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World Education Reform Database (WERD): A Global Dataset on Education Reforms, version 3*

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Abstract. This paper presents a database that is the most comprehensive cross-national, longitudinal compilation of education reforms currently available. The World Education Reform Database (WERD) includes 14,375 reforms from 216 countries and territories. Close to 80 percent of the reforms started in the years ranging from 1970 to 2021. Reforms are drawn from reports to the Organization for Economic Cooperation and Development (OECD), World Bank, and UNESCO, as well as publications produced by country experts. The data are available at the reform level and include the year and country of each reform, plus a title and brief description. We describe the methods used to construct the data and provide a demonstration analysis that shows a positive association between reforms intended to improve access to education and primary enrollment growth rate.

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Documenting Education Reform Around the World

Education is a centerpiece of contemporary world development. Scholars and practitioners alike view schooling as a tool for improving lives, and for enhancing the health of entire economies and societies. However, school systems rarely function optimally, and even good ones need to adapt as times change. To help education make good on its potential, countries pursue an array of education reforms. Sometimes these reforms result in great success. For instance, one study shows a link between inclusive education laws in Uganda and the likelihood of attending school for children with learning differences (Bose & Heymann, 2020). Another suggests tuition-free primary policies are associated with lower infant mortality in low-income countries (Quamruzzaman et al., 2014). However, reforms are just as often decried as expensive failures, wasting resources and upending lives, especially for vulnerable students and families (Sarason, 1990). Scholars have argued that reforms routinely fail to yield the intended outcomes (Brunsson, 2009), that the same reforms return again and again (Cuban, 1990), and that reform is mainly driven by the interests of political elites (Campbell, 1982). In some countries, the education reforms undertaken by international development projects are massive sources of corruption (Ferry et al., 2020). In addition, successful interventions in one country may not be transferrable; we need cross-national data to understand the contextual factors that support successful reform efforts. A central challenge to understanding whether there are patterned causes and consequences of education reform is a lack of large-scale data. This paper introduces a cross-national, longitudinal database of education reforms that represents the most systematic and comprehensive list of educational improvement efforts currently available.

The World Education Reform Database (WERD), available at https://werd.stanford.edu/, comparably operationalizes the concept of education reform across long periods of time and many countries. It reports levels of reform with substantial temporal and geographic scope, covering mainly the period ranging from 1970 to 2021 in 189 countries. The data is available at the reform level, with 14,375 reforms identified by country and year, as well as with a title and brief description. Individual reforms are drawn from 1,389 sources; largely reports submitted to international organizations or compiled by country experts about each nation-state.

In what follows, we define the concept of education reform used to construct the database. Next, we describe the strengths and weaknesses of existing data and how WERD adds to the available data. We proceed to discuss the construction of the database, spelling out the steps used to construct a reliable list of reforms. The final section demonstrates an application of our measure of education reform by exploring the association between reform and the expansion of primary enrollment. We conclude by reflecting on areas for future research, such as the possibility for researchers to create more tailored measures by coding the reform descriptions, and we outline planned expansions of the database.

Conceptual Definition of Reform

Reforms in WERD capture publicly stated goals about how governments should enact change in education systems. The data are not direct observations of implementation. The distinction between the discursive nature of reform and implementation is central to our view, which assumes that the relationships between reform rhetoric, implementation, and outcomes are complex (Meyer & Rowan, 1977). Reform discourse reveals the educational problems thought to be most salient as well as the solutions that are perceived as legitimate, shedding light on beliefs about the role of education in a society. In addition, the discursive foundations of reform provide the starting point for studying implementation and effects. All reform efforts contain a discursive dimension, but only some are implemented in part or in full. Of those that are implemented, only some achieve their goals. Even reforms that are enacted with perfect fidelity can fail to achieve their intended effects if the underlying theory of change is wrong, and results can be multiple and unintended (Bromley & Powell, 2012). Overall, distinct factors shape reform discourse, implementation, and outcomes, and these should be treated as independent processes in research.

We follow a tri-partite definition of reform as proposed change that is: (a) systemic, (b) non-routine, and (c) planned or purposeful (Cuban, 1990; Brunsson, 2009; Bromley et al., 2021). We focus on *systemic* reforms that envision a supra-school administrative level and aim to impact the wider education system, rather than small projects that target individual schools. In rare cases, this can include something like establishing a single institution if it is depicted as representing a broader system, such as founding a national university. More often, reforms take place across school districts, provinces, or entire countries. Reforms are also intended to be *non-routine* changes, which are different from predictable adjustments such as annual budget planning. Education reforms articulate a new direction or vision in the hopes of solving an issue; they are future- and change-oriented. For instance, the Czech Republic reports an education reform from 1992, which alters the methods by which the central government allocates its budget to individual schools (UNESCO, 2006). While an annual budget review is a routine bureaucratic step (i.e. a non-reform), the government's intention to change the budget allocation process counts as a reform. Finally, reforms are also *planned* in the sense that they are purposeful actions and goals, rather than unintentional changes like an influx of a new population or natural disasters. For example, immediate humanitarian response efforts to an unexpected surge of migrants and refugees would not be a planned change, but a country's intention to establish a special task force to respond to the educational needs of refugee children in the future would be considered a reform (OECD, 2016). Overall, reform is distinct from other kinds of changes, such as demographic shifts or wider economic, social, and political developments in society.

Within the concept of reform, there is great variation in scope and scale. Hall (1993) usefully spells out a spectrum including first order policy change (features of incrementalism), second order change (more broadly strategic), and third order change (paradigm shift). Further, reforms can take many forms, including education legislation (e.g., acts, laws, decrees), and other important policy shifts (e.g., new national strategic plans, initiatives, guidelines, standards), or

the creation of new educational organizational structures that are part of the government (e.g., new research boards, ministries, departments).

Existing Cross-National Education Reform Databases

We began our work with a survey of existing cross-national sources of education reforms. The predominant empirical approach is to focus on country or regional case studies, sometimes investigating a specific reform or period (e.g. Ball, 1994 for the United Kingdom; Navarro et al., 1999 for Latin America; Fiske & Ladd, 2004 for South Africa; Silova & Steiner-Khamsi, 2008 for Central Asia; Mondiale, 2008 for the Middle East). These focused studies provide valuable in-depth information on specific instances, but they preclude the ability to shed light on worldwide trends.

Especially since the 1990s, education systems have globalized (Mundy et al., 2016), amplifying the importance of worldwide data. Systematic cross-national data enables scholars to leverage comparative differences for more stringent quantitative tests of the causes and consequences of education reform. Beyond case studies, there are several new and notable efforts to produce cross-national quantitative data that complement the WERD approach. These new datasets are discussed in detail in Del Río et al. (2024), but in brief, recent advancements in data include the following:

- Education Policies and Systems Across Modern History (EPSM) includes a pre-specified set of measures on compulsory education, ideological guidance and content of education, governmental intervention and level of education centralization, and teacher training (Del Río et al., 2024). EPSM covers 157 countries and extends from 1789 to the present.
- The Varieties of Indoctrination (V-Indoc) dataset (Neundorf et al., 2023) covers 160 countries and extends from 1945 to 2021, including measures on education system's indoctrination potential and content, centralized control over the system, and politicization of the curriculum. This dataset mainly aims at capturing practices on the ground (e.g., in the classroom). V-Indoc therefore uses country experts to gauge how indoctrination and political control over the education system operate in practice.
- Paglayan (2021) codes a fixed set of education variables across 33 European and Latin American countries roughly over the period of 1820 to 2010. These indicators cover "the year when central governments began to (i) fund primary schools, (ii) manage them, (iii) establish a mandatory curriculum for all primary schools, (iv) establish certification requirements for primary school teachers, (v) train prospective teachers, (vi) mandate local authorities to provide universal access to schooling, (vii) mandate free provision for the poor, and (viii) establish compulsory primary education" (Paglayan, 2021, 186).

We discuss the features of three additional of the earliest efforts below and identify areas in which our database builds on extant sources. All these approaches, including our own, follow the

strategy of using publicly available documents as the primary source of information about reported reforms. As such, the data share the feature of capturing the discursive dimension of reform.

Database 1. OECD's Education Policy Outlook Reforms Finder

The OECD's Education Policy Outlook Reforms Finder database provides a list of 1,593 reforms from 38 countries (as of March 2022).[1] The database relies mainly on an OECD publication called *Education Policy Outlook* for its information and draws, to a lesser extent, on two comparative reports from 2015 and 2018 as well as the country profiles. For each reform, we learn the year a reform was introduced, such as the "Australian Professional Standards for Principals" in 2011. The earliest reform is from 1950, but 98 percent of reforms are from 2000 or later – there are just a handful of pre-1990 reforms. These reforms are also grouped by target (institutions, student, or system), International Standard Classification of Education level, and 19 mutually exclusive themes.[2] In an impressively wide array of possible reforms, the database shows that most policy changes relate to curriculum or teachers. The OECD does not provide details about the methodology used to code the reports to obtain the list of reforms or classify them into themes, such as whether inter-rater reliability checks were used.

Overall, the database's key strengths are that it captures a wide array of reforms and provides some longitudinal information. The key limitations are that the reforms are drawn from a limited selection of documents for a limited set of countries, and there is little information about how reforms are identified, extracted from the documents, and coded.

Database 2. WORLD Policy Analysis Center at UCLA's Fielding School of Public Health

The WORLD Policy Analysis Center provides data for all 193 UN member states in a range of areas, including education, health, environment, adult labor and working conditions, child labor, poverty, equal rights and discrimination, childhood, gender, marriage, families, aging, and

[1] The 38 countries are: Australia, Austria, Belgium, Brazil, Canada, Chile, Colombia, Costa Rica, Czech Republic, Denmark, Estonia, Finland, France. Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Kazakhstan, Korea, Latvia, Lithuania, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Turkey, United Kingdom.

[2] The 19 themes of reform are: Curriculum, qualifications or standards; Disadvantaged students; Economic resources in education; Investing in early childhood education; Learning environments; Organisation of decision-making process; Quality at all levels; Quality of primary to secondary; Quality of secondary; Quality of tertiary; School evaluation; School leadership; Student assessment; Students from specific populations; System evaluation; System-level policies; Teachers; Transition between school and work; Vocational education and training.

disability. The approach is to report countries' status on a fixed set of policies that are determined in advance, rather than surveying a range of possible education reforms as done by the OECD database. The WORLD Policy Analysis Center's education data covers four areas with 32 distinct variables.[3] The data are cross-sectional, meaning each country receives a score on each variable and the score does not vary over time. For example, we learn whether a country does or does not have a policy for free primary education, but we do not learn in what year the policy was introduced.

Information about education policies comes from a relatively wide variety of sources. Constitutional indicators reflect national constitutional text in force as of May 2017. Legislation and statutory protections extended to public education in education acts, child protection legislation, and anti-discrimination legislation as of June 2018 were identified primarily using the United Nations Educational, Scientific and Cultural Organization (UNESCO)'s Observatory on the Right to Education and the International Labour Organization's NATLEX database. Other measures of access and quality thought to capture a country's status as of June 2014; these variables are coded primarily from the UNESCO International Bureau of Education (IBE) reports (fifth (2003), sixth (2006/2007), and seventh editions (2010/2011) including all reports available as of June 2014; 48th International Conference on Education reports; and Planipolis. And, when needed, these were supplemented with the Millennium Development Goals Reports (2003-2010), the Education for All Mid-Decade Assessment Reports (available through Planipolis), and Eurydice – Network on education systems and policies in Europe.

The coding process for obtaining information from the documents is transparently described. Two researchers coded the documents, and differences were manually compared and discussed. The decision rules to guide coders are available in a codebook and were consistently applied. Although we do not have information about any formal checks for inter-rater reliability, the process maps well onto best-practices for content analysis and we used many of these procedures in our work as well. For example, whenever possible, coding is done in the original language of the document by team members fluent in that language.

Overall, the database's key strengths are its global coverage of all 193 UN members and its systematic data collection process for a set of important variables. The main limitations are that it lacks longitudinal information on education reforms and focuses on a limited set of indicators that exclude many types of education reforms.

Database 3. Braga, Checchi and Meschi 2013

[3] The 32 variables in the UCLA World Policy Analysis database are: a) whether primary and secondary education are compulsory and compulsory (13 variables), b) whether free primary, secondary, and higher education are guaranteed by the constitution (8 variables), c) how much education teachers must complete to teach in primary and secondary education (3 variables), and d) constitutional educational rights in general, and specifically for those with disabilities, linguistic minorities, and non-citizens (8 variables).

Parallel to the WORLD Policy Analysis Center's approach, these authors started with a pre-determined set of reforms on which they looked to collect information. They report on 18 policy features from 24 European countries annually from 1929 to 2000.[4,5] The paper provides a detailed listing of the sources used to gather information but does not provide information about the coding process. Information comes from: Eurybase, United Nations Educational, Scientific and Cultural Organization (UNESCO) country reports, OECD Education at a Glance, country specific documents, as well as direct contact with national experts.

Overall, the database's key strengths are its coverage over time and its systematic data collection process for a set of important variables. The main drawbacks are that it covers a limited number of countries, focuses on a pre-determined set of indicators that exclude many possible education reforms, and provides little information about how reforms were extracted from reports.

In sum, prevailing cross-national measures of education policy changes tend to focus on a fixed set of dimensions of schooling (e.g. establishment of compulsory schooling or tracking; constitutional mentions of education), which capture a pre-determined range of activity (Heymann et al 2014). Of the existing large-scale efforts to collect education reform data, only the OECD's Reform Finder seeks to provide an open-ended compilation of reforms. WERD draws on the OECD's emergent approach for gathering reform data but uses a broader range of sources to collect information. Our team especially focused on expanding the sample beyond OECD members by drawing on UNESCO, World Bank, and IEE documents. In addition, we use rigorous and transparent coding methodology to extract reforms from the documents. Table 1 summarizes the features of existing databases on education reform.

[4] The 18 policy features of national education systems include: Pre-primary expansion; Starting age of compulsory education; Duration compulsory education; Tracking age; Standardized test(for career advancement); Expansion of university access; Pre-primary school teacher qualification; Primary school teacher qualification; Secondary school teacher qualification; Standardized test (for other purposes); School evaluation; School autonomy; Teacher autonomy; Increase grant size (university); Loan component to grant component (university); Interest rate (university); Selectivity in university access; Index of university autonomy.

[5] The countries include: Austria, Belgium (Flanders), Belgium (French), Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece, Hungary, Ireland, Italy, Latvia, the Netherlands, Northern Ireland, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, and Sweden.

Table 1. Summary of Cross-National Education Reform Databases

Database	Number of countries & territories	Time frame	Approach to coding reform	Coding procedures reported	Link to data
OECD's Education Policy Outlook Reforms Finder	38; mainly OECD members	Mainly 2000-2020	Open set of 1,593 reforms (across various country-years)	No	https://www.oecd.org/education/policy-outlook/reforms-finder/ (Accessed 3/29/2022)
WORLD Policy Analysis Center at UCLA's Fielding School of Public Health	195	Cross-sectional (mid-2010s)	Fixed set of reforms; 32 policies (observed for 195 countries)	Yes	https://www.worldpolicycenter.org/topics/education/policieso
Braga, Checchi and Meschi 2013	24; European	1929-2000	Fixed set of reforms; 18 policies (observed for 24 countries over 70 years)	No	Available from Authors
World Education Reform Database (WERD)	216	Mainly 1970-2021	Open set of 14,375 reforms (across various country-years)	Yes	https://werd.stanford.edu/

Construction of the Education Reform Measure

Sampling Frame: Criteria for Sources

Following the approach used by prior efforts, we rely on reported reforms appearing in public sources. We mainly drew reforms from selected education-related publications produced by international organizations with a longstanding involvement in global education since the post-WWII period or volumes produced by country experts outlining educational histories. In addition, we include all reforms listed in the OECD's Education Policy Outlook Reform Database and the European Commission's SHARE database on educational reforms in Europe. The sources used to construct the database include:

- World Data on Education (WDE) reports published by UNESCO,
- Education Project Appraisal Documents (PAD) prepared by the World Bank,
- Systems Approach for Better Education Results (SABER) reports prepared by the World Bank,
- Country entries from Pergamom Press' 1985 and 1994 editions of the International Encyclopedia of Education (IEE),
- Country entries from Facts on File Publications' 1988 edition of the World Education Encyclopedia (WEE),
- Education Policy Outlook (EPO) published by the OECD,
- Reviews of National Policies for Education (RNPE) published by the OECD,
- OECD's Education Reform Finder Database in March 2022,
- The SHARE database/report on educational reforms published by the European Commission's Joint Research Centre

Prior to data collection, we tested the feasibility of several different types of education country reports, encyclopedias, and project documents published by the World Bank, OECD, and UNESCO. Our assessment of potential sources showed that the OECD reports mainly cover its member countries. Thus, the inclusion of IEE country entries and reports from UNESCO and the World Bank expanded the country coverage to include low and middle-income countries. We excluded UNICEF publications because they focus primarily on short-term humanitarian assistance. We also excluded reports published by the Global Partnership for Education (GPE). The GPE is an important international organization engaged in global education, but it is relatively new, having been founded in 2002. Its reports would have been less useful for collecting historical education reform data but is a likely area for expanding data collection in the future. Appendix A provides a detailed overview of the nature of each report type used to construct the database.

Coder Training Process and Inter-Rater Reliability Checks

As a next step, we hired and trained research assistants (RAs) to extract reform data from the reports. Coding began in 2019 with a team of undergraduates, including native Spanish and French speakers to accommodate these languages in our documents. Each cohort of 5-7 RAs received training on the content of the coding document and how to conduct the coding process. During the training program, RAs practiced coding and shared questions to ensure that everyone had a similar interpretation of the coding procedure. The key purpose was to create a shared definition of what counted as an education reform to reliably extract titles and descriptions from the reports. The coding instructions contained detailed examples for coders, and clarification around common questions that emerged during the coding process were all documented and facilitated using Slack. The full document is available in Appendix B.

The RAs coded the education reports using an online Qualtrics survey that included response fields for each piece of information to be collected about the report and reform. Reform descriptions are texts that were exactly as written in the data source, and can appear in English, French, Spanish, or a combination of these languages. A final "Notes" text field at the end of the survey allowed RAs to record questions that arose while coding the report or to flag issues for later review by our research team during the data cleaning process.

It took on average about 25-30 minutes for an RA to code one report, however, the time needed varied substantially based on report length. RNPE reports can run more than 200 pages and sometimes took up to 60 minutes to code. EPO reports and SABER reports are the shortest reports in the sample and took as little as 10-15 minutes to code.

Using this process, a two-way, random effects intra-class correlation to test for inter-rater reliability yielded a result of 0.85 for the final coding document, which falls within the range of the level of significance rated as excellent (Cicchetti, 1994).

We repeated this process in 2021 and 2022 to include Project Appraisal Documents from the World Bank. In 2023 we repeated the process to include the SHARE database on educational reforms in Europe (version 2), as well as the 1985 edition of the International Encyclopedia of Education and the 1988 edition of the World Education Encyclopedia (version 3). Another round of data collection is planned in 2024 to include older reforms from historical reports to the International Bureau of Education and UNESCO, as well as newer reforms from the UNESCO Profiles Enhancing Education Review (PEER).

Data Cleaning and Cross-Checks

After collecting the raw reform data, we undertook several data cleaning tasks. We manually reviewed each reform in the dataset and removed a handful of cases included by coders that did not fit our definition of reform (e.g. budget reapprovals). We also removed duplicate reforms arising in cases where the same reform was coded more than once in the same report, or where

the same reform was recorded while coding different reports for the same country. We found over a third of reforms appeared in more than one report.

During the coding process, we allowed reforms to be recorded as a range of years depending on how it was referenced in the report text, e.g., 1998-2000, or as a decade, e.g., "the 1970s", or some other range of time more than one year, e.g., "the early 1980s". After reviewing the raw data to identify the most common ways that the year had been recorded, we made a set of cleaning rules for the year variable and went back through the dataset to reformat the years. Less than ten percent of the sample was affected by this change, and we did not see any meaningful variation in test analyses when recoding this variable in different ways (e.g. using the middle of the range versus the start; or including a control for reforms that took place over a range of time). The current database reflects the starting year of a reform if the initial coding included a year. Whenever reforms were cited without any mention of their year, coders conducted brief online searches for information available on those reforms, and recorded their years if information was found.

Then, we manually checked cases of outlier countries with high numbers of reforms in a year to determine whether this was due to coding error. The countries we checked included: Bangladesh, Benin, Bulgaria, Burundi, Cameroon, Chile, Dominican Republic, Ecuador, Finland, Guinea, Indonesia, South Korea, Uruguay, and Yemen. Most of the reforms in the outlier cases were accurately recorded, indicating that the high reform counts reflect what a country reported for that year.

Finally, we conducted sensitivity tests to investigate the consequences of relying on reports as the source of reform data. We found a systematic pattern: reports are most likely to discuss reforms that occur in 1-5 years prior to their publication. For example, a report from 2005 for Spain mainly discusses Spanish reforms that occur in 2000-2004. As a result, for many uses of the database it may be important to account for the amount and timing of reporting (e.g. Bromley et al., 2021). Appendix C provides the number of reports of each type coded and the year in which each report was published to facilitate the use of these reporting controls.

Limitations

The core limitations of our database mirror those of existing cross-national efforts and are best addressed using case study methodology, which would lack the global coverage WERD provides. As a first challenge, the sources used to compile the data are better at capturing national level reforms than the many efforts that go on at lower levels. The data sources do not actively exclude lower-level reforms, but in practice few are specifically at the provincial or local level. Presumably, highly decentralized systems have more reforms at lower levels that are not included in country level reports, and thus the database is likely biased towards reporting fewer reforms for highly decentralized systems. Analyses that include level of centralization as a predictor for the number of reforms in a country in a year support the intuition that more

decentralized systems under-report reforms (Bromley et al., 2023). That said, highly decentralized systems, such as the United Kingdom and United States, still report among the highest numbers of reforms of all countries in WERD. The trends are best interpreted as representing patterns of national reforms, and individual studies could remove lower-level reforms on a case-by-case basis.

Second, the reforms represent policies that are viewed as publicly legitimate and are submitted to international organizations or compiled for submission to a handbook for international use. Thus, the database likely undercounts reforms that are not linked to dominant norms of the international community, such as global citizenship and sustainable development (Buckner & Russell, 2013; Jimenez et al., 2017). Regressive policies such as acting to exclude girls or minority groups from schooling are likely under-reported. However, the data do include several examples of reforms that run counter to trends emphasizing international, largely liberal, principles. For example, the "National Reform Steering Assembly" reform reported in Thailand in 2015 describes a renewed emphasis on religion and Thai culture following the military coup:

> Following the military coup, the Education and Human Development Reform Committee within the now-defunct National Reform Council (NRC) took responsibility for Thailand's education policy and for developing recommendations for reform. In September 2014, the new government announced several areas of focus for future education policy, including … *promoting the role of religion and Thai cultural heritage.* After the NRC's dissolution in September 2015, the National Reform Steering Assembly (NRSA) assumed responsibility for developing education policy. (emphasis added; OECD/UNESCO 2016, p.56)

Finally, as discussed earlier, the database does not capture implementation or effects of reforms, which should be conceptualized as equally important but distinct stages of the policy process that warrant independent data collection strategies. This is less a limitation of the data itself, and more a reiteration of the point that WERD provides a foundation on which to build future efforts looking at implementation and impact.

Description of Variables and Data

The database contains five variables, including a unique reform and country identifier, the year and country of a reform, as well as its title and description. The variables are:

- *reform_id:* A distinct numeric identifier for each reform in the database. There are many gaps in the reform_id variable because of duplicate reforms that were removed in the cleaning process; gaps do not indicate missing reforms.
- *country_code_iso:* A distinct three-letter identifier for each country in the database using ISO alpha-3 version 3166 (available at https://www.iso.org/obp/ui/#search),

corresponding to the *country_name* variable. Note this variable is missing for entities without an ISO code, including many former colonies while under colonial rule. See Appendix D for additional details.

- *country_code_vdem:* A distinct three-letter identifier for each country in the database using the Varieties of Democracy (V-Dem)'s country code (dataset is available at https://www.v-dem.net/data/the-v-dem-dataset/), corresponding to the *reporting_entity* variable, following V-Dem's dataset to maximize the number of matched observations when merging.[6]
- *country_name*: The name of the political entity where the reform is intended to take place. See Appendix D for additional details.
- *reporting_entity:* The name of the political entity submitting the source report that was coded. In most cases, researchers will want to use *country_name* and *country_code* in research. See Appendix D for additional details.
- *year:* The year a reform is reported, or first year of a reform if a time range was reported.
- *reform_title:* The name of a reform, or an approximation.
- *reform_description:* The text describing a reform extracted directly from the reports. Different reforms may have the same description if several reforms were listed in the same sentence(s).

The dataset contains 14,375 reforms mainly distributed over the 1970 to 2020 period, as shown in Figure 1. A notable feature of the distribution of reforms is the expansion of reported reforms in the 1990s and a large drop in reported reforms in recent years. In part, this drop is an artifact of reporting – there is a lag between when reports are published and when reforms appear in reports. For example, reports that become available in 2019 mainly discuss reforms from 2018 and earlier. However, it is in part an actual decline in reform discourse; the average number of reforms mentioned in each report also drops in recent years (see Bromley et al., 2020).

[6] In version 3 of WERD, many reforms from older periods were added, and since the ISO system includes only countries that existed after 1973, we added the V-Dem country code system that accounts for countries that existed before then. Note that this variable is missing for entities without a V-Dem country code, including many former colonies while under colonial rule. See Appendix D for additional details.

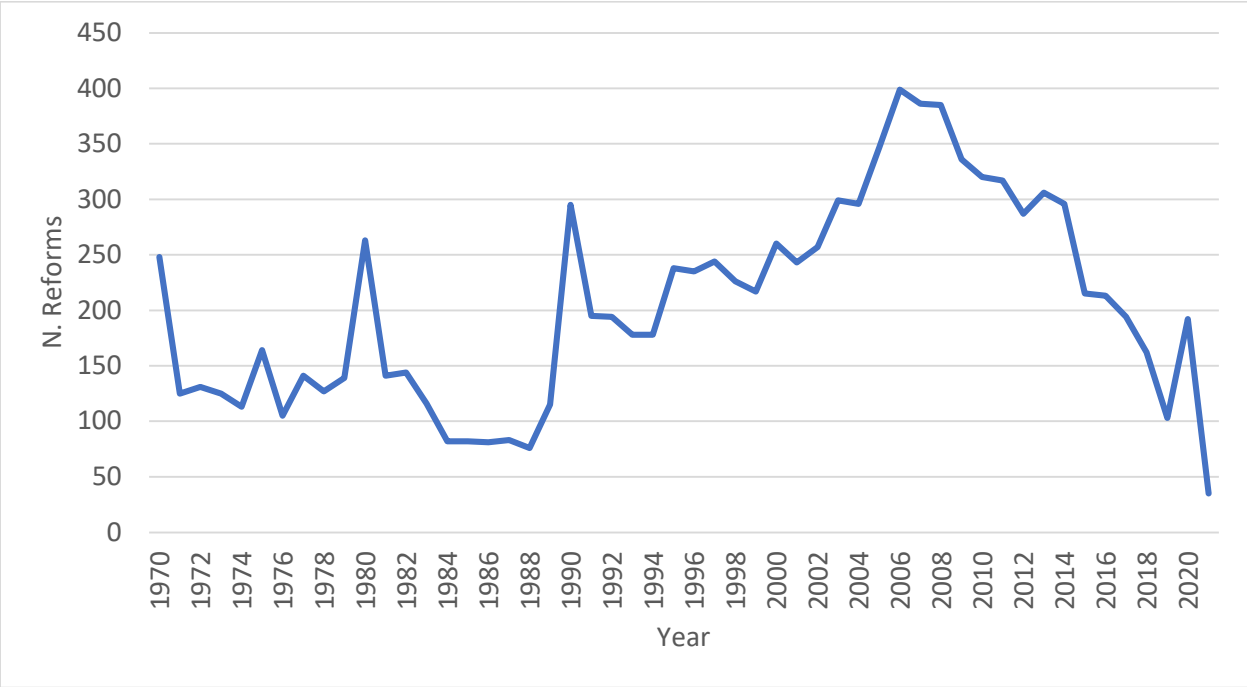

Figure 1. Number of Reforms Globally per Year
Note: For display purposes, the figure only shows reforms from 1970-2021, which covers close to 80 percent of reforms in the database with a reported year. 1,005 reforms have no reported year.

As shown in Figure 2, education reforms are widely distributed around the world. Although one limitation of our database is that the extent of reform is likely under-reported in decentralized systems, the global distribution shows that many of these countries, such as the United Kingdom (280), Canada (87), Brazil (176), and India (141), still show some of the highest levels of reform.

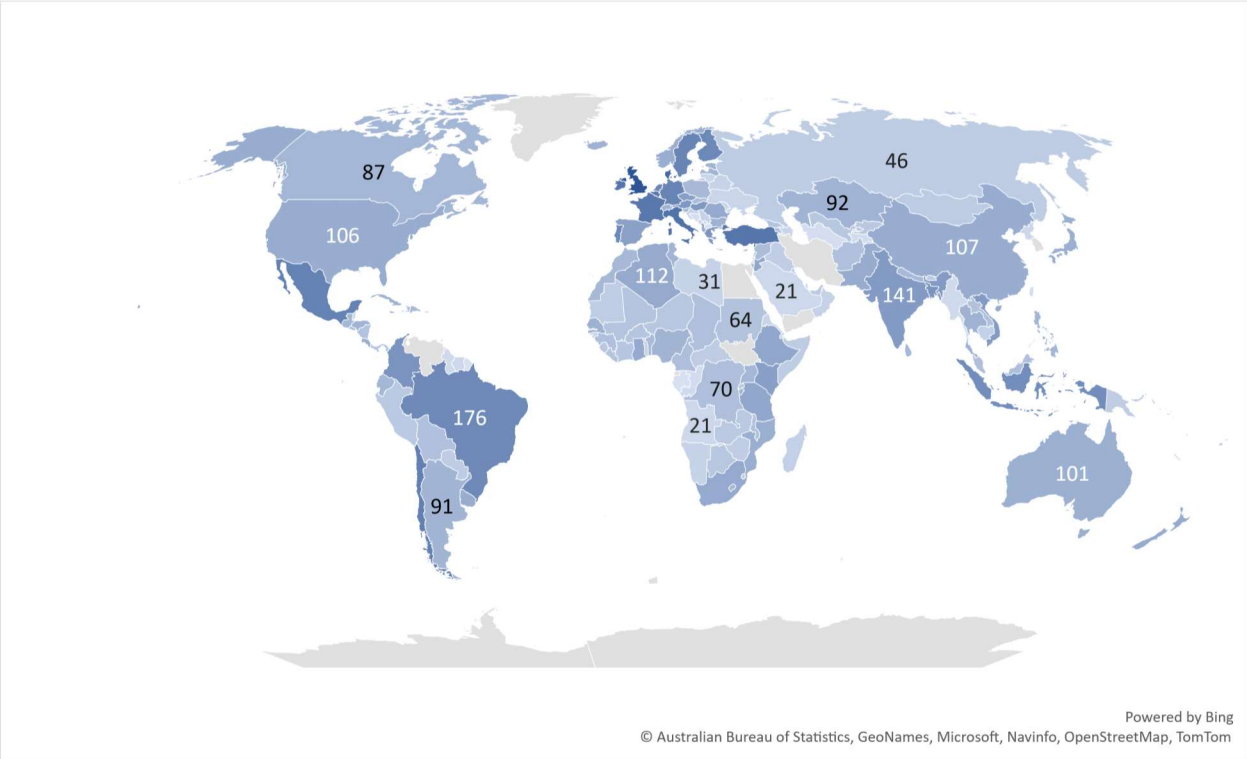

Figure 2. Global distribution of reforms
Note: Darker shade indicates more reforms and numbers indicate a sampling of country totals to illustrate the range. The highest reported total is the United Kingdom at 280 reforms.

Demonstration Analysis: Education Reforms and Enrollment Rates

In this section, we demonstrate how WERD (version 1) can be used to understand global trends. We select two simple research questions and conducted the analyses on a preliminary version of the database: (1) What is the association between education reforms intended to expand access to education and growth in primary enrollment? (2) How does the association between reform and enrollment change with the passage of time relative to the adoption of the reform (i.e. 1, 2, 3, etc. years after the reform is adopted)?

In this exercise, the dependent variable is growth in the primary enrollment rate in each country each year. The key independent variable is the number of education reforms that intend to increase the size of the education system or expand access to schooling in a country in a year. We created the measure of access reforms by coding the titles and descriptions of reforms using a preliminary version of the database. Access reforms include changes that aim to reduce dropouts, increase graduation rates, expand years of compulsory schooling, or introduce a new

level of schooling. For example, the "Reaching Out-of-School Children Project" in Bangladesh in 2004 aimed to "Reduce the number of out-of-school children through improved access, quality and efficiency in primary education, especially for disadvantaged children, in support of Education For All Goals." (World Bank, 2016)

We include basic control variables to address variation in national characteristics. Specifically, we control for GDP per capita (Feenstra, et al., 2015), a measure of liberal democracy (Coppedge et al., 2021), youth population (World Bank, 2020), ethnolinguistic fractionalization (Alesina, et al., 2003; Drazanova, 2020), adult fertility rate (World Bank, 2020), and urban population growth (World Bank, 2020). We also control for foreign direct investment (World Bank, 2020) and overseas development assistance (OECD, 2020). Education-related controls include secondary enrollment, education expenditure (World Bank, 2020), and years of compulsory schooling (World Bank, 2020). All independent and control variables are lagged by one year to adjust for the time it takes for change to occur. For illustrative purposes, we use two-way fixed effects models, holding constant the country and year, although we acknowledge recent methodological controversies that may shift the field away from this approach in the future (Hill, et al., 2020).

We find a positive and statistically significant association between primary enrollment growth and the total number of access reforms (log transformed), holding all else constant. We also find that this association weakens with the passage of time since the onset of reform. Figure 3 shows the size of the association between reforms and enrollment growth each year after a reform is adopted. The association remains statistically significant two years after a reform is adopted, but from years three and onwards the relationship weakens.

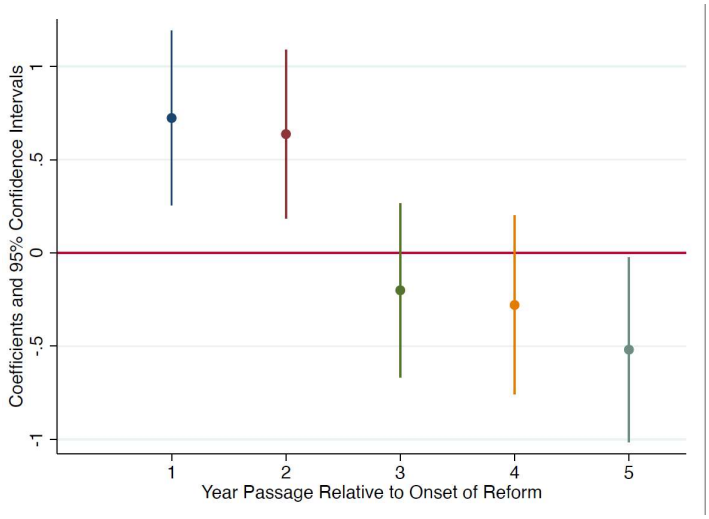

Figure 3. Association between access reforms and primary enrollment growth from years one to five after the adoption of a reform.

One policy implication is evident in these preliminary findings. In contexts where access reforms work as intended to increase enrollment, their effects diminish over time. Reform is often thought of as a one-time event; find an effective policy and implement it, and then the problem is solved. However, our results suggest we need a longer-term view of the policy process. The effects of reform may be temporary and require repeated enactment to continue having impact. One explanation for this pattern could be that part of the mechanism through which reforms are successful is by bringing attention and focus to a problem, not just through the mechanics of the policy change itself.

This simple demonstration reveals some of the possibilities afforded by the World Education Reform Database; several sample working papers are available at https://werd.stanford.edu/. The longitudinal panel data can be merged with other datasets to understand how national education reforms influence educational outcomes such as access and quality, or to examine why countries pursue certain types of reforms. The strengths of this database are the high coverage of countries around the world, its coverage over a long period of time, and its comprehensiveness of all reported education reforms rather than a pre-determined set.

Conclusion

WERD is the most comprehensive cross-national, longitudinal compilation of education reforms currently available. Future versions of the database will include more historical sources (e.g. historical reports to the International Bureau of Education and UNESCO), a wider range of documents (e.g. entries to UNESCO PEER), and reforms from other databases and studies (e.g. the other databases described above). But already it can be used for multiple kinds of research. Most obviously, it provides a measure of levels of reform discourse for each country over time, which is an outcome of interest itself or it can be used to predict other educational and societal outcomes. For instance, studies could examine arguments that levels of reform are driven by election cycles (Cuban 1990) and interest groups (Finger 2018). Further, WERD shares an array of policy changes that can be tailored for multiple uses. Scholars could code titles and descriptions to capture reforms about specific groups (such as women and girls, indigenous peoples, or those with learning differences) to learn more about the distribution of these types of reforms around the world, how they might have changed over time, and/or their prevalence relative to other kinds of reforms. In the demonstration analyses, we selected the subset of reforms focused on access, but future studies could examine reforms related to higher education or education quality. More recently, Bromley et al. (2024) used topic modeling to examine changes in the content of reforms over time, Choi (2024) coded reforms for their human rights or human capital rationales, and Overbey (2023) examined the spread of neoliberal reforms. Alternatively, many education researchers are interested in issues of implementation; some subsets of the reforms (such as those reported by the World Bank Project Appraisal Documents) could be linked to additional reports produced by the World Bank on the implementation and evaluation of the projects. We hope this database, and future versions, will enable a deeper

understanding of the forces driving education reform, the consequences of education reform, and contribute to policymaking.

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Appendix A. Description of Reports Used as Education Reform Sources[7]

Source	Organization	Who prepares the report?	Description
Review of National Policies for Education (RNPE)	OECD	OECD with input from country government.	The **OECD** produces **RNPE** reports for its member countries. Member countries request the assistance of the OECD in conducting a review. The topics of RNPEs vary based on the needs and requests of governments, ranging from early childhood development to workforce development. Some reports in the series provide a comprehensive analysis of a country's entire education system, while others focus on a specific policy area or level of education. The purpose of the reports is to present comparative data on a country's education policies and institutions in a specific topic area that can be easily benchmarked against the results from other OECD member countries. The reports run up to 200 plus pages in length.
Education Policy Outlook (EPO) reports	OECD	OECD staff with input from country governments.	The **OECD EPO** series provide analysis of national education policies primarily among OECD member countries. The OECD assembles a team of education experts to write the EPO reports with input provided by country governments. Each country report follows the same format. The reports provide information and analysis on a specific education policy area to guide policy making. These reports cover education policy with a focus on six 'policy levers': equity and quality, preparing students for the

[7] We referred to the document websites for background information on the reports in addition to our own insights from assessing the suitability of different document types for data collection. For more information see: https://www.oecd-ilibrary.org/education/reviews-of-national-policies-for-education_19900198; http://www.oecd.org/education/profiles.htm; http://siteresources.worldbank.org/PROJECTS/Resources/40940-1365611011935/Preparing_the_PAD_Templates.pdf; https://www.sciencedirect.com/referencework/9780080448947/international-encyclopedia-of-education#book-info; https://documents.worldbank.org/en/publication/documents-reports/documentdetail/867151468180272110/the-what-why-and-how-of-the-systems-approach-for-better-education-results-saber; and http://www.ibe.unesco.org/en/resources/world-data-education.

			future, school improvement, evaluation and assessment, governance, and funding. These reports are also used for comparative benchmarking across OECD countries on these topics.
Education Reforms Finder database	OECD	OECD EPO, reports, comparative reports, country profiles with input from country governments.	The **OECD Education Reforms Finder** is a list of more than 1,600 education policy reforms in 38 education systems. Data is pulled from the OECD Education Policy Outlook Reports and through a data gathering effort led by the OECD with its partner countries. These reports are available online and were imported directly from the website. For this data source, we did not follow a process of identifying and listing separate education policy reforms from a particular document. Since entries in the Education Reforms Finder fit our tri-partite concept of education reform, all reforms listed on the OECD database were included in our dataset, with the exception of duplicate reforms from other data sources.
Systems Approach for Better Education Results (SABER) reports	World Bank	World Bank staff	**World Bank SABER** reports are intended to produce comparative data on education policies, with the aim of helping countries systematically strengthen their education systems. They are intended for low, middle, and high-income countries and focus on a specific area. The 13 focus areas covered in SABER reports are: early childhood development; education management information systems; education resilience; engaging the private sector; equity and inclusion; information and communication technologies; school autonomy and accountability; school finance; school health and school feeding; student assessment; teachers; tertiary education; and workforce development. National governments commission SABER country reports, which are produced by the World Bank. The reports follow a standard format, and countries choose which of the topic focus areas of their education systems they would like to have evaluated. Not all countries therefore have reports for

			all or the same set of focus areas. SABER reports have been produced for low, middle, and high-income countries.
World Data on Education (WDE) reports (2006/2007 and 2010/2011 editions)	UNESCO International Bureau of Education (IBE)	UNESCO IBE staff	**UNESCO's IBE** publishes the **WDE** database and the series of related country education reports included in our sample. The first WDE series was published in 1996 and there have been seven editions, the most recent in 2010/2011. Each country report, prepared by UNESCO-IBE, follows a standard format and focuses specifically on curriculum and curriculum development issues. The reports provide an overview of the education system's structure, list of foundational education legislation, and curriculum development topics. The reports do not include a section with explicit policy recommendations.
Project Appraisal Documents (PADs)	World Bank	World Bank staff	The **World Bank** prepares **PADs** for each of its investment lending projects after the project preparation phase has been completed and the World Bank team and borrowing government have come to an agreement on all aspects of the project. The PAD includes details of the project design including the project development objective, project components, and activities. PADs have a standard format, but the length and content may vary depending on the project type. PADs for education projects include information on responsible agencies and ministries, national education statistics, and educational policies or reforms relevant to the project under preparation.
International Encyclopedia of Education (IEE) (1985 and 1994 editions)	Pergamom Press	Expert researchers (editors-in-chief: Torsten Husén and T. Neville Postlethwaite).	The 1985 edition of the **IEE** includes more than 45,000 entries authored by experts from 100 different countries around the world. The 1994 edition of the **IEE** contains an addition of more than 1,200 entries covering 22 educational themes from 96 countries. A group of editors commissioned a network of researchers with globally oriented expertise in specific thematic areas to prepare the entries. Country entries provide

			a general overview of the education system, noting the main institutions, foundational legislation, and recent developments.
The Survey of Health, Ageing and Retirement in Europe (SHARE) database in "100 Years of Educational Reforms in Europe: a contextual database" report	European Commission's Joint Research Centre (JRC) – Institute for the Protection and Security of the Citizen (IPSC)	SHARE team affiliated with the European Commission's JRC-IPSC (lead author: Christelle Garrouste).	The **SHARE** collects data on individuals' health, socioeconomic status, and other life-related outcomes. To connect this individual-level data with macro-level data on the welfare state, the SHARE team has collected information on educational reforms in 16 European countries. The SHARE database of education reforms in Europe draws from several sources including: the Eurydice database on national education systems, the International Labour Organization's database of national labor, social security and related human rights legislation (NATLEX), cross-national studies (Fort, 2006; Brunello et al., 2009; Murtin & Viarengo, 2007), and the 2006 report by the Institute of International Education. Data collected from these various sources were cross-checked with national level sources, such as the Ministry of Education and National Statistics Agencies, and country-specific studies.
World Education Encyclopedia (WEE)	Facts on File Publications	Edited by George Thomas Kurian, with support from several country experts, drawing on local sources.	The 1988 edition of the **WEE** was compiled over a period of three years by a global team of almost 100 collaborators and draws on local sources published at the country level. It is designed to be a descriptive survey of education systems around the world. In addition to providing information on reforms adopted across the world over the years, the WEE also lists important milestones in education systems around the world, such as the establishment of the first formal education systems and institutions of higher education across several different countries.

https://werd.stanford.edu/

Appendix B. Education Reform Coding Directions for 2019 Data Collection

General Directions

Please complete one Qualtrics survey for each country report that you code. The survey is divided into two sections. In the first section, you will answer questions about the report. In the second section, you will record information about each individual education policy mentioned in the report. At the end of the survey, there is "Notes" box where you can flag any issues you encountered while coding the report, questions, or things you weren't sure about while coding.

Before submitting a survey, please be sure to look through the information collected for each reform and make sure that it is as complete as possible. You should still submit a survey for a report even if it does not contain any education policies. In this case, only fill out the first section of the survey with the report information, and then indicate in the Notes section that the report did not mention any education policies.

Section 1: Coder and Report Data

Coder Name: Your name

Country: Name of the country that is the subject of the report

Report Type: Select the acronym corresponding to the type of report you are coding
- EPO = Education Policy Outlook Country Profiles
- IEE = International Encyclopedia of Education
- PAD = Project Appraisal Document
- RNPE = Reviews of National Policies for Education
- SABER = Systems Approach for Better Education Results Country Reports
- WDE = World Data on Education Country Reports

Number of Pages: total number of pages in the report

Report Year: copyright date/year report published

Section 2: Education Reform Data

Policy Name: Record a mention in the report of a planned change to the education system. The text does not need to mention the official title of a policy. If an important change is discussed in the text without a title, instead type in a short description of the policy or the action taken by the government.

An education reform includes planned changes described as changes to education such as education legislation (e.g., acts, laws, decrees), and other important policy shifts (e.g., new

national strategic plans, frameworks, initiatives, guidelines; see keyword list for more examples).
The reform mentioned must apply schooling as a system (i.e., the whole country, a region, or city; not solving the internal problems of one specific classroom or school).
The creation of new educational organizational structures that are part of the government (e.g., new research boards, ministries, departments) should be counted as reforms.
Early childhood development policies, such as health or feeding programs, that are not related to education should not be counted as education policies (this is particularly an issue for the SABER reports).

Policy Year: Year policy was adopted or planned to take effect.

Policy Description: Copy and paste the sentence(s) or paragraph(s) that contains the mention of an education policy; if it's not possible to copy/paste then please type the description by hand. We will use this text for a subsequent round of education policy coding so please make sure to fill this in whenever possible. If there is no text to include, e.g., only the title of the policy is listed, please make a note of that here.

Example

Education policies reported in text boxes and tables without any context should be counted
SABER country reports often have boxes with education reforms in them. The one below is an example taken from a Vietnam SABER report from 2012:

Box 1: A Note on Documentary Sources

This report is based on data from various documents collected through a desk study. The most important of these are:

- Decision No 630/QD-TTg dated 29/5/2012 on approving the Vocational Training Development strategy for the period of 2011-2020;
- Draft Education Development Strategy for the period of 2011-2020, proposed by the MOET and MPI;
- Decision No 579/QD-TTg dated 19/4/2011 on approving the Human Resource Development Strategy for the period of 2011 – 2020;
- Decision No 1216/QD-TTg dated 22/7/2011 on approving the Master plan of Human Resource Development for the period of 2011-2020;
- Education Law (2005) and Vocational Training Law (2006);

This report is also based a survey of vocational training institutions implemented by CIEM. Information on the methodology used in the survey is available in Annex 5.

As a guide, but not a definitive list to follow, these keywords are often used in the reports when describing an education reform: *amendment; act; law; decree; legislation; order; ordinance;*

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framework; strategy; policy; initiative; guidelines; plan; standard; program; regulate/regulation; reform; education reform; systemic reform

Appendix C. Distribution of Data Sources by Year of Publication (n=1,389 sources)

	World Bank PAD[1]	World Bank SABER[2]	UNESCO WDE[3]	IEE[4]	OECD RNPE[5]	OECD EPO[6]	OECD Reforms Finder	SHARE database[7]	WEE[8]	Number of reports per year
1985	0	0	0	154	0	0	0	0	0	154
1986	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	126	126
1989	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0
1994	0	1	0	125	1	0	0	0	0	127
1995	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0
1998	10	0	0	0	3	0	0	0	0	13
1999	3	0	0	0	1	0	0	0	0	4
2000	10	0	0	0	1	0	0	0	0	11
2001	4	0	0	0	2	0	0	0	0	6
2002	8	0	0	0	2	0	0	0	0	10
2003	6	0	0	0	3	0	0	0	0	9
2004	5	0	0	0	3	0	0	0	0	8
2005	16	0	0	0	1	0	0	0	0	17
2006	21	0	84	0	1	0	0	0	0	106

2007	18	0	0	0	3	0	0	0	0	21
2008	17	0	0	0	3	0	0	0	0	20
2009	19	7	0	0	2	0	0	0	0	28
2010	25	8	168	0	5	1	0	16	0	223
2011	14	2	0	0	1	0	0	0	0	17
2012	16	28	0	0	2	0	0	0	0	46
2013	17	46	0	0	1	9	0	0	0	73
2014	28	28	0	0	0	6	0	0	0	62
2015	21	27	0	0	1	8	0	0	0	57
2016	14	14	0	0	4	6	0	0	0	38
2017	22	13	0	0	6	5	0	0	0	46
2018	26	2	0	0	3	4	0	0	0	35
2019	21	0	0	0	1	0	0	0	0	22
2020	52	0	0	0	0	0	0	0	0	52
2021	20	0	0	0	0	0	0	0	0	20
2022	0	0	0	0	0	0	38	0	0	38
Total	**413**	**176**	**252**	**279**	**50**	**39**	**38**	**16**	**126**	**1,389**

Notes: [1] Project Appraisal Document. [2] Systems Approach for Better Education. [3] World Data on Education. [4] International Encyclopedia of Education. [5] Review of National Policies for Education. [6] Education Policy Outlook. [7] Survey of Health, Ageing and Retirement in Europe. [8] World Education Encyclopedia.

Appendix D. Details of Reporting Entity Names, Country Names, and Country Codes

Starting in version 2, WERD differentiates between the reporting entity of an education reform and the country where a reform is intended to occur. This change allows researchers to disentangle reforms reported by predecessor or successor entities from those reported by prior or subsequently independent countries. For example, recent reports submitted by Estonia refer to reforms prior to independence in 1992. In the case of Estonian reports referring to reforms from the 1980s, the indicator for *reporting_entity* would say "Estonia" and *country_name* would say "USSR" (the corresponding three letter *country_code_iso* would be SUN, though the corresponding *country_code_vdem* would be EST). Similarly reports from Kosovo refer to reforms prior to 2008; these earlier reforms have the *country_name* and *country_code_iso* for Serbia, but the reporting entity is Kosovo and the *country_code_vdem* is XKX, a unique code V-Dem created for Kosovo. All reforms listed from the successor countries to the former USSR, Yugoslavia and Czechoslovakia that occurred before independence now use the ISO code from their predecessor during that time. However, their *country_code_vdem* corresponds to the *reporting_entity*, even before the successor countries' independence, following V-Dem's database.

Version 2 contains several new *country_name* cases to reflect the distinction between the reporting entity and political entity where a reform is intended to take place; these include, North Macedonia for reforms adopted after 2019; the *country_name* for the former Swaziland is Eswatini from 2018 onwards (but the reporting entity remains Swaziland for reports submitted under that name); Yugoslavia, USSR, and Czechoslovakia become the *country_name* for the relevant pre-1992 reforms; Zaire for pre-1997 reforms in Congo; Congo for pre-1971 reforms in Congo; Rhodesia for pre-1978 reforms in Zimbabwe, and Dahomey for reforms pre-1975 in Benin. For all other countries, the country names were maintained from the original database.

The *country_code_iso* and *country_code_vdem* indicators are missing for reforms from before countries' independence, or for former colonies that do not have an ISO code or a V-Dem code from before independence. When one country code system has such code, but the other does not – then we included the one that exists. The only territory with no *country_code_iso* or *country_code_vdem* at all is the United States Trust Territory of the Pacific Islands.

The variable *country_code_iso* reflects the formal ISO codes of the countries at the time the reform was adopted (as opposed to the code for the reporting political entity). Some notable cases include:

- the country code for Kosovo is marked as missing for reforms from 2008 onwards, as there is no ISO code;
- the country codes for former Yugoslavian countries are YUG for reforms before 1992;
- the country code for Serbia and Montenegro is SCG for reforms before 2006;
- the country code for former countries in the USSR is SUN for reforms before 1992;
- the country code for former Czechoslovakia countries is SCG for reforms before 1993;

- the country code for Zaire (formerly DRC) is ZAR for reforms before 1997; and the country code for Rhodesia, now Zimbabwe, is RHO for reforms before 1978.

The following cases do not exist in V-Dem, and therefore might have a *country_code_iso* but not a *country_code_vdem*: American Samoa, Andorra, Anguilla, Antigua and Barbuda, Bahamas, Belize, Bermuda, Brunei Darussalam, Czechoslovakia, Dominica, French Guiana, Kiribati, Macao, Marshall Islands, Martinique, Micronesia, New Caledonia, Puerto Rico, Samoa, St Kitts and Nevis, St Lucia, St Vincent, Tonga, Tuvalu, Western Samoa, Yugoslavia.

Appendix E. Summary of version changes

Version 1 to version 2

- New reforms: Version 2 of WERD includes an additional 702 reforms coded from the European Commission's SHARE database.

- Increased precision of attribution of reforms to political entities: We added a new variable for *reporting_entity,* which reflects the name of the entity that submitted the report where a reform was discussed. This distinction reflects the fact that in a handful of cases the reporting entity is a predecessor or successor to another political entity (e.g. Russia for the USSR). The variables for *country_name* and *country_code* reflect the political entity where a reform is intended to occur. Previously the variables for *countryname* and *countrycode* reflected the reporting entity. Appendix D discusses these improvements.

- Corrections after additional data cleaning: Changed the country code for Kosovo to missing, as it does not have an ISO code; corrected the count of countries in the OECD Reform Finder database in the year data was collected; removed several duplicate reforms from version 1.

Version 2 to version 3

- New reforms: Version 3 of WERD includes an additional 3,420 reforms coded from the 1985 edition of the International Encyclopedia of Education and the 1988 edition of the World Education Encyclopedia.

- Addition of Varieties of Democracy (V-Dem) country codes: The ISO country code system includes countries that exist after 1973. In light of many older reforms added in this version 3, we utilized V-Dem's country code's information to capture earlier political entities.