggregate scores of 1.33, 1.67, 2.33, 2.67, 3.33 and 3.67 are less common resulting in a smaller number of observations for these values. Therefore, the variance is not very large, an outcome that can result in a mean that is lower or greater than expected. However, the correlation between the simple average of items scores and factor scores is still generally strong.

[24] Due to the complexity of the final models, which took into account measurement invariance testing results both cross-country within each ISCED level, and cross-ISCED levels with each participating country/economy participating in more than one population sample, and the structure of the large-scale data, multidimensional models needed computing power beyond the limit of available resources

[25] The TALIS 2013 technical report uses the term “calibration sample” to refer to the ISCED level 2 population, which is a different use of the term from the TALIS 2008 technical report, in which it referred to a random sample of each participating country/economy so that each contributed to the model parameter estimates equally.

[26] For example, in relation to teacher job satisfaction, a positive response of "strongly agree" to the item "The advantages of being a teacher clearly outweigh the disadvantages" is also positive for the latent construct of job satisfaction. However, a positive response of "strongly agree" to the item "I regret that I decided to become a teacher" is negatively related to the latent construct, which means this item would be reverse coded; therefore, a response of "strongly disagree" would now be coded (i.e. assigned a higher integer) to align with the positive association with the latent construct for this particular item.

[27] The CFA on a pooled sample during the evaluation process was conducted to gain a general overview of the scale's performance. The results from this analysis are therefore not presented in this technical report. In addition, model parameters were used to fix the results from the final scale modelling for populations that did not meet the technical standards and for those participating countries/economies submitting data late (see Chapter 10 for more detail). These participating countries/economies were not considered during model analysis at the country/economy level.

[28] In models with three items, the number of the information in the variance covariance matrix equals the number of parameters being estimated. The fact that the number of degrees of freedom equals zero ($df = 0$) provides a unique solution to the parameter estimation and means that the models are just identified. Consequently, models based on three items could not be evaluated with respect to their fit to the empirical data (because the model fit indices suggest a perfect model fit).

[29] The composite scale is evident in the variable labels in the database referred to as "overall".

[30] The complexity of the final mode meant the multidimensional scales could not be processed because of the resulting lack of computation power.

[31] Their data were rated as "insufficient" during the adjudication process. For details, see Chapter 10.

[32] The TALIS-PISA link populations were not included into the parameter estimation as it is not part of the TALIS target populations.

[33] Because the models in these populations were specified by fixing the parameters (factor loadings and intercepts) to be equal to the international parameters, the number of the degrees of freedom was positive ($df > 0$) and the model fit could therefore be estimated.

[34] The weights for the teacher data were slightly altered late in the analysis process. To check the impact of changes on the invariance testing results, the TALIS Consortium performed invariance tests for a few scales to ensure that decisions did not change. After confirming that the change only minimally affected the numeric results, did not affect the model evaluation and invariance testing results and did not affect the decisions made from such results, the consortium moved on to the final scale modelling (computing the scale scores). Due to the weights being altered late in the modelling some of the results are reported with the use of preliminary weights (before the minor alteration), as indicated by this endnote.

Chapter 12. Table production and verification, analyses

This chapter describes the table production process, from developing the table shells up to the verification of the table results. It provides an overview of conducted analyses, applied quality rules, software used and the different parties involved in ensuring high-quality results.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

12.1. Introduction

The process and procedures presented in this report and, in particular, this chapter, relate to the tables of results produced by the International Association for the Evaluation of Educational Achievement (IEA) Hamburg and the OECD for Volume I of the TALIS 2018 international report (OECD, 2019[1]). Preparation of the tables consisted of two major steps: (1) the development, review and revision of table shells; and (2) data analysis, table production and verification. After providing a brief description of the first step, this chapter focuses on the second step. The chapter also provides an overview of the procedures and methods applied to estimate population parameters and uses selected but shortened versions[1] of the tables from the report to highlight relevant statistical issues. It furthermore provides insights into the production and verification of regression tables.

12.2. Responsibilities

The OECD and the TALIS 2018 International Consortium, specifically the IEA and the Australian Council for Education Research (ACER), shared the development and production of the tables for the TALIS 2018 international report (OECD, 2019[1]). The OECD developed the table shells and determined the content and format of the tables on the basis of the analysis plan produced by the TALIS Consortium, as well as the reporting plan developed by the OECD and agreed to by the participating countries/economies. The table shells were then reviewed by the TALIS Consortium for statistical and substantial soundness and revised by the OECD over multiple rounds.

In a subsequent step, the TALIS Consortium's IEA Hamburg team conducted the analyses, populated around 190 tables in collaboration with the OECD and verified/validated estimates in collaboration with ACER and the OECD. The IEA team members discussed methodological issues relating to these tables amongst themselves and with the OECD. Both the IEA team and the OECD considered advice from the Technical Advisory Group (TAG). The OECD was also responsible for designing and populating an additional 45 tables showing the results of regression analyses. The OECD furthermore noted the consortium's recommendations and shared them in the TALIS 2018 analysis plan and consulted with the TAG. The countries/economies participating in TALIS 2018 participated in the table development and review process via the OECD Secretariat.

12.3. Populating the table shells: General procedures

The process of populating table shells consisted of two major steps. First, the IEA IDB Analyzer was used to estimate, for each table, all parameters (percentages, means, etc.) and their respective standard errors.[2] Second, R packages[3] were used to transfer estimates resulting from the first step to the appropriate table shell and cell; estimates for the EU total, the OECD and TALIS averages were computed (see the section OECD average, TALIS average and EU total below); and the supplementary statistical analyses needed for flagging estimates[4] and quality control (such as the analysis of non-response at item level and the verification of a minimum sample size) were conducted. The codebook provided in Annex J of this report includes information on: (1) the variables created and delivered in the public TALIS 2018 dataset; and (2) the advanced recoded variables generated during table production.

All tables presented in the TALIS 2018 initial report were structured in a manner similar to the example shown in Table 12.1, and each accorded with these elements and principles:

1. A parameter always appears with its standard errors (SE) (Items 1 and 2, Table 12.1).
2. The following averages appear (see Items 4 to 6 in Table 12.1, formula presented in the section on OECD average, TALIS average and EU total) in all tables except those tables displaying change over time, tables based on the ISCED levels 1 and 3 populations and selected tables featuring data from survey questions that were co-ordinated national options:
   - *OECD average-30, OECD average-31*: average of the OECD countries/ economies participating in TALIS 2018
   - *EU total-23*: total of the 23 EU countries/economies participating in TALIS 2018
   - *TALIS average-47, TALIS average-48:* average of all the countries/economies participating in TALIS 2018.
3. Country/economy-specific considerations:
   a. "Flemish Comm." (i.e. Flemish Community): This name, written in italics and with an indentation, indicates separate adjudication. However, note that data collected within the Flemish Community of Belgium (Item 3) also contributed to the estimates for Belgium.
   b. Data from countries/economies not meeting the requirements determined in the technical standards (see Chapter 10 of this technical report): These are reported below the main body of the table. The affected data did not contribute to the above-cited averages (see Items 4 to 7 in Table 12.1).

Table 12.1. Type of professional development undertaken by principals

Percentage of principals who participated in the following professional development activities in the previous 12 months: Courses/seminars about subject matter, teaching methods or pedagogical topics		
	% (1)	SE (2)
Alberta (Canada)	62.2	(11.0)
Austria	82.7	(3.1)
Belgium	78.9	(3.0)
Flemish Comm. (Belgium) (3)	85.8	(3.2)
…	…	…
…	…	…
…	…	…
Turkey	46.9	(4.2)
United Arab Emirates	70.0	(2.0)
United States	73.7	(7.5)
Viet Nam	87.9	(2.6)
OECD average-30 (4)	70.5	(0.8)
EU total-23 (5)	66.0	(1.1)
TALIS average-47 (6)	73.1	(0.6)
Australia (7)	79.7	(4.4)

12.4. Estimating standard errors using weights

One of TALIS's main goals is to generate reliable, valid and comparable population estimates based on sample data. All parameters presented in the TALIS 2018 international report are therefore weighted (see, for example, the percentages in Table 12.1). The data provided by school principals that contributed to the school-based estimates were weighted by school weights (variable name: SCHWGT), while the results arising out of either teacher data or combined teacher and school principal data (i.e. school/principal information merged with teacher records) were weighted by teacher weights (variable name: TCHWGT).

Because all estimates in the TALIS 2018 international report are based on sample data, they could only be estimated with a degree of uncertainty. Thus, results from analyses of these data and the information on the precision of the population estimates must be reported together. In the TALIS tables, the degree of uncertainty of an estimate is reflected by its standard error (SE; Item 2 in Table 12.1) and this has the same metric as the estimate.

Fay's variant of the balanced repeated replication (BRR) technique was used to estimate the standard errors during the weighting stage. BRR estimates of sampling error can be computed with the IEA IDB Analyzer.

Chapter 9 of this report gives more information on computing sampling weights and about the BRR technique. It also describes how to obtain standard errors for differences of estimates obtained from different samples or from the same sample. Chapter 3 of the *TALIS 2018 User Guide to the International Database* (OECD, forthcoming[2]) provides details on using weights for data analysis.

12.5. OECD average, TALIS average and EU total

The formula used to calculate the OECD and TALIS averages was:

$$\hat{\bar{\theta}} = \frac{1}{C}\sum_{c=1}^{C}\hat{\theta}_c$$

where C is the number of countries contributing to the average $\hat{\bar{\theta}}$, c is an index that runs from 1 to C, and $\hat{\theta}_c$ is the estimate for country c.

The formula used to calculate the standard errors for the OECD and the TALIS averages was:

$$se\left(\hat{\bar{\theta}}\right) = \sqrt{\frac{\sum_{c=1}^{C} se(\hat{\theta}_c)^2}{C^2}} = \sqrt{\frac{\sum_{c=1}^{C} \hat{V}_{Fay}(\hat{\theta}_c)}{C^2}} = \frac{1}{C}\sqrt{\sum_{c=1}^{C}\hat{V}_{Fay}(\hat{\theta}_c)}.$$

Here, C is the number of countries contributing to the average $\hat{\bar{\theta}}$, c is an index that runs from 1 to C, $\hat{\theta}_c$ is the estimate for country c, and $\hat{V}_{Fay}(\hat{\theta}_c)$ is the Fay's BRR estimate for the variance of that estimate. According to this formula for statistically independent samples, the standard error of the average $se\left(\hat{\bar{\theta}}\right)$ is the square root of the sum of the squared standard errors divided by the squared number of countries.

The formula used to calculate the estimate for the EU total (Table 12.1, Item 5) was:

$$EU\ total = \frac{\sum_{c=1}^{C} \widehat{N}_c \widehat{\theta}_c}{\sum_{c=1}^{C} \widehat{N}_c},$$

where $\widehat{N}_c$ is the estimated population size for country c, that is, the sum of the appropriate weights (e.g. for principal-level analyses, the sum of the school weights of country c), C is the number of countries contributing to the estimate of the $EU\ total$, and $\widehat{\theta}_c$ is the parameter of interest (i.e. a country-specific average of the analysis variable) for country c.

The formula used to calculate the standard error of the EU total (see Table 12.1, Item 5, SE column) was:

$$se_{EU\ total} \sqrt{\frac{\sum_{c=1}^{C} \widehat{N}_c^2\ se(\widehat{\theta}_c\ )^2}{(\sum_{c=1}^{C} \widehat{N}_c)^2}}$$

where $\widehat{N}_c$ is the estimated population size for country c, C is the number of countries contributing to the estimate $se_{EU\ total}$, and $\widehat{\theta}_c$ is the parameter of interest (i.e. a country-specific average of the analysis variable).

While all countries were weighted to equally contribute to the OECD and TALIS averages, this was not the case for the EU total. Here, each country/economy contributed according to its estimated population size, meaning that countries/economies with a large estimated population size (i.e. a high number of teachers or principals) contributed more to the EU total than did countries/economies with a small population size (i.e. with a low number of teachers or principals). Thus, the "EU total" is an "average European teacher", whereas the OECD or TALIS average is an "average country/economy".

The Flemish Community of Belgium (see Table 12.1, Item 3) was excluded from calculations of the OECD average, TALIS average and EU total, as the population was already included in the estimates for Belgium. Countries/economies for which estimates are flagged in the table (e.g. because the respective question was not administered) were not included in the calculation of the OECD average, TALIS average and EU total.

12.6. Estimating percentiles

The IEA IDB Analyzer was used to estimate the percentiles. This procedure had two steps. Step 1 involved sorting the values and producing a vector of accumulated weighted frequencies. During Step 2, the first value to exceed the percentile threshold (25th, 50th and 75th) became the respective percentile value.

12.7. Use of weights in tables featuring analyses of teachers' and principals' data

In tables including results derived from both principal and teacher data, the column displaying results from the principal questionnaire has to be interpreted with caution because of the estimation algorithm, which required the principal data to be merged with the teacher data, and the teacher weights then used to conduct the analyses. The principal data in these tables must, therefore, be viewed as a feature of teachers rather than of the actual principal population.

Box 12.1. Interpretation of results derived from analysis of teachers' and principals' data

As an example of how to interpret the results derived from jointly analysing principals' data with teachers' data, consider the results displayed in the column labelled "principal" in Table 12.2. The estimates in this column need to be interpreted as the percentages of teachers whose principal said that his or her school was "supporting activities or organisations encouraging students' expression of diverse ethnic and cultural identities". It would, therefore, be incorrect to state that a specific percentage of principals said their schools were "supporting activities or organisations encouraging students' expression of diverse ethnic and cultural identities".

Table 12.2. School practices related to diversity

Percentage of teachers working in a school with diverse ethnic and cultural student background where the following diversity-related practices are implemented:
Supporting activities or organisations encouraging students' expression of diverse ethnic and cultural identities

	According to teachers		According to principals	
	%	SE	%	SE
Alberta (Canada)	75.2	(2.2)	83.9	(5.0)
Austria	50.6	(1.5)	64.8	(3.5)
Belgium	52.1	(1.3)	59.3	(3.1)
Flemish Comm. (Belgium)	47.5	(1.7)	48.6	(4.3)
…	…	…	…	…
…	…	…	…	…
…	…	…	…	…
Turkey	40.8	(1.3)	48.5	(0.9)
United Arab Emirates	88.1	(0.6)	94.4	(0.2)
United States	72.8	(2.5)	90.2	(2.7)
Viet Nam	94.8	(1.2)	93.5	(3.0)
OECD average-30	54.2	(0.4)	61.3	(0.8)
EU total-23	57.0	(0.5)	67.0	(1.2)
TALIS average-47	62.7	(0.3)	69.9	(0.6)

12.8. Calculating parameters for the analyses of change over time

Another important TALIS goal is to report change over time. As the third cycle of the TALIS survey, TALIS 2018 enables data users to look at changes over a ten-year period. However, this type of analysis poses particular challenges that data users need to consider when interpreting comparisons across cycles. First, not all countries/economies participated in all cycles. Second, study questionnaires underwent some modifications, which means that not all questions remained the same across the three measurement points. A third consideration is that the context of teaching and learning may have changed considerably across the ten years in terms of student intake or general societal trends, for example. This section describes the measures taken to address these challenges.

Samples in the tables displaying different TALIS cycles were adjusted to represent the same populations across all cycles, thus ensuring comparability over time. This adjustment was implemented by using the filter variable TALIS13POP to exclude affected cases from analyses based on the TALIS 2018 dataset – see also OECD (forthcoming[2]). Chapter 9 of this report provides the formula for estimating the standard error of the estimated difference between cycles (i.e. the standard error for the difference between the estimates for two countries/economies).

A change in the defined target populations across the TALIS cycles also needs to be considered when comparing findings across them. Whereas in 2008, teachers of special needs children in regular schools were not part of the target population definition and were therefore not covered (OECD, 2010, p. 56[3]), these teachers were included in the TALIS 2013 and TALIS 2018 surveys (see Chapter 5). Comparisons of the estimates from TALIS 2008 and the other two cycles (2013 and 2008) therefore need to be made with caution. Note also that teachers in schools exclusively directed towards teaching students with special educational needs were excluded from all three cycles.

12.9. Tables based on the results of regression analysis

The OECD was responsible for conducting the regression analyses and for producing the subsequent 45 tables presenting the regression results. The table shells for these analyses were designed with the aim of ensuring that the analyses aligned with the plan for reporting TALIS results.

The regression analyses, which were conducted separately for each participating country/economy, explored the relationships between different variables. Linear regression was used in those cases where the dependent (or outcome) variable was considered continuous. Binary logistic regression was employed if the dependent (or outcome) variable was a binary variable.

Selection of the independent (or control) variables included in each regression model was based on theoretical reasoning and, preferably, limited to the most objective measures or those measures that do not change over time. Controls for teacher characteristics included teacher's gender, age, employment status (full-time/part-time) and years of teaching experience. Controls for class characteristics included variables of classroom composition (share of students whose first language differed from the language of instruction, low achievers academically, students with special needs, students with behavioural problems, students from socio-economically disadvantaged homes, academically gifted students, immigrant students or students with an immigrant background, refugee students) and class size.

In the case of the multiple linear regression models, the models' explanatory power is also highlighted by the R-squared (R^2), which represents the proportion of the observed variation in the dependent (or outcome) variable that can be explained by the independent (or control, explanatory) variables.

To ensure the robustness of the regression models, the OECD team used a stepwise approach to introduce the independent variables into the models. This approach required each step of the model to be based on the same sample. Consequently, during analysis, the restricted sample used for the different versions of the same model corresponded to the sample of the most extended version of the model (i.e. the version with the maximum number of independent variables). Thus, the restricted sample for each regression model excluded those observations that had missing values for any of the independent variables.[5]

12.10. Handling of filter-dependent questions

Some questions in the TALIS surveys are meant to be answered by a defined subgroup of the surveys' target populations. The respective subgroups are identified by their responses to filter questions. Consider, for example, Question 37 in the TALIS 2018 principal questionnaire (variable TC3G37): "In this school, are the following policies and practices in relation to diversity implemented?". This question was to be answered only by principals who gave the answer "Yes" to the preceding filter question (variable TC3G37): "Does this school include students of more than one cultural or ethnic background?". In this instance, TC3G37 is a *filter question* and TC3G38 is the *filter-dependent question.*

Estimates involving filter-dependent questions were based only on those respondents who were filtered in by the preceding corresponding filter question (information on this matter can be found in the table header of each table that provides the selection criteria for the filter). The IEA and OECD team implemented this rule by treating cases not meeting the filter criteria (i.e. observations with *logically not applicable* codes in the dataset) as missing values that needed to be ignored in the analyses (more information about the missing codes can be found in Chapter 8 of this report). If a participant did not answer a filter question, yet answered a subsequent filter-dependent question, the team included the response to the filter dependent question in the analyses.

In specific cases, subgroups were defined not only by filter variables but also by other criteria for interpretative reasons. Information on these criteria is provided in the footnotes below the tables of the TALIS 2018 international report, *TALIS 2018 Results (Volume I): Teachers and School Leaders as Lifelong Learners* (OECD, 2019[1]).

12.11. Annotation rules related to data quality requirements (minimum number of cases, item non-response)

The annotation scheme shown in Box 12.2 for flagging empty cells in the tables of the TALIS 2018 international report was developed by the TALIS International Consortium in collaboration with the OECD and the TAG and it followed the approaches used for the TALIS 2013 and PISA 2015 international reports.

Box 12.2. Annotation rules relating to data-quality requirements

a	The question was not administered in the country/economy because it was optional or was part of a questionnaire from a TALIS cycle the country/economy did not participate in. Data are therefore deemed missing data.
c	There were too few or no observations to provide reliable estimates and/or to ensure the confidentiality of respondents, that is, there were fewer than 10 schools/principals and/or 30 teachers with valid data; and/or the item non-response rate (i.e. ratio of missing or invalid responses to the number of participants for whom the question was applicable) was above 50%.
m	Data were collected but were subsequently, as part of the data-checking process, removed for technical reasons (e.g. erroneous translation).

p	Data were collected but not reported for technical reasons (e.g. low participation rate) as part of the data adjudication process.
w	Data were withdrawn or were not collected at the request of the country/economy concerned.

The first data quality check verified the proportion of participants who answered a given question (*item non-response rule*). The item non-response rule was implemented to ensure that the number of participants who gave a valid answer to a question divided by the number of participants to whom the question was applicable (refers to filter or CNO)[6] was not lower than 50%. The second data quality check ensured that an estimate was based on at least 30 teachers and 10 principals/schools (*minimum sample rule*). If a country/economy did not meet one or both requirements, the analysis was not conducted for that country/economy, as indicated by the symbol "c" in the relevant table. For example, in the TALIS dataset for Alberta (Canada), no more than ten principals from privately managed schools gave a valid answer to the question "Are you female or male?", which accounts for the "c" for Alberta (Canada) in the Table 12.3 column titled "privately managed schools".

Estimated differences that tested significantly different from zero are highlighted in bold in the tables. More information on statistical testing can be found in the *TALIS 2018 and TALIS Starting Strong Survey 2018 User Guide* (OECD, forthcoming[2]).

Table 12.3. Principals' gender, by school characteristics

	Percentage of female principals					
	Total		By school type			
			Publicly managed schools		Privately managed schools	
	%	SE	%	SE	%	SE
Alberta (Canada)	29.7	(6.7)	29.1	(6.4)	c	c
Austria	49.9	(3.6)	47.4	(3.6)	64.1	(8.3)
Belgium	43.6	(2.9)	56.2	(4.8)	35.4	(3.7)
Flemish Comm. (Belgium)	40.3	(3.7)	51.0	(7.4)	36.4	(4.2)
…	…	…	…	…	…	…
…	…	…	…	…	…	…
…	…	…	…	…	…	…
Turkey	7.2	(1.2)	5.5	(1.3)	28.4	(1.8)
United Arab Emirates	51.3	(2.1)	53.5	(2.8)	49.8	(3.2)
United States	48.5	(8.5)	38.8	(10.8)	77.5	(9.4)
Viet Nam	28.8	(3.1)	28.8	(3.1)	27.4	(15.1)
OECD average-30	47.3	(0.8)	46.6	(0.9)	50.6	(2.1)
EU total-23	54.0	(1.1)	54.1	(1.4)	54.8	(3.7)
TALIS average-47	48.9	(0.6)	48.6	(0.7)	50.5	(1.7)

12.12. Quality assurance and table verification

To ensure high quality, the results presented in the tables were produced and released during up to three review and revision rounds. During each release, the TALIS Consortium,

the OECD and the participating countries/economies verified the results for substantial plausibility.

To validate and verify the statistical procedures applied by the TALIS Consortium (implemented with the IEA IDB Analyzer and R), both ACER and the OECD reproduced all estimates presented in the tables. ACER recalculated the table results using ACER-developed tools for replicated analysis (Fay-BRR in this case), while the OECD relied on the repest function in STATA.

Verification encompassed the following activities:

- general plausibility checks
- different reviewers verifying the variables, sub-settings and recodings several times over
- recalculation of randomly-selected results from each table (usually one or two randomly-selected columns of a table)
- recalculation of all OECD and TALIS averages and the EU totals
- comparison of results against the results produced by ACER and the OECD.

References

OECD (2019), *TALIS 2018 Results (Volume I): Teachers and School Leaders as Lifelong Learners*, TALIS, OECD Publishing, Paris, https://dx.doi.org/10.1787/1d0bc92a-en. [1]

OECD (2010), *TALIS 2008 Technical Report*, TALIS, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264079861-en. [3]

OECD (forthcoming), *TALIS 2018 and TALIS Starting Strong Survey 2018 User Guide*, OECD, Paris. [2]

Notes

[1] Tables were shortened to highlight important statistical aspects and thus to increase readability. All footnotes that were not important in the context of this chapter were deleted from the tables, but can be found in the international report (OECD, 2019[1]). Order and names of countries in Chapter 12 tables match tables in the international report (OECD, 2019[1]) but differ slightly from other tables in this technical report.

[2] The IEA IDB Analyzer is a software application developed by the IEA to perform analysis with data of international large-scale assessments in education. It provides, via a user interface, SPSS or SAS syntax that can be run with the respective software (see www.iea.nl/data). Version 4.0.26 of the IEA IDB Analyzer was used to produce the TALIS 2018 tables.

[3] The following R packages were used: data.table, openxlsx. More information on R can be found at https://www.r-project.org.

[4] Box 12.2 of this chapter details the annotation rules relating to data quality requirements and their associated flagging symbols.

[5] Listwise deletion was implemented in the regression analysis.

[6] CNO refers to co-ordinated national options or, in other words, to country-specific questions.

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Translation verification was performed in co-operation with cApStAn Linguistic Quality Control, an independent linguistic quality control agency located in Brussels, Belgium. IEA Amsterdam appointed, contracted and trained independent quality observers to monitor survey implementation in each participating country/economy.

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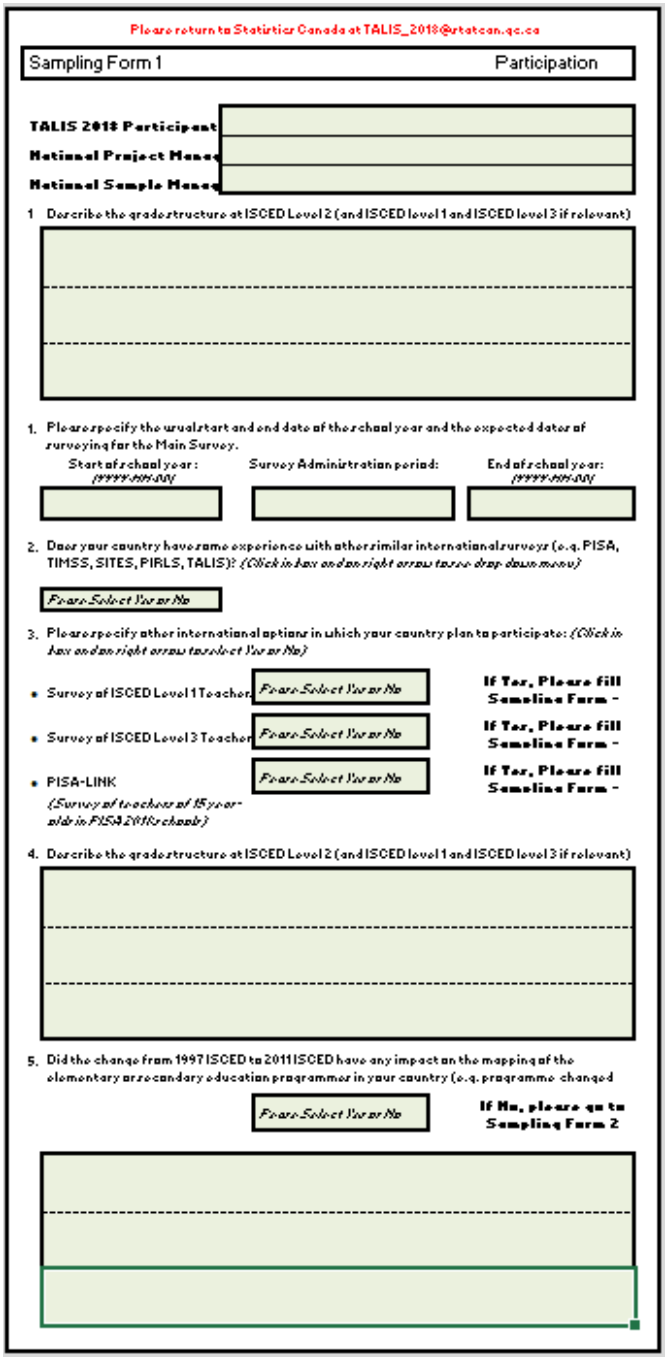
Annex B. Technical standards

You can find the full technical standards on line at:
www.oecd.org/education/talis/Annex_B-TALIS2018_Technical_report-Technical_Standards.pdf

Annex C. Sampling forms

Figure A C.1. Sampling Form 1



Please return to Statistics Canada at TALIS_2018@statcan.gc.ca

Sampling Form 1 — Participation

TALIS 2018 Participant
National Project Manag
National Sample Manag

1 Describe the grade structure at ISCED Level 2 (and ISCED level 1 and ISCED level 3 if relevant)

1. Please specify the usual start and end date of the school year and the expected dates of surveying for the Main Survey.

Start of school year: (*****/**/**)
Survey Administration period:
End of school year: (*****/**/**)

2. Does your country have some experience with other similar international surveys (e.g. PISA, TIMSS, SITES, PIRLS, TALIS)? *(Click in box and on right arrow to see drop down menu)*

Please Select Yes or No

3. Please specify other international options in which your country plan to participate: *(Click in box and on right arrow to select Yes or No)*

- Survey of ISCED Level 1 Teacher — *Please Select Yes or No* — **If Yes, Please fill Sampling Form -**
- Survey of ISCED Level 3 Teacher — *Please Select Yes or No* — **If Yes, Please fill Sampling Form -**
- PISA-LINK — *Please Select Yes or No* — **If Yes, Please fill Sampling Form -**

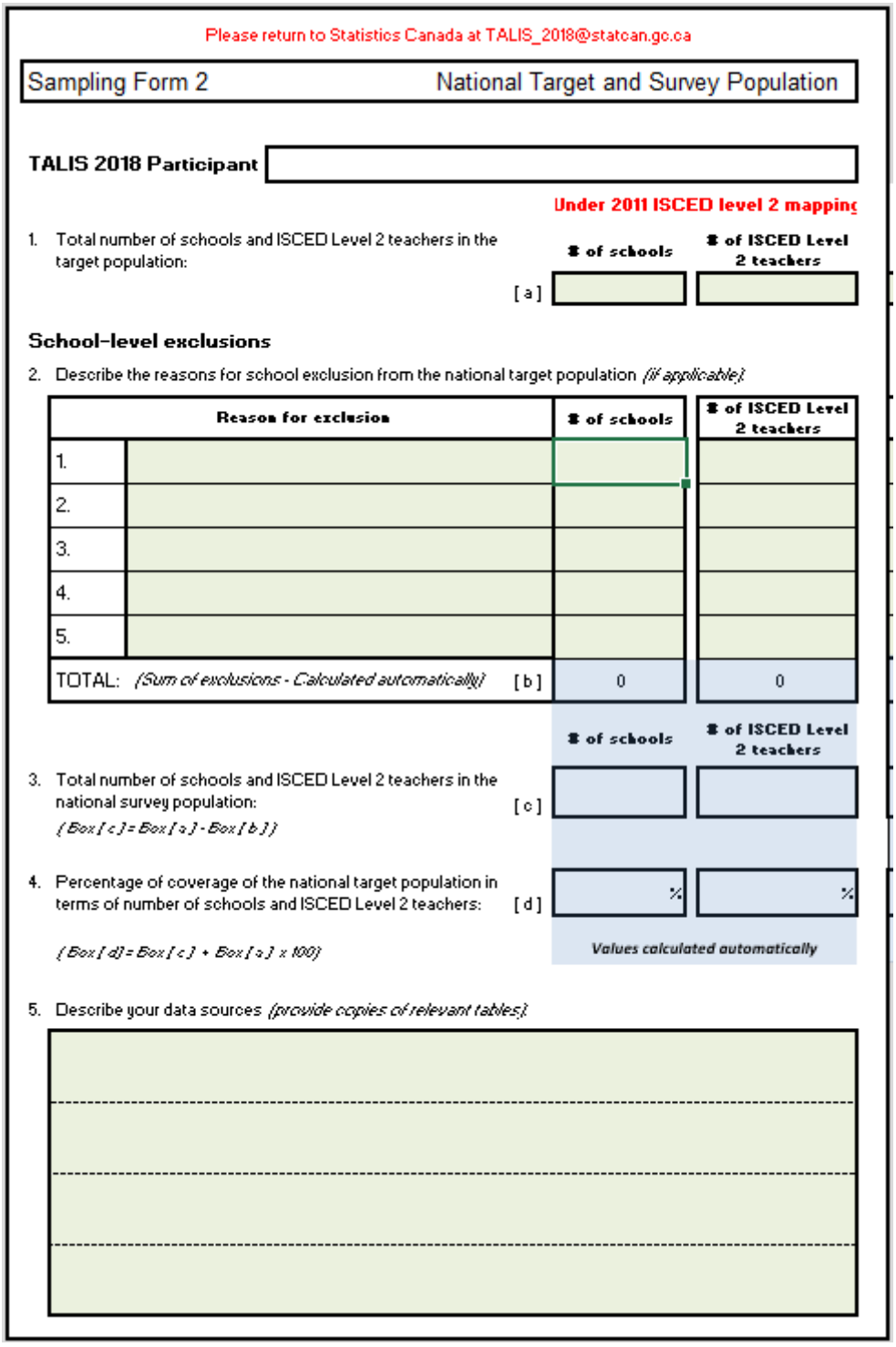
(Survey of teachers of 15 year-olds in PISA 2018 schools)

4. Describe the grade structure at ISCED Level 2 (and ISCED level 1 and ISCED level 3 if relevant)

5. Did the change from 1997 ISCED to 2011 ISCED have any impact on the mapping of the elementary or secondary education programmes in your country (e.g. programme changed

Please Select Yes or No — **If No, please go to Sampling Form 2**

Figure A C.2. Sampling Form 2



Please return to Statistics Canada at TALIS_2018@statcan.gc.ca

Sampling Form 2 — National Target and Survey Population

TALIS 2018 Participant

Under 2011 ISCED level 2 mapping

1. Total number of schools and ISCED Level 2 teachers in the target population:

	# of schools	# of ISCED Level 2 teachers
[a]		

School-level exclusions

2. Describe the reasons for school exclusion from the national target population *(if applicable)*

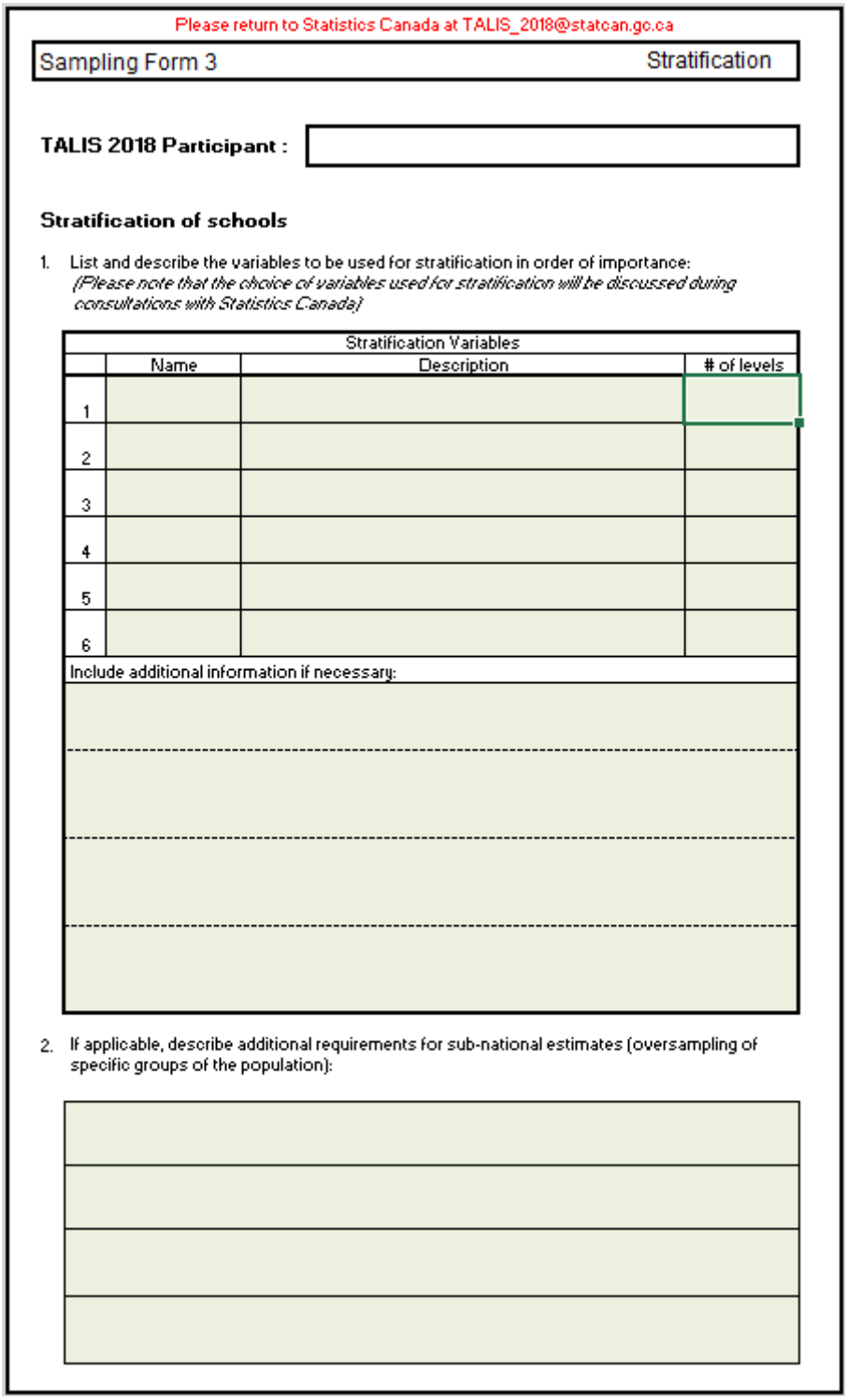
	Reason for exclusion	# of schools	# of ISCED Level 2 teachers
1.			
2.			
3.			
4.			
5.			
TOTAL: *(Sum of exclusions - Calculated automatically)*	[b]	0	0

	# of schools	# of ISCED Level 2 teachers
3. Total number of schools and ISCED Level 2 teachers in the national survey population: *(Box [c] = Box [a] - Box [b])* [c]		
4. Percentage of coverage of the national target population in terms of number of schools and ISCED Level 2 teachers: *(Box [d] = Box [c] ÷ Box [a] x 100)* [d]	%	%

Values calculated automatically

5. Describe your data sources *(provide copies of relevant tables)*

Figure A C.3. Sampling Form 3



Please return to Statistics Canada at TALIS_2018@statcan.gc.ca

Sampling Form 3 — Stratification

TALIS 2018 Participant :

Stratification of schools

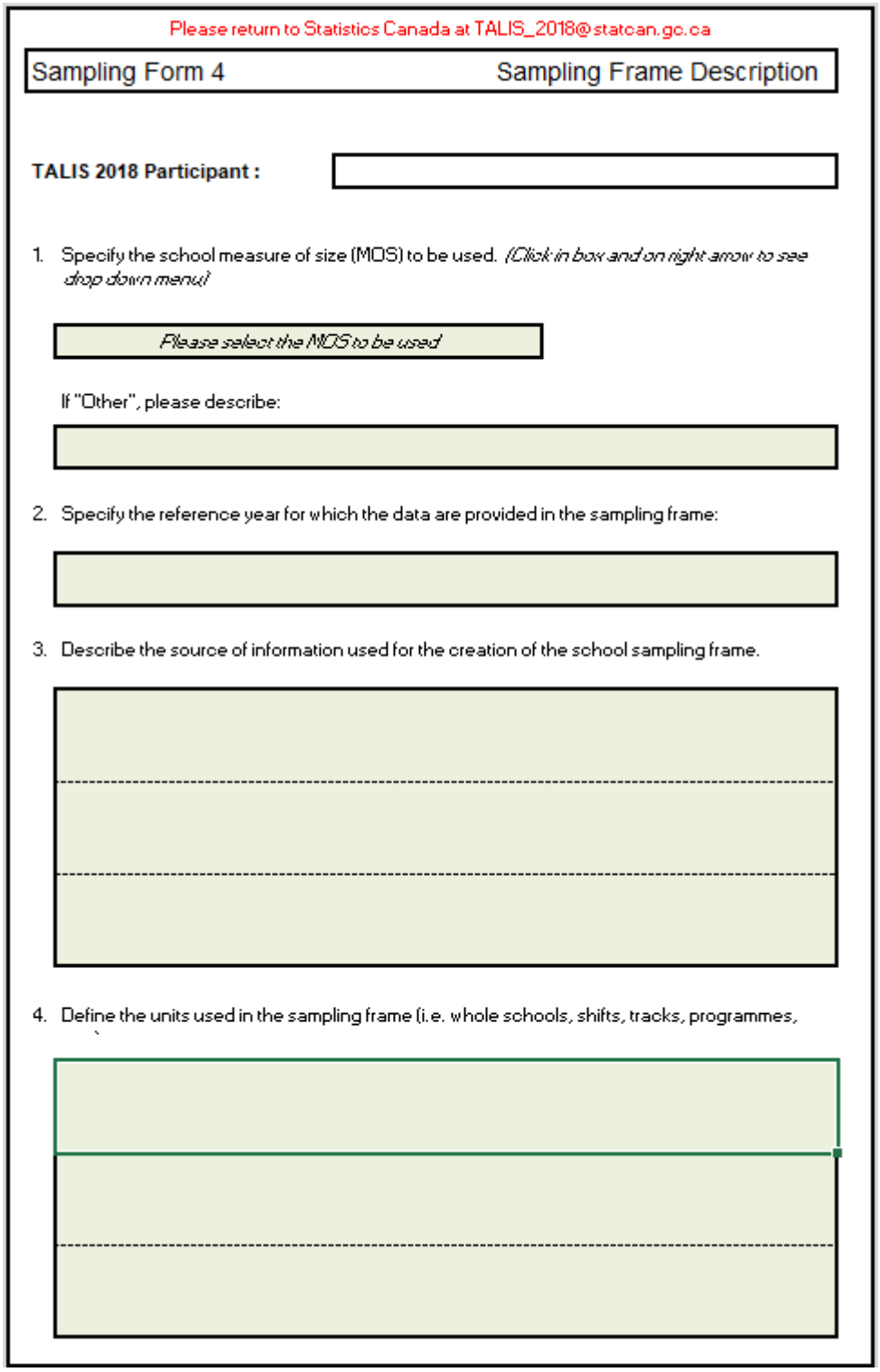
1. List and describe the variables to be used for stratification in order of importance:
(Please note that the choice of variables used for stratification will be discussed during consultations with Statistics Canada)

Stratification Variables			
	Name	Description	# of levels
1			
2			
3			
4			
5			
6			

Include additional information if necessary:

2. If applicable, describe additional requirements for sub-national estimates (oversampling of specific groups of the population):

Figure A C.4. Sampling Form 4



Please return to Statistics Canada at TALIS_2018@statcan.gc.ca

Sampling Form 4 Sampling Frame Description

TALIS 2018 Participant :

1. Specify the school measure of size (MOS) to be used. *(Click in box and on right arrow to see drop down menu)*

Please select the MOS to be used

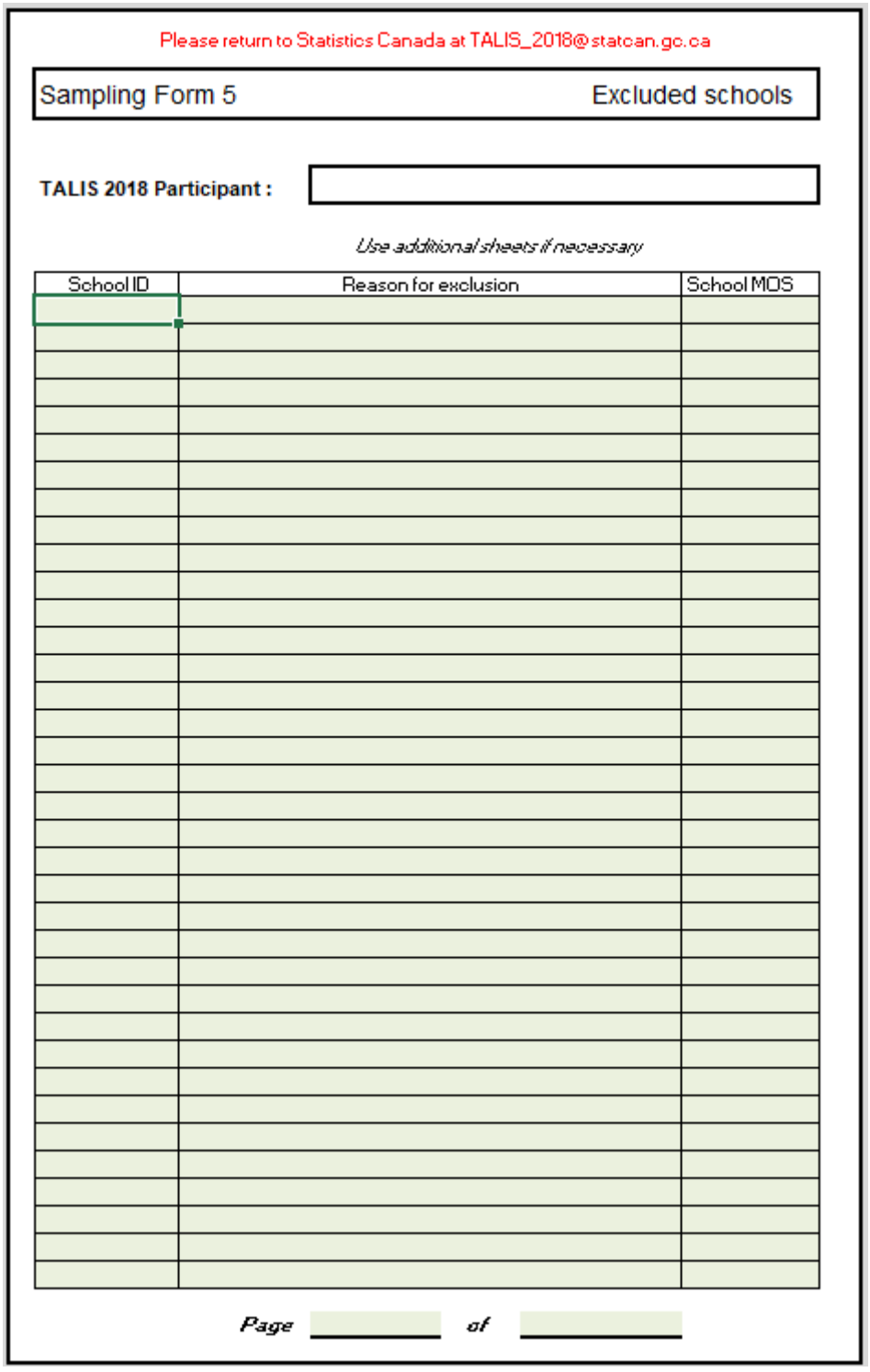
If "Other", please describe:

2. Specify the reference year for which the data are provided in the sampling frame:

3. Describe the source of information used for the creation of the school sampling frame.

4. Define the units used in the sampling frame (i.e. whole schools, shifts, tracks, programmes,

Figure A C.5. Sampling Form 5



Please return to Statistics Canada at TALIS_2018@statcan.gc.ca

Sampling Form 5 — Excluded schools

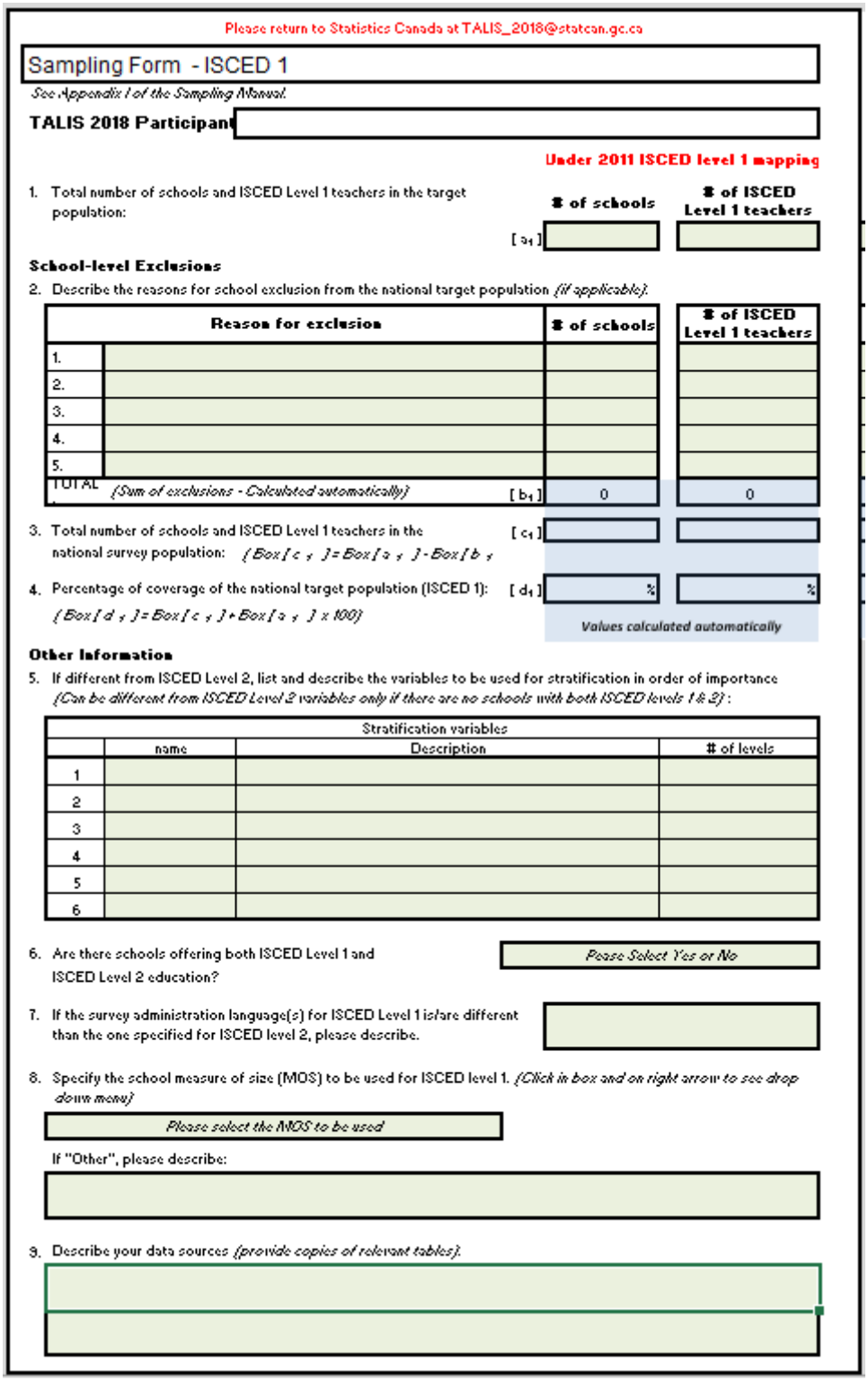
TALIS 2018 Participant :

Use additional sheets if necessary

School ID	Reason for exclusion	School MOS

Page _____ *of* _____

Figure A C.6. Sampling Form ISCED 1



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Sampling Form - ISCED 1

See Appendix I of the Sampling Manual.

TALIS 2018 Participant

Under 2011 ISCED level 1 mapping

1. Total number of schools and ISCED Level 1 teachers in the target population:

	# of schools	# of ISCED Level 1 teachers
[a_1]		

School-level Exclusions

2. Describe the reasons for school exclusion from the national target population *(if applicable)*.

	Reason for exclusion	# of schools	# of ISCED Level 1 teachers
1.			
2.			
3.			
4.			
5.			
TOTAL	*(Sum of exclusions - Calculated automatically)* [b_1]	0	0

3. Total number of schools and ISCED Level 1 teachers in the national survey population: *(Box [c ,] = Box [a ,] - Box [b ,]* [c_1]

4. Percentage of coverage of the national target population (ISCED 1): [d_1] % %

(Box [d ,] = Box [c ,] ÷ Box [a ,] x 100)

Values calculated automatically

Other Information

5. If different from ISCED Level 2, list and describe the variables to be used for stratification in order of importance *(Can be different from ISCED Level 2 variables only if there are no schools with both ISCED levels 1 & 2)* :

Stratification variables			
	name	Description	# of levels
1			
2			
3			
4			
5			
6			

6. Are there schools offering both ISCED Level 1 and ISCED Level 2 education? *Pease Select Yes or No*

7. If the survey administration language(s) for ISCED Level 1 is/are different than the one specified for ISCED level 2, please describe.

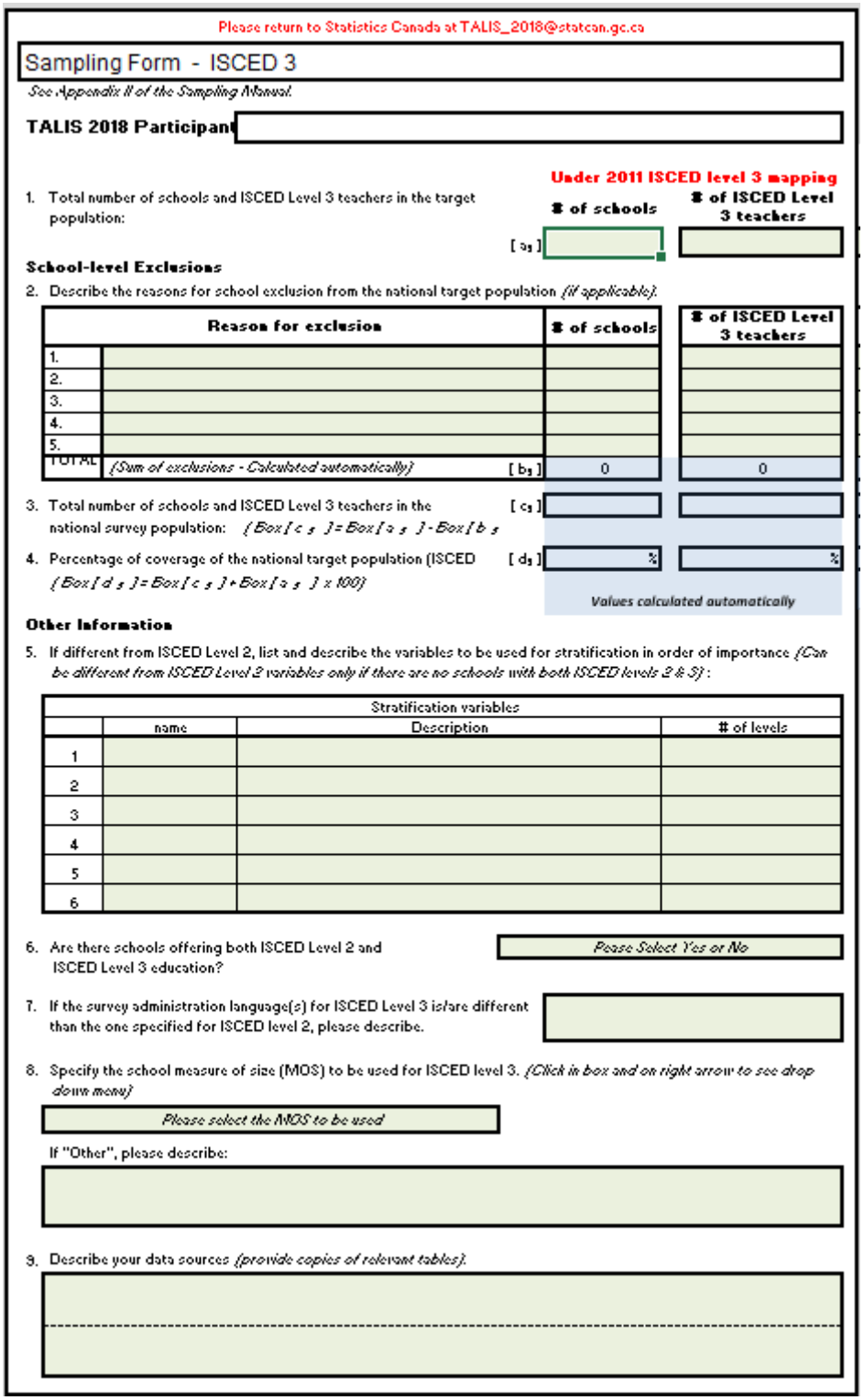
8. Specify the school measure of size (MOS) to be used for ISCED level 1. *(Click in box and on right arrow to see drop down menu)*

Please select the MOS to be used

If "Other", please describe:

9. Describe your data sources *(provide copies of relevant tables)*.

Figure A C.7. Sampling Form ISCED 3



Please return to Statistics Canada at TALIS_2018@statcan.gc.ca

Sampling Form - ISCED 3

See Appendix II of the Sampling Manual.

TALIS 2018 Participant

Under 2011 ISCED level 3 mapping

1. Total number of schools and ISCED Level 3 teachers in the target population:

	# of schools	# of ISCED Level 3 teachers
[a_3]		

School-level Exclusions

2. Describe the reasons for school exclusion from the national target population *(if applicable)*.

	Reason for exclusion	# of schools	# of ISCED Level 3 teachers
1.			
2.			
3.			
4.			
5.			
TOTAL	*(Sum of exclusions - Calculated automatically)* [b_3]	0	0

3. Total number of schools and ISCED Level 3 teachers in the national survey population: [c_3] *(Box [c_3] = Box [a_3] - Box [b_3]*

4. Percentage of coverage of the national target population (ISCED [d_3] *(Box [d_3] = Box [c_3] ÷ Box [a_3] x 100)*

Values calculated automatically

Other Information

5. If different from ISCED Level 2, list and describe the variables to be used for stratification in order of importance *(Can be different from ISCED Level 2 variables only if there are no schools with both ISCED levels 2 & 3)* :

Stratification variables			
	name	Description	# of levels
1			
2			
3			
4			
5			
6			

6. Are there schools offering both ISCED Level 2 and ISCED Level 3 education? *Please Select Yes or No*

7. If the survey administration language(s) for ISCED Level 3 is/are different than the one specified for ISCED level 2, please describe.

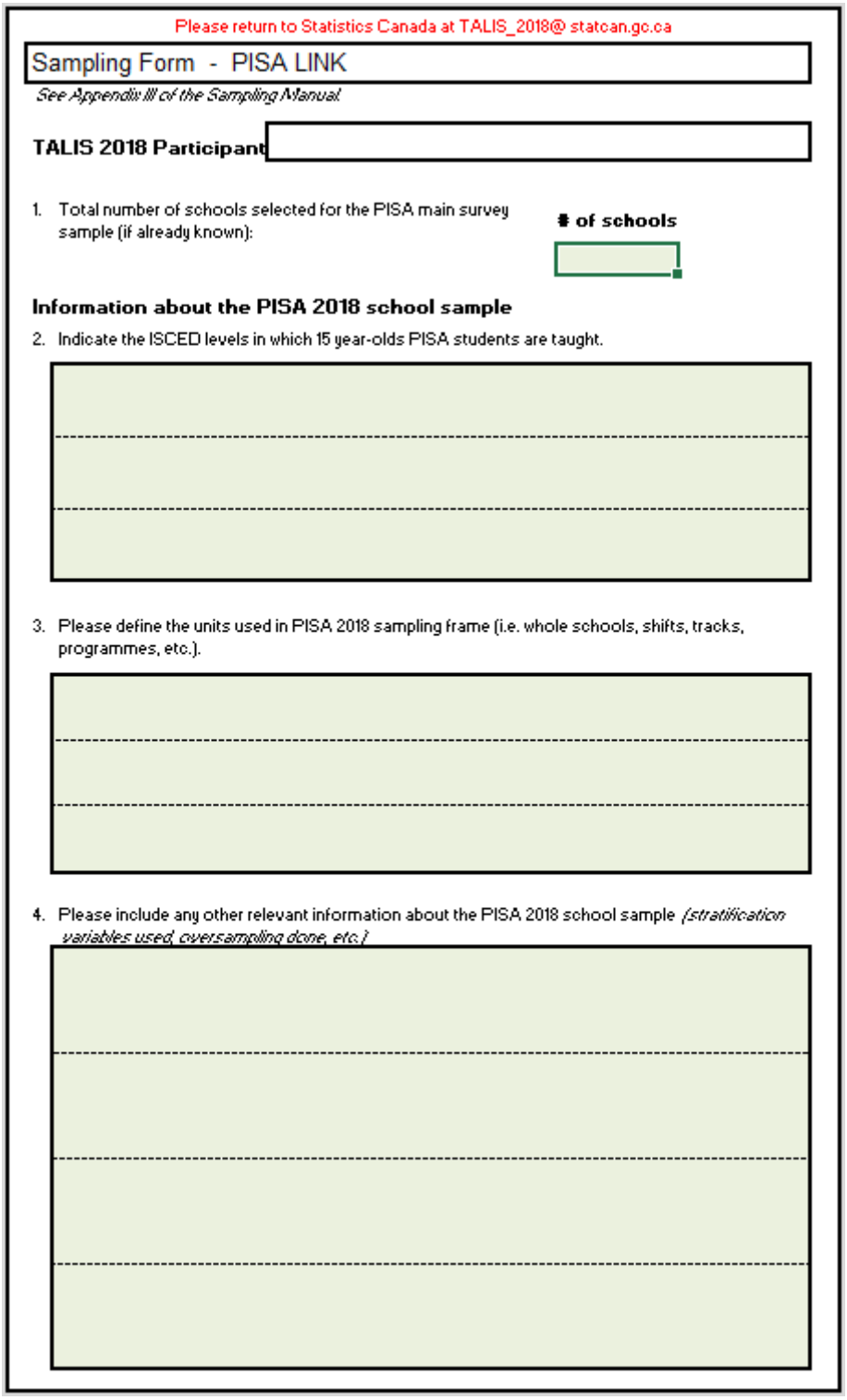
8. Specify the school measure of size (MOS) to be used for ISCED level 3. *(Click in box and on right arrow to see drop down menu)*

Please select the MOS to be used

If "Other", please describe:

9. Describe your data sources *(provide copies of relevant tables)*.

Figure A C.8. Sampling Form TALIS-PISA Link



Please return to Statistics Canada at TALIS_2018@ statcan.gc.ca

Sampling Form - PISA LINK

See Appendix III of the Sampling Manual

TALIS 2018 Participant

1. Total number of schools selected for the PISA main survey sample (if already known):

# of schools

Information about the PISA 2018 school sample

2. Indicate the ISCED levels in which 15 year-olds PISA students are taught.

3. Please define the units used in PISA 2018 sampling frame (i.e. whole schools, shifts, tracks, programmes, etc.).

4. Please include any other relevant information about the PISA 2018 school sample *(stratification variables used, oversampling done, etc.)*

Figure A C.9. Additional Information

Annex D. Target and survey population

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

Table A D.1. ISCED level 2

Participating country/economy	Population and coverage	Reasons for exclusions	Number of schools	Percentage of total	Number of teachers	Percentage of total
Alberta (Canada)	**Target Population**		1 158	**100**	**..**	**..**
	Exclusions:	Band-operated schools. These schools operate on First Nations' reserves and are the responsibility of the federal government rather than the responsibility of Alberta Education	39	3.37	..	..
		Very small schools (fewer than three students in each of Grades 7 to 9)	100	8.64	..	..
	Survey Population		1 019	88	..	..
Australia	**Target Population**		**2 862**	**100**	**..**	**..**
	Exclusions:	Small schools (fewer than four students)	263	9.19	..	..
		Schools that are geographically remote	32	1.12	..	..
		Small schools that are also geographically remote	31	1.08	..	..
	Survey Population		2 536	88.61	..	..
Austria	**Target Population**		**1 496**	**100**	**..**	**..**
	Exclusions:	Slovene school where the language of instruction is not German	1	0.07	..	..
	Survey Population		1 495	99.93	..	..
Belgium	**Target Population**		**1 245**	**100**	**..**	**..**
	Exclusions:	Very small schools (fewer than 20 students at ISCED level 2)	10	0.8	..	..
		Special needs schools	79	6.35	..	..
	Survey Population		1 156	92.85	..	..
Flemish Community (Belgium)	**Target Population**		**718**	**100**	..	..
	Exclusions:	Very small schools (fewer than 20 students at ISCED level 2)	2	0.28	..	..
	Survey Population		716	99.72	..	..
Brazil	**Target Population**		**58 303**	**100**	**870 737**	**100**
	Exclusions:	Schools with fewer than six teachers. Because ISCED level 2 requires at least one teacher for each subject, most of these schools have only one class. The schools that fit this criterion are located in geographically remote areas	4 957	8.5	18 896	2.17
		Public-federal schools	38	0.07	1 724	0.2
	Survey Population		53 308	91.43	850 117	97.63
Bulgaria	**Target Population**		**1 834**	**100**	**23 168**	**100**
	Exclusions:	Schools for students with special education needs	67	3.65	454	1.96
		Very small schools	45	2.45	126	0.54
	Survey Population		1 722	93.89	22 588	97.5

Participating country/economy	Population and coverage	Reasons for exclusions	Number of schools	Percentage of total	Number of teachers	Percentage of total
Ciudad Autónoma de Buenos Aires (Argentina)	**Target Population**		**488**	**100**	**..**	**..**
	Survey Population		488	100	..	..
Chile	**Target Population**		**6 008**	**100**	**51 626**	**100**
	Exclusions:	Schools with fewer than three teachers	681	11.33	1433	2.78
		Schools that are geographically remote	4	0.07	27	0.05
	Survey Population		5 323	88.6	50 166	97.17
Colombia	**Target Population**		**13 009**	**100**	**..**	**..**
	Exclusions:	Small schools (fewer than three teachers at ISCED level 2)	322	2.48	..	..
		Schools that are outside the Sistema Integrado de Matricula	15	0.12	..	..
	Survey Population		12 672	97.41	..	..
Croatia	**Target Population**		**860**	**100**	**..**	**..**
	Exclusions:	National minority schools (Italian, Serbian schools)	11	1.28	..	..
	Survey Population		849	98.72	..	..
Cyprus[1, 2]	**Target Population**		**102**	**100**	**4 426**	**100**
	Exclusions:	School that is geographically remote	1	0.98	13	0.29
		School where language of instruction is one other than Greek or English	1	0.98	8	0.18
		Very small school that has part-time teachers and no head teacher or assistant head teacher	1	0.98	5	0.11
	Survey Population		99	97.06	4 400	99.41
Czech Republic	**Target Population**		**2 645**	**100**	**39 690**	**100**
	Exclusions:	Schools with a different language of instruction (Polish)	10	0.38	116	0.29
		Dancing conservatoire – specific education programmes	5	0.19	122	0.31
		Very small schools (fewer than three teachers at ISCED level 2)	14	0.53	11	0.03
	Survey Population		2 616	98.9	39 441	99.37
Denmark	**Target Population**		**1 721**	**100**	**..**	**..**
	Exclusions:	Small schools (fewer than 40 students and generally fewer than 5 teachers)	251	14.58	..	..
	Survey Population		1 470	85.42	..	..
England (United Kingdom)	**Target Population**		**4 345**	**100**	**..**	**..**
	Exclusions:	International schools	13	0.3	..	..
		Very small schools	57	1.31	..	..
		Schools proposed for closure	17	0.39	..	..
	Survey Population		4 258	98	..	..
Estonia	**Target Population**		**404**	**100**	**8 622**	**100**
	Exclusions:	International schools	4	0.99	34	0.39
		Ballet school	1	0.25	21	0.24
	Survey Population		399	98.76	8 567	99.36

Participating country/economy	Population and coverage	Reasons for exclusions	Number of schools	Percentage of total	Number of teachers	Percentage of total
Finland	**Target Population**		**722**	**100**	**..**	**..**
	Exclusions:	International//foreign/immersion schools, where all students are taught in languages other than Finnish or Swedish	8	1.11	..	..
	Survey Population		714	98.89	..	..
France	**Target Population**		**7 203**	**100**	**215 940**	**100**
	Exclusions:	Schools located in overseas French territories (TOM)	79	1.1	1 342	0.62
		Schools located in La Réunion and Mayotte (Southern Hemisphere calendar)	103	1.43	5 529	2.56
		Private schools under different administration	193	2.68	.	.
	Survey Population		6 828	94.79	209 069	96.82
Georgia	**Target Population**		**2 265**	**100**	**42 757**	**100**
	Exclusions:	Schools where the language of instruction is an excluded minority language	13	0.57	249	0.58
		Very small schools	2	0.09	6	0.01
	Survey Population		2 250	99.34	42 502	99.4
Hungary	**Target Population**		**2 844**	**100**	**37 938**	**100**
	Exclusions:	Very small schools (fewer than three teachers at ISCED level 2)	85	2.99	126	0.33
	Survey Population		2 759	97.01	37 812	99.67
Iceland	**Target Population**		**142**	**100**	**..**	**..**
	Survey Population		142	100	..	..
Israel	**Target Population**		**2 475**	**100**	**..**	**..**
	Exclusions:	International/foreign schools where the language of instruction is a single minority language	5	0.2	..	..
		Ultra-Orthodox Jewish schools where the language of instruction is Hebrew	1 246	50.34	..	..
	Survey Population		1 224	49.45	..	..
Italy	**Target Population**		**5 783**	**100**	**154 071**	**100**
	Exclusions:	Schools with fewer than three teachers at ISCED level 2	63	1.09	90	0.06
	Survey Population		5 720	98.91	153 981	99.94
Japan	**Target Population**		**10 426**	**100**	**264 356**	**100**
	Survey Population		10 426	100	264 356	100
Kazakhstan	**Target Population**		**6 424**	**100**	**208 254**	**100**
	Exclusions:	Uzbek, Uighur and Tadjik schools. These regions together account for less than 5% of Kazakhstan's population. The TALIS questionnaire will be administered in the Kazakh and Russian languages in these schools	30	0.47	1 215	0.58
		Schools located in the Baikonur region (special permission is required to enter this territory)	5	0.08	306	0.15

Participating country/economy	Population and coverage	Reasons for exclusions	Number of schools	Percentage of total	Number of teachers	Percentage of total
		Schools with fewer than three teachers at ISCED level 2	2	0.03	5	0
		School where the language of instruction is English	1	0.02	60	0.03
	Survey Population		6 386	99.41	206 668	99.24
Korea	**Target Population**		**3 252**	**100**	**69 820**	**100**
	Exclusions:	Schools with fewer than three teachers at ISCED level 2	7	0.22	17	0.02
		Schools that are geographically remote	151	4.64	1073	1.54
		Schools with no more than three teachers at ISCED level 2 and schools that are geographically remote	4	0.12	7	0.01
		Schools with alternative curricula, teacher licensure and school structure	31	0.95	382	0.55
	Survey Population		3 059	94.07	68 341	97.88
Latvia	**Target Population**		**695**	**100**	**..**	**..**
	Exclusions:	International schools (e.g. for diplomats' children)	2	0.29	..	..
		Special regime (criminal) school	1	0.14	..	..
	Survey Population		692	99.57	..	..
Lithuania	**Target Population**		**960**	**100**	**..**	**..**
	Exclusions:	International schools where English and French are the languages of instruction and the education system	3	0.31	..	..
		Youth schools. These implement basic education programmes but also have a particular focus on special education (emotionally or socially disadvantaged students)	12	1.25	..	..
		Small schools (fewer than ten students at ISCED level 2)	19	1.98	..	..
	Survey Population		926	96.46	..	..
Malta	**Target Population**		**63**	**100**	**3 271**	**100**
	Exclusions:	Language schools	2	3.17	16	0.49
	Survey Population		61	96.83	3 255	99.51
Mexico	**Target Population**		**16 763**	**100**	**328 649**	**100**
	Exclusions:	Schools with fewer than three teachers	41	0.24	95	0.03
	Survey Population		16 722	99.76	328 554	99.97
Netherlands	**Target Population**		**538**	**100**	**..**	**..**
	Survey Population		538	100	..	..
New Zealand	**Target Population**		**1 696**	**100**	**..**	**..**
	Exclusions:	National correspondence school	1	0.06	..	..
	Survey Population		1 695	99.94	..	..
Norway	**Target Population**		**1 154**	**100**	**23 542**	**100**
	Exclusions:	Very small schools (fewer than three teachers)	68	5.89	168	0.71
		Sami schools	5	0.43	48	0.2
		International schools	15	1.3	216	0.92

Participating country/economy	Population and coverage	Reasons for exclusions	Number of schools	Percentage of total	Number of teachers	Percentage of total
		International schools where the language of instruction is French	2	0.17	31	0.13
	Survey Population		1 064	92.2	23 079	98.03
Portugal	**Target Population**		**1 273**	**100**	**36 912**	**100**
	Exclusions:	Schools with non-Portuguese curricula	16	1.26	299	0.81
	Survey Population		1 257	98.74	36 613	99.19
Romania	**Target Population**		**4 776**	**100**	**..**	**..**
	Exclusions:	Very small schools (fewer than 25 students at ISCED level 2)	88	1.84	..	..
	Survey Population		4 688	98.16	..	..
Russian Federation	**Target Population**		**41 893**	**100**	**760 196**	**100**
	Exclusions:	Crimean schools	621	1.48	12 462	1.64
		Moscow schools	733	1.75	41 541	5.46
	Survey Population		40 539	96.77	706 193	92.9
Saudi Arabia	**Target Population**		**8 105**	**100**	**120 109**	**100**
	Exclusions:	Schools in the Najran and Jazan regions (near the borders with Yemen where there is war)	767	9.46	9 028	7.52
		Private schools. These schools are not being included in TALIS at this stage because their system of education differs from that of the public system	951	11.73	11 075	9.22
		Schools with fewer than four teachers	121	1.49	240	0.2
	Survey Population		6 266	77.31	99 766	83.06
Shanghai (China)	**Target Population**		**662**	**100**	**41 705**	**100**
	Exclusions:	Special schools for students with behavioural problems, including delinquency	12	1.81	340	0.82
	Survey Population		650	98.19	41 365	99.18
Singapore	**Target Population**		**197**	**100**	**12 285**	**100**
	Exclusions:	Schools where the language of instruction is not English and where teachers would have difficulty responding to the TALIS survey, which is in English	4	2.03	200	1.63
	Survey Population		193	97.97	12 085	98.37
Slovak Republic	**Target Population**		**1 591**	**100**	**24 841**	**100**
	Exclusions:	Schools with fewer than three teachers at ISCED level 2	10	0.63	20	0.08
	Survey Population		1 581	99.37	24 821	99.92
Slovenia	**Target Population**		**451**	**100**	**9 090**	**100**
	Exclusions:	Italian basic schools in an ethnically mixed area where the language of instruction is Italian and where the teachers are therefore a separate group of Slovenian teachers	3	0.67	42	0.46
	Survey Population		448	99.33	9 048	99.54

Participating country/economy	Population and coverage	Reasons for exclusions	Number of schools	Percentage of total	Number of teachers	Percentage of total
Spain	**Target Population**		**6 954**	**100**	**200 193**	**100**
	Exclusions:	Small schools (fewer than three teachers)	43	0.62	59	0.03
		Schools that are geographically remote	2	0.03	42	0.02
	Survey Population		6 909	99.35	200 092	99.95
Sweden	**Target Population**		1 768	100	..	..
	Exclusions:	Small schools (fewer than six students at ISCED level 2)	49	2.77	..	..
		International schools not following the Swedish curriculum	11	0.62	..	..
	Survey Population		1 708	96.61	..	..
Chinese Taipei	**Target Population**		**939**	**100**	**..**	**..**
	Exclusions:	Schools with fewer than three teachers	7	0.75	..	..
	Survey Population		932	99.25	..	..
Turkey	**Target Population**		**16 228**	**100**	**310 932**	**100**
	Survey Population		16 228	100	310 932	100
United Arab Emirates	**Target Population**		**577**	**100**	**17 541**	**100**
	Exclusions:	Private schools	14	2.43	350	2
	Survey Population		563	97.57	17 191	98
United States	**Target Population**		**63 795**	**100**	**..**	**..**
	Exclusions:	Schools in detention, hospital and treatment centres	569	0.89	..	..
	Survey Population		63 226	99.11	..	..
Viet Nam	**Target Population**		**10 843**	**100**	**303 171**	**100**
	Exclusions:	Non-Vietnamese international schools	22	0.2	153	0.05
	Survey Population		10 821	99.8	303 018	99.95

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1. Note by Turkey: The information in this document with reference to “Cyprus” relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the “Cyprus issue”.

2. Note by all the European Union Member States of the OECD and the European Union: The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

Table A D.2. ISCED level 1

Participating country/economy	Population and coverage	Reasons for exclusions	Number of schools	Percentage of total	Number of teachers	Percentage of total
Australia	**Target Population**		**7 733**	**100**	**140 827**	**100**
	Exclusions:	Small schools	1 106	14.3	2 289	1.63
		Schools that are geographically remote	77	1	533	0.38
		Small schools that are also geographically remote	40	0.52	119	0.08
	Survey Population		6 510	84.18	137 886	97.91
Flemish Community (Belgium)	**Target Population**		**2 238**	**100**	**..**	**..**
	Exclusions:	Schools with fewer than 20 pupils at ISCED level 1	5	0.22	..	..
	Survey Population		2 233	99.78	..	..
Ciudad Autónoma de Buenos Aires (Argentina)	**Target Population**		**878**	**100**	**..**	**..**
	Survey Population		878	100	..	..
Denmark	**Target Population**		**1 751**	**100**	**..**	**..**
	Exclusions:	Small schools (fewer than 40 students and generally fewer than 5 teachers)	57	3.26	..	..
	Survey Population		1 694	96.74	..	..
England (United Kingdom)	**Target Population**		**18 445**	**100**	**..**	**..**
	Exclusions:	International schools	17	0.09	..	..
		Very small schools	258	1.4	..	..
		Schools proposed for closure	26	0.14	..	..
	Survey Population		18 144	98.37	..	..
France	**Target Population**		**33 929**	**100**	**..**	**..**
	Exclusions:	Schools located in overseas French territories (TOM)	105	0.31	..	..
		Schools located in La Réunion and Mayotte (Southern Hemisphere calendar)	473	1.39	..	..
		Private schools under different administration	425	1.25	..	..
	Survey Population		32 926	97.04	..	..
Japan	**Target Population**		**20 333**	**100**	**385 923**	**100**
	Survey Population		20 333	100	385 923	100
Korea	**Target Population**		**6 242**	**100**	**118 417**	**100**
	Exclusions:	Schools with fewer than three teachers at ISCED level 1	120	1.92	237	0.2
		Schools that are geographically remote	303	4.85	1 809	1.53
		Schools with fewer than three teachers at ISCED level 1 and also geographically remote	208	3.33	305	0.26
	Survey Population		5 611	89.89	116 066	98.01

Participating country/economy	Population and coverage	Reasons for exclusions	Number of schools	Percentage of total	Number of teachers	Percentage of total
Netherlands	**Target Population**		**6 429**	**100**	**111 157**	**100**
	Exclusions:	Fewer than five teachers	95	1.48	339	0.3
		Schools on wheels/boat schools	2	0.03	49	0.04
	Survey Population		6 332	98.49	110 769	99.65
Spain	**Target Population**		**13 603**	**100**	**287 262**	**100**
	Exclusions:	Small schools	328	2.41	800	0.28
	Survey Population		13 275	97.59	286 462	99.72
Sweden	**Target Population**		**4 339**	**100**	**..**	**..**
	Exclusions:	Small schools (fewer than six students at ISCED level 1)	67	1.54	..	..
		International schools not following the Swedish curriculum	11	0.25	..	..
	Survey Population		4 261	98.2	..	..
Chinese Taipei	**Target Population**		**2 656**	**100**	**93 713**	**100**
	Exclusions:	Schools with fewer than three teachers	1	0.04	3	0
	Survey Population		2 655	99.96	93 710	100
Turkey	**Target Population**		**24 755**	**100**	**289 681**	**100**
	Survey Population		24 755	100	289 681	100
United Arab Emirates	**Target Population**		**602**	**100**	**22 074**	**100**
	Exclusions:	Private schools	14	2.33	428	1.94
	Survey Population		588	97.67	21 646	98.06
Viet Nam	**Target Population**		**15 169**	**100**	**395 620**	**100**
	Exclusions:	Non-Vietnamese international schools	26	0.17	685	0.17
	Survey Population		15 143	99.83	394 935	99.83

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Table A D.3. ISCED level 3

Participating country/economy	Population and coverage	Reasons for exclusions	Number of schools	Percentage of total	Number of Teachers	Percentage of total
Alberta (Canada)	**Target Population**		**688**	**100**	**..**	**..**
	Exclusions:	Band-operated schools. These schools operate on First Nations' reserves and are the responsibility of the federal government rather than the responsibility of Alberta Education	37	5.38	..	..
		Very small schools (fewer than three students in each of Grades 10 to 12)	45	6.54	..	..
	Survey Population		606	88.08	..	..
Brazil	**Target Population**		**28 815**	**100**	**643 204**	**100**
	Exclusions:	Schools with fewer than six teachers. Because ISCED level 2 requires at least one teacher for each subject, most of these schools have only one class. The schools that fit this criterion are located in geographically remote areas	804	2.79	2 682	0.42
	Survey Population		28 011	97.21	640 522	99.58
Croatia	**Target Population**		**385**	**100**	**..**	**..**
	Exclusions:	National minority schools (Italian, Serbian, Hungarian)	6	1.56	..	..
	Survey Population		379	98.44	..	..
Denmark	**Target Population**		**421**	**100**	**..**	**..**
	Exclusions:	Small schools (fewer than 40 students and generally fewer than 5 teachers)	24	5.7	..	..
	Survey Population		397	94.3	..	..
Portugal	**Target Population**		**871**	**100**	**36 849**	**100**
	Exclusions:	Schools with non-Portuguese curricula	17	1.95	230	0.62
	Survey Population		854	98.05	36 619	99.38
Slovenia	**Target Population**		**153**	**100**	**..**	**..**
	Exclusions:	Italian upper secondary schools in an ethnically mixed area where the language of instruction is Italian and where the teachers are therefore a separate group of Slovenian teachers	3	1.96	..	..
	Survey Population		150	98.04	..	..
Sweden	**Target Population**		**1 296**	**100**	**..**	**..**
	Exclusions:	Small schools (fewer than six students at ISCED level 3)	7	0.54	..	..
		International schools not following the Swedish curriculum	11	0.85	..	..
	Survey Population		1 278	98.61	..	..

Participating country/economy	Population and coverage	Reasons for exclusions	Number of schools	Percentage of total	Number of Teachers	Percentage of total
Chinese Taipei	**Target Population**		**505**	**100**	**..**	**..**
	Exclusions	Schools with fewer than three teachers	2	0.4	..	..
	Survey Population		503	99.6	..	..
Turkey	**Target Population**		**9 520**	**100**	**325 692**	**100**
	Survey Population		9 520	100	325 692	100
United Arab Emirates	**Target Population**		**448**	**100**	**13 260**	**100**
	Exclusions:	Private schools	11	2.46	285	2.15
	Survey Population		437	97.54	12 975	97.85
Viet Nam	**Target Population**		**2 941**	**100**	**167 755**	**100**
	Exclusions:	Non-Vietnamese international schools	13	0.44	156	0.09
	Survey Population		2 928	99.56	167 599	99.91

.. : missing value or not available.

Annex E. Characteristics of national samples ISCED levels 1, 2 and 3

You can find the full annex on line at:

www.oecd.org/education/talis/Annex_E-TALIS2018_Technical_Report-Characteristics_of_national_samples_ISCED_levels1_2_and_3.pdf

Annex F. Teacher listing and tracking forms

You can find the full annex on line at:

www.oecd.org/education/talis/Annex_F-TALIS2018_Technical_report-Teacher_Listing_and_Tracking_Forms.pdf

Annex G. Unweighted and weighted participation rates

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

Table A G.1. Unweighted and weighted participation rates (%) for ISCED level 1 schools and principals

Participating country/ economy	Unweighted		Weighted	
	Before replacement	After replacement	Before replacement	After replacement
Australia	47.2	74.6	48.8	77.9
Flemish Community (Belgium)	70.0	92.0	69.0	92.2
Ciudad Autónoma de Buenos Aires (Argentina)	85.0	87.5	84.0	86.0
Denmark	56.6	73.2	52.7	72.2
England (United Kingdom)	70.5	84.7	76.4	89.5
France	88.7	91.3	89.3	91.5
Japan	97.0	99.5	97.2	99.5
Korea	78.0	80.5	77.3	78.9
Netherlands	40.7	69.6	39.0	69.6
Spain	98.2	98.2	97.4	97.4
Sweden	84.7	87.4	83.2	86.9
Chinese Taipei	99.5	100.0	99.8	100.0
Turkey	98.8	98.8	99.3	99.3
United Arab Emirates	90.6	90.6	90.6	90.6
Viet Nam	100.0	100.0	100.0	100.0

Table A G.2. Unweighted and weighted participation rates (%) for ISCED level 1 teachers

Participating country/ economy	Unweighted				Weighted			
	Before replacement	After replacement	Teachers in participating schools	Overall teacher participation	Before replacement	After replacement	Teachers in participating schools	Overall teacher participation
Australia	46.2	71.2	76.5	54.5	48.8	74.0	76.4	56.5
Flemish Community (Belgium)	67.0	88.5	92.0	81.4	66.3	88.5	92.2	81.7
Ciudad Autónoma de Buenos Aires (Argentina)	81.0	83.5	86.9	72.5	79.5	81.9	86.2	70.6
Denmark	58.6	77.8	87.5	68.1	58.4	77.7	87.3	67.8
England (United Kingdom)	66.3	80.0	85.7	68.6	74.3	85.9	85.0	73.1
France	89.2	91.3	90.7	82.8	88.6	91.2	92.1	84.0
Japan	97.0	99.5	98.8	98.3	97.1	99.5	98.7	98.3
Korea	86.0	91.0	91.9	83.6	85.8	90.3	92.0	83.1
Netherlands	39.2	67.0	86.8	58.2	38.7	67.0	87.3	58.5
Spain	99.3	99.5	95.4	95.0	99.3	99.5	94.1	93.6
Sweden	90.0	93.7	78.8	73.8	89.8	93.8	78.6	73.7
Chinese Taipei	99.5	100.0	97.6	97.6	99.9	100.0	97.0	97.0
Turkey	99.4	99.4	98.5	97.9	99.2	99.2	98.4	97.6
United Arab Emirates	99.6	99.6	96.6	96.2	99.7	99.7	96.3	96.0
Viet Nam	100.0	100.0	98.0	98.0	100.0	100.0	98.3	98.3

Table A G.3. Unweighted and weighted participation rates (%) for ISCED level 2 schools and principals

Participating country/ economy	Unweighted		Weighted	
	Before replacement	After replacement	Before replacement	After replacement
Alberta (Canada)	54.4	66.2	46.0	57.8
Australia	49.0	75.7	47.1	75.1
Austria	96.0	100.0	93.1	100.0
Belgium	86.5	95.7	86.0	95.8
Flemish Community (Belgium)	82.5	94.0	81.4	94.0
Brazil	85.1	94.4	88.0	95.4
Bulgaria	97.5	100.0	96.5	100.0
Ciudad Autónoma de Buenos Aires (Argentina)	75.3	80.7	77.5	82.6
Chile	76.9	86.7	78.9	87.6
Colombia	68.8	70.9	66.6	69.6
Croatia	94.9	95.9	95.0	95.6
Cyprus[1, 2]	88.9	88.9	88.9	88.9
Czech Republic	98.6	98.6	99.0	99.0
Denmark	50.5	71.4	51.5	71.4
England (United Kingdom)	71.9	81.8	70.1	81.8
Estonia	88.2	100.0	88.3	100.0
Finland	100.0	100.0	100.0	100.0
France	97.5	98.0	97.6	98.0
Georgia	91.7	91.7	91.7	91.7
Hungary	91.2	94.3	90.9	93.3
Iceland	74.3	74.3	74.3	74.3
Israel	90.9	93.4	90.9	93.7
Italy	91.2	98.4	92.4	98.6
Japan	91.9	99.0	93.9	99.4
Kazakhstan	99.7	100.0	100.0	100.0
Korea	65.0	75.0	68.1	77.8
Latvia	80.4	91.9	73.4	90.8
Lithuania	100.0	100.0	100.0	100.0
Malta	93.1	93.1	93.1	93.1
Mexico	90.5	96.5	90.6	97.0
Netherlands	56.2	85.6	56.2	85.6
New Zealand	65.1	81.5	71.7	92.0
Norway	67.5	81.0	64.9	80.6
Portugal	97.5	100.0	97.7	100.0
Romania	100.0	100.0	100.0	100.0
Russian Federation	99.1	100.0	99.1	100.0
Saudi Arabia	96.5	96.5	96.2	96.2
Shanghai (China)	100.0	100.0	100.0	100.0
Singapore	97.0	98.8	93.3	97.9
Slovak Republic	84.4	90.5	83.6	90.4
Slovenia	74.7	79.3	74.8	79.3
South Africa	92.3	92.3	91.1	91.1
Spain	98.7	99.2	98.1	98.5
Sweden	85.9	89.1	83.5	88.6
Chinese Taipei	100.0	100.0	100.0	100.0

Participating country/ economy	Unweighted		Weighted	
	Before replacement	After replacement	Before replacement	After replacement
Turkey	99.0	99.0	98.9	98.9
United Arab Emirates	91.4	91.4	91.4	91.4
United States	57.5	76.6	63.1	77.6
Viet Nam	100.0	100.0	100.0	100.0

1. Note by Turkey: The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".
2. Note by all the European Union Member States of the OECD and the European Union: The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

Table A G.4. Unweighted and weighted participation rates (%) for ISCED level 2 teachers

Participating country/economy	Unweighted				Weighted			
	Before replacement	After replacement	Teachers in participating schools	Overall teacher participation	Before replacement	After replacement	Teachers in participating schools	Overall teacher participation
Alberta (Canada)	51.8	62.6	83.0	52.0	48.9	60.3	84.2	50.7
Australia	50.3	76.6	77.7	59.6	48.5	75.1	77.5	58.2
Austria	85.9	88.8	84.4	75.0	85.7	88.6	84.3	74.6
Belgium	85.2	94.2	86.2	81.2	86.0	95.1	86.8	82.6
Flemish Community Belgium)	80.0	91.0	84.4	76.8	80.1	91.0	84.2	76.6
Brazil	85.6	94.9	94.6	89.8	89.9	96.6	94.9	91.6
Bulgaria	97.5	100.0	98.1	98.1	97.1	100.0	98.3	98.3
Ciudad Autónoma de Buenos Aires (Argentina)	81.3	86.7	88.6	76.8	80.7	85.2	89.2	76.0
Chile	80.5	91.8	94.1	86.3	82.6	91.5	94.3	86.2
Colombia	73.9	77.4	93.4	72.3	73.1	77.1	93.5	72.1
Croatia	94.9	95.9	87.0	83.5	95.4	96.2	87.0	83.7
Cyprus[1]	88.9	88.9	90.1	80.1	88.9	88.9	90.1	80.1
Czech Republic	100.0	100.0	93.8	93.8	100.0	100.0	93.8	93.8
Denmark	50.5	71.9	86.8	62.5	51.1	72.0	86.8	62.5
England (United Kingdom)	68.2	77.6	83.1	64.5	72.7	81.5	83.6	68.1
Estonia	88.2	100.0	95.4	95.4	86.6	100.0	95.2	95.2
Finland	100.0	100.0	95.9	95.9	100.0	100.0	96.2	96.2
France	87.9	88.4	87.8	77.6	87.3	87.8	88.1	77.3
Georgia	99.5	99.5	95.8	95.3	99.5	99.5	95.8	95.3
Hungary	94.8	97.9	94.5	92.5	94.9	97.7	95.0	92.8
Iceland	89.7	89.7	75.5	67.7	89.7	89.7	75.5	67.7
Israel	85.3	87.3	84.9	74.2	84.9	86.4	84.9	73.4
Italy	91.7	99.0	93.5	92.5	92.8	99.1	93.8	93.0
Japan	92.4	99.5	99.0	98.5	92.5	99.5	99.0	98.5
Kazakhstan	99.7	100.0	99.7	99.7	100.0	100.0	99.8	99.8
Korea	70.5	81.5	92.2	75.1	69.9	82.5	91.9	75.8
Latvia	79.7	91.2	87.6	79.9	77.1	91.2	87.9	80.2
Lithuania	100.0	100.0	97.4	97.4	100.0	100.0	97.4	97.4

Participating country/economy	Unweighted				Weighted			
	Before replacement	After replacement	Teachers in participating schools	Overall teacher participation	Before replacement	After replacement	Teachers in participating schools	Overall teacher participation
Malta	94.8	94.8	86.5	82.0	92.5	92.5	86.5	80.0
Mexico	90.5	96.5	93.9	90.6	90.4	96.3	94.3	90.8
Netherlands	52.7	79.5	80.5	63.9	56.7	79.5	80.9	64.3
New Zealand	63.4	79.3	79.0	62.6	62.6	79.3	79.6	63.2
Norway	77.0	92.5	82.7	76.5	77.4	92.6	83.2	77.0
Portugal	97.5	100.0	91.9	91.9	97.9	100.0	92.7	92.7
Romania	100.0	100.0	98.3	98.3	100.0	100.0	98.3	98.3
Russian Federation	99.1	100.0	99.8	99.8	98.7	100.0	99.9	99.9
Saudi Arabia	89.9	89.9	85.4	76.8	89.7	89.7	86.0	77.1
Shanghai (China)	100.0	100.0	99.5	99.5	100.0	100.0	99.5	99.5
Singapore	98.2	100.0	99.2	99.2	96.9	100.0	99.1	99.1
Slovak Republic	82.4	88.4	95.0	84.0	82.4	88.9	95.4	84.7
Slovenia	82.7	88.0	91.4	80.5	82.2	88.0	91.5	80.5
South Africa	92.3	92.9	89.7	83.3	92.1	92.4	89.1	82.3
Spain	99.5	100.0	94.6	94.6	99.7	100.0	93.2	93.2
Sweden	90.1	93.8	81.0	76.0	89.1	93.9	81.3	76.3
Chinese Taipei	99.0	99.0	97.2	96.2	98.9	98.9	97.2	96.2
Turkey	99.0	99.0	98.2	97.2	99.0	99.0	98.5	97.5
United Arab Emirates	100.0	100.0	96.0	96.0	100.0	100.0	95.7	95.7
United States	58.4	77.1	89.1	68.7	60.1	76.8	89.6	68.8
Viet Nam	100.0	100.0	96.3	96.3	100.0	100.0	96.1	96.1

1. See notes 1 and 2, Table A G.3.

Table A G.5. Unweighted and weighted participation rates (%) for ISCED level 3 schools and principals

Participating country/ economy	Unweighted		Weighted	
	Before replacement	After replacement	Before replacement	After replacement
Alberta (Canada)	51.8	59.6	47.0	57.8
Brazil	88.0	97.4	91.4	97.5
Croatia	96.7	96.7	96.6	96.6
Denmark	57.6	69.1	58.3	70.8
Portugal	98.0	99.5	97.2	99.4
Slovenia	69.6	69.6	69.6	69.6
Sweden	91.4	94.1	91.6	93.8
Chinese Taipei	100.0	100.0	100.0	100.0
Turkey	98.0	98.0	97.4	97.4
United Arab Emirates	89.7	89.7	89.7	89.7
Viet Nam	100.0	100.0	100.0	100.0

Table A G.6. Unweighted and weighted participation rates (%) for ISCED level 3 teachers

Participating country/economy	Unweighted				Weighted			
	Before replacement	After replacement	Teachers in participating schools	Overall teacher participation	Before replacement	After replacement	Teachers in participating schools	Overall teacher participation
Alberta (Canada)	49.7	58.0	79.6	46.2	51.6	56.6	80.2	45.4
Brazil	87.0	96.9	94.2	91.3	92.2	97.4	94.5	92.0
Croatia	98.0	98.0	89.5	87.7	97.9	97.9	89.7	87.9
Denmark	65.5	79.9	85.7	68.5	72.2	85.6	84.7	72.4
Portugal	98.0	99.5	91.2	90.7	99.0	99.7	91.3	91.0
Slovenia	80.4	80.4	87.8	70.6	80.4	80.4	87.7	70.5
Sweden	94.6	97.8	80.8	79.1	95.3	97.8	81.7	79.9
Chinese Taipei	98.0	98.0	95.9	94.0	98.1	98.1	95.8	94.1
Turkey	100.0	100.0	97.7	97.7	100.0	100.0	98.0	98.0
United Arab Emirates	99.3	99.3	95.7	95.0	99.0	99.0	95.4	94.5
Viet Nam	100.0	100.0	97.5	97.5	100.0	100.0	97.7	97.7

Table A G.7. Unweighted and weighted participation rates (%) for TALIS-PISA link schools and principals

Participating country/ economy	Unweighted		Weighted	
	Before replacement	After replacement	Before replacement	After replacement
Australia	66.9	88.5	67.7	88.2
Ciudad Autónoma de Buenos Aires (Argentina)	88.9	95.1	88.9	95.1
Colombia	91.4	94.4	85.5	90.4
Czech Republic	89.6	89.6	90.0	90.0
Denmark	52.7	55.3	52.0	57.8
Georgia	86.1	86.1	85.5	85.5
Malta	94.0	94.0	94.0	94.0
Turkey	96.6	96.6	97.8	97.8
Viet Nam	100.0	100.0	100.0	100.0

Table A G.8. Unweighted and weighted participation rates (%) for TALIS-PISA link teachers

Participating country/economy	Unweighted				Weighted			
	Before replacement	After replacement	Teachers in participating schools	Overall teacher participation	Before replacement	After replacement	Teachers in participating schools	Overall teacher participation
Australia	66.9	88.5	92.5	81.9	65.6	88.8	93.4	82.9
Ciudad Autónoma de Buenos Aires (Argentina)	87.7	90.1	85.1	76.7	86.5	88.8	84.4	74.9
Colombia	91.4	95.1	94.6	89.9	90.4	93.9	95.1	89.3
Czech Republic	100.0	100.0	93.2	93.2	100.0	100.0	94.8	94.8
Denmark	63.3	66.7	82.4	54.9	65.8	70.0	85.9	60.2
Georgia	91.7	91.7	94.0	86.2	93.1	93.1	94.3	87.8
Malta	88.0	88.0	88.6	78.0	86.7	86.7	88.6	76.8
Turkey	96.6	96.6	99.4	96.0	97.9	97.9	99.6	97.5
Viet Nam	99.1	99.1	98.5	97.7	99.3	99.3	98.4	97.7

Annex H. Questionnaires

You can find the TALIS 2018 questionnaires on line at:
http://www.oecd.org/education/school/talis2018questionnaires.htm

Annex I. Construction and validation of scales and indices

Table A I.1. Descriptive statistics of the scaled scores (based on all populations, unweighted)

	Mean	Standard deviation	Lowest score	Highest score
	Principal scales			
T3PACAD	12.12	2.04	0.23	17.06
T3PCOM	10.80	2.15	3.17	16.92
T3PDELI	6.97	2.02	2.28	20.32
T3PDIVB	13.11	1.95	3.64	14.83
T3PJOBSA	13.45	1.95	2.10	17.41
T3PJSENV	13.54	1.98	0.89	16.92
T3PJSPRO	12.04	1.88	2.32	12.04
T3PLACSN	9.38	2.09	4.04	17.36
T3PLEADP	11.99	2.05	0.59	18.11
T3PLEADS	11.23	2.05	3.88	18.36
T3PORGIN	12.45	2.07	0.86	17.66
T3PWLOAD	9.87	1.96	2.50	16.11
	Teacher scales			
T3CLAIN	12.33	1.99	1.48	16.85
T3CLASM	10.92	1.96	-0.24	15.48
T3COGAC	9.95	2.08	1.71	17.18
T3COLES	9.20	2.16	3.09	17.97
T3COOP	9.97	2.10	2.23	17.89
T3DISC	8.73	2.00	4.21	15.67
T3DIVP	10.68	2.06	4.08	16.55
T3EFFPD	12.41	2.36	5.52	18.72
T3EXCH	10.98	2.04	2.09	16.33
T3JOBSA	12.11	2.03	3.27	16.55
T3JSENV	12.02	2.07	3.11	16.21
T3JSPRO	11.48	2.01	4.10	15.37
T3PDBAR	9.24	2.03	2.57	17.99
T3PDIV	9.93	2.03	4.17	15.04
T3PDPED	9.47	2.01	1.57	16.31
T3PERUT	10.78	1.97	3.60	16.43
T3SATAT	12.73	2.03	2.08	16.08
T3SECLS	12.68	1.99	2.86	17.47
T3SEENG	11.97	1.97	1.53	18.38
T3SEFE	11.23	1.99	2.58	17.87
T3SEINS	12.63	2.01	1.87	18.60

	Mean	Standard deviation	Lowest score	Highest score
T3SELF	12.73	2.01	0.67	19.45
T3SOCUT	12.23	1.94	1.77	16.13
T3STAKE	11.24	2.08	2.90	16.52
T3STBEH	9.15	1.98	4.08	16.06
T3STUD	13.32	2.07	1.74	17.38
T3TEAM	11.58	2.08	4.94	15.03
T3TPRA	11.43	2.03	-0.60	18.25
T3VALP	8.62	2.05	2.49	17.26
T3WELS	9.36	2.03	4.23	16.54
T3WLOAD	9.20	2.06	3.40	16.38

Note: Participating countries/economies with untrustworthy scale scores were exclude from these averages.
Source: OECD, TALIS 2018 database.

Table A I.2. Country-specific invariance levels across ISCED levels within countries that participated in more than one ISCED level: Principal scales

Participating country/economy	T3PACAD	T3PCOM	T3PDELI	T3PDIVB	T3PLACSN	T3PLEADP	T3PLEADS	T3PORGIN	T3PWLOAD	T3PJOBSA	T3PJSENV	T3PJSPRO
Alberta (Canada)[1]	Metric	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar
Flemish Community (Belgium)[1]	Scalar	Scalar	Metric	Scalar	Scalar	Metric	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar
Brazil[2]	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar
Ciudad Autónoma de Buenos Aires (Argentina)[2]	Scalar	Scalar	Metric	Scalar	Metric	Metric	Scalar	Scalar	Metric	Configural	Scalar	Configural
Croatia[2]	Scalar	Metric	Metric	Scalar	Metric	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar
Denmark	Scalar	-	Metric	Scalar	Scalar	Metric	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar
England (United Kingdom)[1]	Scalar	Scalar	Metric	Scalar	Metric	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar
France[1]	Metric	Metric	Configural	Scalar	Scalar	Metric	Metric	Scalar	Metric	Metric	Metric	Scalar
Japan[1]	Scalar	Metric	Metric	Scalar	Scalar	Metric	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar
Korea[1]	Scalar	Scalar	Metric	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Metric	Metric	Scalar
Portugal[2]	Scalar	Metric	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar
Slovenia[2]	Scalar	Metric	Metric	Scalar	Scalar	Metric	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar
Spain[1]	Scalar	Metric	Metric	Scalar	Metric	Metric	Scalar	Scalar	Scalar	Metric	Metric	Scalar
Sweden	Scalar	-	Metric	Scalar	Scalar	Metric	Scalar	Scalar	-	Scalar	Scalar*	Scalar
Chinese Taipei	Scalar	Metric	Configural	Scalar	Metric	Metric	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar
Turkey	Scalar	Metric	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar
United Arab Emirates	Scalar	Scalar	Configural	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar
Viet Nam	Scalar	Metric	Configural	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar

1. Country/economy participated in ISCED levels 1 and 2.
2. Country/economy participated in ISCED levels 2 and 3.
All participating countries/economies that do not have a note participated in ISCED levels 1, 2 and 3.
* The ISCED 3 population for Sweden was not included in the measurement invariance testing for this scale.
Note: A dash (-) indicates that the country/economy was excluded from the scale due to model non-convergence in the evaluation steps.
Source: OECD, TALIS 2018 database.

Table A I.3. Country-specific invariance levels across ISCED levels within countries that participated in more than one ISCED level: Teacher scales

Participating countries/economies	T3DISC	T3DIVP	T3EFFPD	T3PDBAR	T3PDIV	T3PDPED	T3PERUT	T3SECLS	T3SATAT	T3SOCUT	T3STAKE	T3STBEH	T3STUD	T3COOP	T3EXCH	T3COLES
Alberta (Canada)[1]	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Metric	Scalar	Metric
Flemish Community (Belgium) [1]	Metric	Scalar	Scalar	Metric	Scalar	Scalar	Scalar	Scalar	Metric	Scalar	Metric	Scalar	Metric	Metric	Scalar	Metric
Brazil[2]	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar
Ciudad Autónoma de Buenos Aires (Argentina)[2]	Scalar	Scalar	Scalar	Metric	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar
Croatia[2]	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Metric	Scalar	Metric
Denmark	Metric	Scalar	Scalar	Metric	Metric	Metric	Scalar	Metric	Metric	Metric	Metric	Scalar	Metric	Metric	Metric	Metric
England (United Kingdom)[1]	Scalar	Scalar	Scalar	Scalar	Metric	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Metric	Scalar	Metric	Scalar	Metric
France[1]	Metric	Scalar	Scalar	Metric	Scalar	Scalar	Scalar	Scalar	Metric	Scalar	Metric	Metric	Metric	Metric	Scalar	Metric
Japan[1]	Metric	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Metric	Scalar	Metric
Korea[1]	Metric	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Metric	Scalar	Scalar	Metric	Scalar	Metric	Metric	Metric
Portugal[2]	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Metric	Scalar	Scalar	Scalar	Scalar
Slovenia[2]	Scalar	Scalar	Scalar	Metric	Scalar	Metric	Metric	Scalar	Scalar	Scalar	Metric	Metric	Scalar	Metric	Scalar	Metric
Spain[1]	Metric	Scalar	Scalar	Metric	Scalar	Scalar	Scalar	Scalar	Metric	Metric	Scalar	Metric	Scalar	Metric	Metric	Scalar
Sweden	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Metric	Metric	Scalar	Metric	Metric	Scalar	Metric
Chinese Taipei	Metric	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Metric	Scalar	Scalar	Scalar	Scalar	Scalar
Turkey	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Metric	Metric	Scalar
United Arab Emirates	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar
Viet Nam	Scalar	Scalar	Scalar	Scalar	Metric	Scalar	Scalar	Scalar	Metric	Scalar	Scalar	Metric	Scalar	Metric	Scalar	Metric

1. Participating country/economy participated in ISCED levels 1 and 2.
2. Participating country/economy participated in ISCED levels 2 and 3.
All participating countries/economies that do not have a note participated in ISCED levels 1, 2 and 3.
Source: OECD, TALIS 2018 database.

Table A I.4. Country-specific invariance levels across ISCED levels within countries that participated in more than one ISCED level (teacher scales continued)

Participating countries/economies	T3TEAM	T3VALP	T3WELS	T3WLOAD	T3SELF	T3SEENG	T3SEFE	T3SEINS	T3TPRA	T3CLAIN	T3CLASM	T3COGAC	T3JOBSA	T3JSENV	T3JSPRO
Alberta (Canada)[1]	Scalar	Metric	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar
Flemish Community (Belgium) [1]	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Metric	Metric	Scalar	Metric	Scalar	Scalar	Scalar
Brazil[2]	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar
Ciudad Autónoma de Buenos Aires (Argentina)[2]	Scalar	Scalar	Scalar	Metric	Metric	Metric	Scalar	Scalar	Metric	Metric	Metric	Metric	Scalar	Scalar	Scalar
Croatia[2]	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar
Denmark	Scalar	Scalar	Scalar	Metric	Metric	Metric	Metric	Metric	Metric	Metric	Metric	Metric	Scalar	Scalar	Scalar
England (United Kingdom)[1]	Scalar	Scalar	Scalar	Metric	Metric	Metric	Metric	Scalar	Metric	Scalar	Metric	Metric	Scalar	Scalar	Scalar
France[1]	Scalar	Scalar	Scalar	Metric	Metric	Metric	Scalar	Metric	Metric	Scalar	Metric	Metric	Scalar	Scalar	Scalar
Japan[1]	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Metric	Metric	Metric	Metric	Scalar	Scalar	Scalar
Korea[1]	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Metric	Metric	Metric	Metric	Scalar	Scalar	Scalar
Portugal[2]	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Metric	Scalar	Metric	Scalar	Scalar	Scalar	Scalar
Slovenia[2]	Scalar	Scalar	Scalar	Metric	Scalar	Scalar	Scalar	Scalar	Metric	Metric	Scalar	Scalar	Scalar	Scalar	Scalar
Spain[1]	Scalar	Scalar	Scalar	Scalar	Metric	Metric	Scalar	Scalar	Metric	Scalar	Scalar	Metric	Scalar	Scalar	Scalar
Sweden	Scalar	Scalar	Scalar	Metric	Metric	Metric	Metric	Scalar	Metric	Metric	Scalar	Metric	Scalar	Scalar	Scalar
Chinese Taipei	Scalar	Scalar	Scalar	Metric	Scalar	Scalar	Scalar	Scalar	Metric	Scalar	Scalar	Metric	Scalar	Scalar	Scalar
Turkey	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar
United Arab Emirates	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar	Scalar
Viet Nam	Scalar	Scalar	Scalar	Scalar	Metric	Scalar	Metric	Scalar	Metric	Scalar	Scalar	Metric	Scalar	Scalar	Scalar

1. Participating country/economy participated in ISCED levels 1 and 2.
2. Participating country/economy participated in ISCED levels 2 and 3.
All participating countries/economies that do not have a note participated in ISCED levels 1, 2 and 3.
Source: OECD, TALIS 2018 database.

Annex J. Table production and verification, analyses

Recoded variables that are part of the TALIS 2018 public data set

Variable name	STRATIO		
Description	Student-teacher ratio		
Procedure	Multivariable recode		
Missing values	Missing if at least one variable is missing.		
Source	What is the current school enrolment, i.e. the number of students of all grades/ages in this school?	TC3G16	Recoding TC3G16/TC3G13A
	For each type of position listed below, please indicate the number of staff (headcount) currently working in this school.	TC3G13A	

Variable name	TPRATIO		
Description	Teacher-pedagogical support personnel ratio		
Procedure	Multivariable recode		
Missing values	Missing if at least one variable is missing.		
Source	For each type of position listed below, please indicate the number of staff (headcount) currently working in this school.	TC3G13A, TC3G13B	Recoding TC3G13A/TC3G13B **Please note**: if TC3G13B=0, TPRATIO is set to equal TC3G13A.

Variable name	TARATIO		
Description	Teacher-administrative or management personnel ratio		
Procedure	Multivariable recode		
Missing values	Missing if at least one variable is missing.		
Source	For each type of position listed below, please indicate the number of staff (headcount) currently working in this school.	TC3G13A, TC3G13C, TC3G13D	Recoding TC3G13A/(TC3G13C+TC3G13D)

Variable name	TARATIO		
Description	Teacher-administrative or management personnel ratio		
Procedure	Multivariable recode		
Missing values	Missing if at least one variable is missing.		
Source	For each type of position listed below, please indicate the number of staff (headcount) currently working in this school.	TC3G13A, TC3G13C, TC3G13D	Recoding TC3G13A/(TC3G13C+TC3G13D)

Variable name	SCHLOC		
Description	School location		
Procedure	Simple recode		
Source	Which best describes this school's location?	TC3G10 1 = [A village, hamlet or rural area] (up to 3,000 people) 2 = [Small town] (3,001 to 15,000 people) 3 = [Town] (15,001 to 100,000 people) 4 = [City] (100,001 to 1,000,000 people) 5 = [Large city] (more than 1,000,000 people)	Recoding 1 = Rural (up to 3,000 people) 2 = Town (3,001 to 100,000 people) 3 = City (more than 100,000 people)

Variable name	TCHAGEGR		
Description	Teacher age groups		
Procedure	Simple recode		
Source	How old are you?	TT3G02	Recoding 1 = Under 25 2 = 25-29 3 = 30-39 4 = 40-49 5 = 50-59 6 = 60 and above

Variable name	PRAGEGR		
Description	Principal age groups		
Procedure	Simple recode		
Source	How old are you?	TC3G02	Recoding 1 = Under 40 2 = 40-49 3 = 50-59 4 = 60 and above

Variable name	NENRSTUD		
Description	Number of enrolled students		
Procedure	Simple recode		
Source	What is the current school enrolment, i.e. the number of students of all grades/ages in this school?	TC3G16	Recoding 1 = Under 250 2 = 250-499 3 = 500-749 4 = 750-999 5 = 1,000 and above

Recoded variables that are not part of the TALIS 2018 public data set

Variable name	TT3G03_r1		
Description	Highest level of formal education		
Procedure	Simple recode		
Source	What is the highest level of formal education you have completed?	TT3G03 1 = Below <ISCED 2011 Level 3> 2 = <ISCED 2011 Level 3> 3 = <ISCED 2011 Level 4> 4 = <ISCED 2011 Level 5> 5 = <ISCED 2011 Level 6> 6 = <ISCED 2011 Level 7> 7 = <ISCED 2011 Level 8>[1]	Recoding 1 = Below ISCED Level 5 2 = ISCED Level 5 3 = ISCED Levels 6 and 7 4 = ISCED Level 8

Variable name	TT2G10_r1 (TALIS 2013)		
Description	Highest level of formal education		
Procedure	Simple recode		
Source	What is the highest level of formal education you have completed?	TT2G10 (TALIS 2013) 1 = <Below ISCED Level 5> 2 = <ISCED Level 5B> 3 = <ISCED Level 5A> 4 = <ISCED Level 6>[1]	Recoding 1 = Below ISCED Level 5 2 = ISCED Level 5 3 = ISCED Levels 6 and 7 4 = ISCED Level 8

Variable name	BTG07_r1 (TALIS 2008)		
Description	Highest level of formal education		
Procedure	Simple recode		
Source	What is the highest level of formal education that you have completed?	BTG07 (TALIS 2008) 1 = <Below ISCED Level 5> 2 = <ISCED Level 5B> 3 = <ISCED Level 5A Bachelor's degree> 4 = <ISCED Level 5A Master's degree> 5 = <ISCED Level 6>[1]	Recoding 1 = Below ISCED Level 5 2 = ISCED Level 5 3 = ISCED Levels 6 and 7 4 = ISCED Level 8

Variable name	TC3G03_r1		
Description	Highest level of formal education		
Procedure	Simple recode		
Source	What is the highest level of formal education you have completed?	TC3G03 1 = Below <ISCED 2011 Level 3> 2 = <ISCED 2011 Level 3> 3 = <ISCED 2011 Level 4> 4 = <ISCED 2011 Level 5> 5 = <ISCED 2011 Level 6> 6 = <ISCED 2011 Level 7> 7 = <ISCED 2011 Level 8>[1]	Recoding 1 = Below ISCED Level 5 2 = ISCED Level 5 3 = ISCED Levels 6 and 7 4 = ISCED Level 8

Variable name	TC2G03_r1 (TALIS 2013)		
Description	Highest level of formal education		
Procedure	Simple recode		
Source	What is the highest level of formal education you have completed?	TC2G03 (TALIS 2013) 1 = <Below ISCED Level 5> 2 = <ISCED Level 5B> 3 = <ISCED Level 5A> 4 = <ISCED Level 6>[1]	Recoding 1 = Below ISCED Level 5 2 = ISCED Level 5 3 = ISCED Levels 6 and 7 4 = ISCED Level 8

Variable name	BCG04_r1 (TALIS 2008)		
Description	Highest level of formal education		
Procedure	Simple recode		
Source	What is the highest level of formal education that you have completed?	BCG04 (TALIS 2008) 1 = <Below ISCED Level 5> 2 = <ISCED Level 5B> 3 = <ISCED Level 5A Bachelor's degree> 4 = <ISCED Level 5A Master's degree> 5 = <ISCED Level 6>[1]	Recoding 1 = Below ISCED Level 5 2 = ISCED Level 5 3 = ISCED Levels 6 and 7 4 = ISCED Level 8

Variable name	TT3G19A2B2_mulvar_r1		
Description	No induction activities (formal and informal) at this school		
Procedure	Multivariable recode		
Missing values	Missing if at least one variable is missing.		
Source	Did you take part in any induction activities?	TT3G19A2 = I took part in a formal induction programme. Yes, at this school. 1 = Checked 2 = Not checked TT3G19B2 = I took part in informal induction activities. Yes, at this school. 1 = Checked 2 = Not checked	Recoding 1 = No induction at this school (if TT3G19A2 = 2 AND TT3G19B2 = 2) 0 = Other

Variable name	TT3G19A1B1_mulvar_r1		
Description	No induction during my first employment		
Procedure	Multivariable recode		
Missing values	Missing if at least one variable is missing.		
Source	Did you take part in any induction activities?	TT3G19A1 = I took part in a formal induction programme. Yes, during my first employment. 1 = Checked 2 = Not checked TT3G19B1 = I took part in informal induction activities. Yes, during my first employment. 1 = Checked 2 = Not checked	Recoding 1 = No induction during my first employment (if TT3G19A1 = 2 AND TT3G19B1 = 2) 0 = Other

Variable name	TT3G22AJ_mulvar_r1		
Description	Participation in professional development activities		
Procedure	Multivariable recode		
Missing values	Missing if all variables are missing.		
Source	During the last 12 months, did you participate in any of the following professional development activities?	TT3G22A, TT3G22B, TT3G22C, ..., TT3G22J 1 = Yes 2 = No	Recoding 1 = Yes 0 = No

Variable name	TT3G56AE_mulvar_r1		
Description	Teachers who have been abroad only as part of their teacher education		
Procedure	Multivariable recode		
Missing values	Missing if at least one variable is missing. Not administered does not count as missing; it counts only if all variables are not administered.		
Source	Have you ever been abroad for professional purposes in your career as a teacher or during your teacher <education or training>?	TT3G56A, TT3G56B, TT3G56C, TT3G56D and TT3G56E 1 = Yes 2 = No	Recoding 1 = Yes (if TT3G56A = 1 AND TT3G56B = 2 AND TT3G56C = 2 AND TT3G56D = 2 AND TT3G56E = 2) 0 = No

Variable name	TC3G21_mulvar_r1		
Description	Administrative tasks and meetings and leadership tasks and meetings		
Procedure	Multivariable recode		
Missing values	Missing if at least one variable is missing.		
Source	On average throughout the school year, what percentage of time in your role as a principal do you spend on the following tasks in this school?	TC3G21A = _____ % administrative tasks and meetings TC3G21B = _____% leadership tasks and meetings	Recoding TC3G21A+TC3G21B

Variable name	TC3G07AJ_mulvar_r1		
Description	Participation in professional development activities		
Procedure	Multivariable recode		
Missing values	Missing if all variables are missing.		
Source	During the last 12 months, did you participate in any of the following professional development activities aimed at you as a principal?	TC3G07A, TC3G07B, TC3G07C, ..., and TC3G07J 1 = Yes 2 = No	Recoding 1 = Yes 0 = No

Variable name	TT3G47TC3G38_mulvar_r1		
Description	Indicator of data records with no logically not applicable codes for either TT3G47 or TC3G38		
Procedure	Multivariable recode		
Missing values	Records only included if TT3G47 (teacher data) and TC3G38 (principal data) have data records with no logically not applicable cases.		
Source	Does this school include students of more than one cultural or ethnic background?	TT3G47 and TC3G38 1 = Yes 2 = No 6 = Not applicable 7 = Not reached 8 = Not administered 9 = Omitted or invalid	Recoding 0 = Record not included 1 = Record included

Note

[1] ISCED code 1997 level 5 was split into level 5 (short tertiary), 6 (tertiary, bachelor's), 7 (tertiary, master's) in ISCED code 2011. Therefore, ISCED code 1997 level 6 became ISCED code 2011 level 8 (doctoral or equivalent): http://uis.unesco.org/sites/default/files/documents/international-standard-classification-of-education-isced-2011-en.pdf (UNESCO-UIS, 2012[1]).

References

UNESCO-UIS (2012), *International Standard Classification of Education (ISCED) 2011*, UNESCO Institute for Statistics, Montreal, http://uis.unesco.org/sites/default/files/documents/international-standard-classification-of-education-isced-2011-en.pdf. [1]

TALIS 2018 Technical Report

The Teaching and Learning International Survey (TALIS) asks teachers and school leaders about working conditions and learning environments at their schools to help countries face diverse challenges. This technical report details the steps, procedures, methodologies, standards and rules that the TALIS 2018 cycle used to collect high-quality data. The primary purpose of the report is to support readers of the international and subsequent thematic reports, as well as users of the public international database when interpreting results, contextualising information and using the data.

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Further information about TALIS project can be found at: http://www.oecd.org/education/talis/