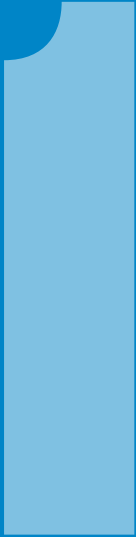


WORKING  
GROUP 03

C H A P T E R



# Towards an integrative view of the learning experience in the context of human flourishing

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## Abstract:

This chapter introduces Working Group 3 of the International Science and Evidence based Education Assessment, which discusses the learning experience and provides some answers to the two fundamental questions addressed in this report: Are our education systems still serving the right purpose? And, are they equipped to address the pressing challenges we face? Based on the six learning trajectories defined in Working Group 1 (i.e., learning to know and think, learning to learn, learning to do and evaluate, learning to be and become, learning to live together, and learning to live with nature), this section takes a transdisciplinary approach to determine the genetic, neurobiological, psychological, social and environmental factors that underpin the learning experiences of diverse learners, and their complex interactions. We start the chapter by defining the key concepts that are the foundation of the six chapters in this section. We then present briefly the most influential models of development and learning before providing a brief overview of the chapters in this section.

## Coordinating Lead Authors

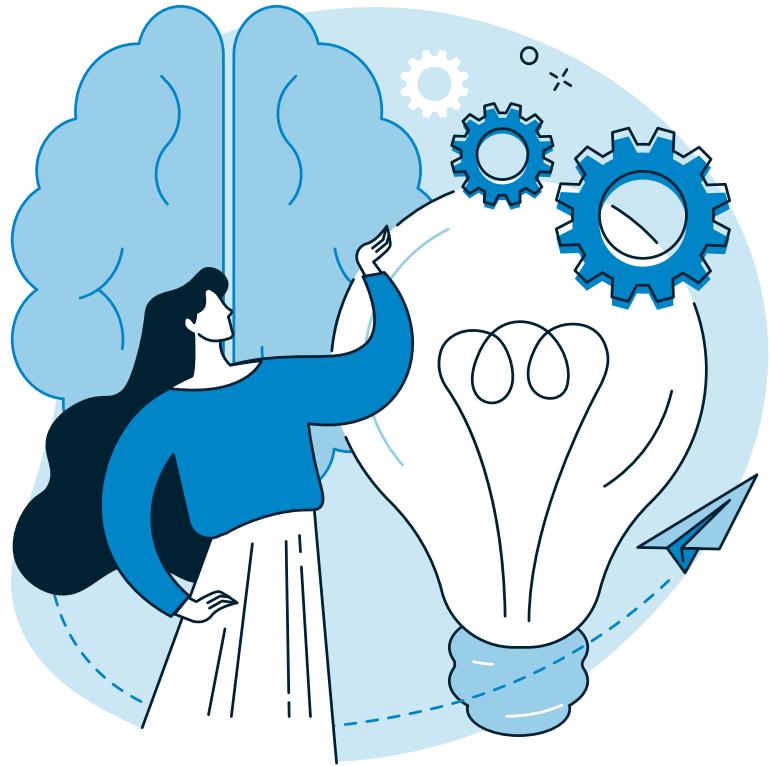
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# 1.1

## Introduction: central concepts, definitions and debates

Working Group 3 (**WG3**) explores the learning experience by assessing research covering the many interrelated influences on individual learners' experiences. The learning experience arises through complex interactions between intersecting factors including genes, brain development, language, cognitive abilities, social emotional skills,

environment and culture. In this chapter, we define central concepts and describe an integrative approach to learning experience. Note that the contextualization of learning and education is addressed in depth in **WG2**. Throughout the six chapters of **WG3**, we take a transdisciplinary approach and integrate evidence from the biological, psychological





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and social sciences (Youdell et al., 2020). We acknowledge that human development is dynamic and individual differences in learning experiences arise from complex interactions between biological, psychological and socio-political factors. We also recognize the shortcomings of the assessment because most of the psychological science and educational research evidence reviewed by WG3 are drawn from studies on populations of the global North, which represents a minority of the world's population (e.g. Henrich, Heine and Norenzayan, 2010; Nielsen et al., 2017). This suggests an urgent need to promote and support more inclusive and large-scale studies across countries from the global North and global South to understand better how the learning experience is modulated by a number of sociocultural, political and environmental factors across countries (Brown, Mistry and Yip, 2019).

Learning experience is defined by the International Bureau of Education (UNESCO-IBE, 2013, p.36) as

*A wide variety of experiences across different contexts and settings which transform the perceptions of the learner, facilitate conceptual understanding, yield emotional qualities, and nurture the acquisition of knowledge, skills and attitudes. In educational settings learning experiences are ideally challenging, interesting, rich, engaging, meaningful, and appropriate to learner needs. Previous learning experiences are considered to be key factors predicting further learning.*

Adopting a transdisciplinary approach to learning and the learning experience has been, in part, dictated by the polysemic nature of the term across disciplines, but also by the emphasis that each discipline has on how, what, when and where we learn. For example, in neuroscience, the focus is on how learning occurs, through the formation of new neural circuits and other structural and functional changes in the brain. In contrast, in education research focused on curriculum

and assessment, the focus is on what is learned and what learning outcomes should be achieved through education (**WG2-ch8, and ch9**). As evident in **WG3-ch7**, other fields, such as environmental sciences, geography and/or architecture, address questions about the various ways of where we learn and how it affects our learning experience. Across the six chapters in **WG3**, the when we learn question is also addressed by reviewing evidence for sensitive periods of brain development during early childhood and adolescence (**WG3-ch2**) and for age-related change in cognitive and socio-emotional abilities supporting learning (**WG3-ch3, ch4 and ch5**).

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Another key factor at the root of the learning experience is the emotions engaged in the learning process and, more specifically, the social interactions and emotions supporting or impeding learning. In the context of learning and education, social emotions relate to teachers and classmates, such as compassion, admiration, contempt, envy, anger or social

anxiety in the classroom and social and emotional learning (SEL) as ‘the learner’s experiences of contexts and emotions related to learning and embedded in learning’ (**WG3-ch4**). Thus, the learning experience at the individual level is intrinsically cognitive, emotional and social. Moreover, recent research in neuroscience investigating the connectivity across brain networks has revealed that there is no clear distinction between cognition and emotion. Thus, learning is heavily influenced by cognitive, emotional, motivational and social brain processes that are all interdependent, as well as by culture (e.g. value and belief systems and practices shared by groups) and other environmental factors (e.g. socio-economic status/SES) (**WG3-ch2 and ch6**).

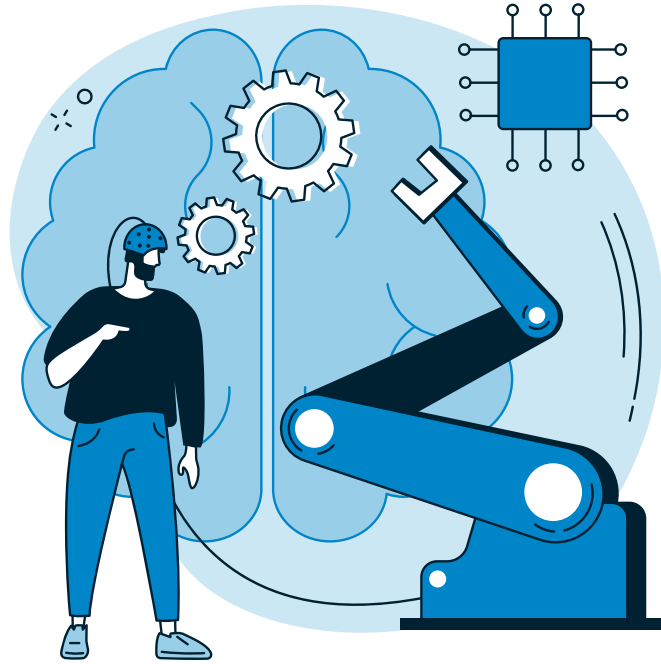
Defining learning and the learning experience for human flourishing, as we aim to do in **WG3**, leads inevitably to the debate regarding whether ‘nature’ (genes) or ‘nurture’ (environment) has a greater influence on human development. It is well established



Human brain development is a continuous, non-linear process that begins during the first weeks of gestation and lasts until early adulthood.

that human cognition and behaviours arise through complex interplay between nature and nurture (see Mitchell and Frith, 2019 for a concise review). Human brain development is a continuous, non-linear process that begins during the first weeks of gestation and lasts until early adulthood (e.g. Karmiloff-Smith, 2009). Findings from multiple disciplines highlight that development is dynamic, with bidirectional interactions between biological features (e.g. DNA, brain structure) and environmental factors (e.g. economic forces, cultural influences, relationships). Yet, much research is still influenced by the framework of biology and culture as competing forces, and the epistemological divide between the disciplines interested by the factors at play in the learning experience and their inability to ‘join forces’ stems in part from the weight they give to the role of ‘nature’ or ‘nurture’ in human development. We argue that this false dichotomy between focusing on the variables at the level of the individual (as in psychology and cognitive science) versus the

variables at the level of institutions (as in educational and sociological research) can distract researchers and policy-makers from studying how the two interact. For example, developmental psychology researchers have often assumed that individual differences in cognitive skills influence differences in academic outcomes, but have only recently begun to investigate how education in turn shapes cognitive development (e.g. Morrison et al., 2019; Peng and Kievit, 2020). Academic and cognitive skills gained in a variety of contexts have direct reciprocal interactions with each other over the course of education and development, and these interactions facilitate mutual growth. Taken together, these new lines of evidence demonstrate that human development and learning arise from reciprocal interactions between biological, psychological and sociological factors and call for an integrated multidisciplinary approach to studying human development as in the present report.



# 1.2

## Developmental theories: how and when we learn

Questioning the learning experience in and out of schools requires a clear understanding of the psychological mechanisms at play in human development. Jean Piaget is considered one of the founders of modern developmental psychology and proposed one of the most influential models of cognitive development (**Piaget, 1947, 1983**). In his seminal constructivist theory, Piaget argues that children progressively acquire a logical understanding of the principles that govern the physical world by directly acting in it. According to

this theory, the logical structures of children's minds become increasingly more complex throughout four fundamental shifts (or stages) during which the logical structures at a given stage are combined to create more complex structures at the next stage. These shifts occur at about the same age for all children in all cultures. Piaget's constructivist theory has been widely criticized because it (a) underestimates the rich conceptual knowledge of infants on the mathematical and physical principles of their environment and social



The socio-cultural-historical theory of human development emphasizes that learning and development cannot be dissociated from the context in which they occur.

and emotional principles of the agents acting in their environment (Spelke, 2000), and (b) overestimation of the logical abilities of adolescents and adults (Kahneman, 2011). While Piaget's theory essentially addressed the cognitive nature of the learning experience, others, such as Lev Vygotsky, stressed the interactions of social, cultural, historical and individual factors in human development. The socio-cultural-historical theory of human development emphasizes that learning and development cannot be dissociated from the context in which they occur (Schunk, 2012).

While these two theories, along with others, still have a major impact on education, research has since provided evidence that human development is more complex than initially thought. There is a growing consensus that human development should not be viewed as an incremental stage-like process, but as a complex, non-linear and dynamic process characterized by a great variability of learning trajectories across individuals, and where

learning and development in one domain supports the learning and development in others, in an interactive mutualistic system (Van der Maas et al., 2006). The most recent models, such as the interactive specialization framework proposed by Johnson (Johnson, 2001, 2005, 2011), conceptualize human development in the context of brain maturation. According to this model, the functional characteristic of a given cortical region is determined, among other things, by its connectivity to other cortical regions, as well as by their activity. In this context, the emergence of new abilities with age is associated with changes in networks of brain regions, and not just changes within one or a few specific regions.

In conclusion, human development is rooted in the interactive specialization of multiple brain networks, a biological process that is highly influenced by the cultural, economic, social, cognitive and emotional environment in which humans live.



# 1.3

## Learning experience through the six learning trajectories

The chapters in **WG3** explore the learning experience across the six learning trajectories introduced and refined in **WG1-ch4**: learning to know and think, learning to do and evaluate, learning to learn, learning to live together, learning to live with nature and learning to be and become. These learning trajectories are reflected in individual's development through various chapters as follows.

*Brain development and maturation in the context of learning (WG3-ch2)* discusses the educational implications of research on mechanisms underlying brain development

and learning. It focuses on brain functioning, how the brain develops with age and how it affects the development of learning abilities, the neural processes involved in cognitive development and learning, and the factors that impact knowledge acquisition and executive functioning also with regards to sex differences and similarities. The chapter argues that human brain development is a complex, dynamic, continuous and non-linear process and provides examples of how biological processes and social factors have mutual effects on the brain's development and therefore on learning. These processes can inform education on how learning



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works and the various modalities through which an individual learns and thinks and how the ways we learn to know and think can be affected and constrained by the brain function and structure.

*Individual differences and influences on learning* (WG3-ch3) covers the biological, psychological, environmental and social factors that contribute to individual differences in learning. The chapter discusses the bi-directional interactions of intrinsic biological features and external environmental factors and argues that individual differences emerge from the interaction of a wide range of molecular, psychological and environmental factors (social, economic and cultural) that shape individual differences and influence learning. The interplay of these factors creates various capacities and differences that enable individuals to regulate their learning and confront challenges differently, which is particularly reflected in meta-cognitive skills and motivational factors impacting learning to learn competencies.

*The social and emotional foundations of learning* (WG3-ch4) features analysis of the significance of SEL in educational practices. It emphasizes the nature of learning, which is inherently social, relational and affective, and how social and emotional experiences interact with learning processes. The chapter describes the development of social and emotional skills across the lifespan with regards to neurobiological, social and cultural factors. It also argues that social, cultural, temporal and physical contexts affect the experience of SEL and developing socio-emotional skills. These contextual factors affect the experience of SEL in, for example, relationships and interactions with peers, family, community and the environment. Learning to live together and learning to live with nature result from the ability to communicate with others, understand each other, respect others and from aspects of human-to-human communication, as well as relationship with nature, which includes the connections and interrelations between living beings and the natural world

that are central to understanding the world in which we live. This is particularly important in indigenous contexts, where the relations between individuals and the environment play a significant role in how to live with nature. Life satisfaction and well-being are also associated with socio-emotional skills and competencies that individuals develop through a trajectory of learning to be and become in which they learn how to take care of themselves, how to live wisely amidst change and to become guided by an informed sense of purpose and meaning in life.

*Foundations of academic knowledge (WG3-ch5)* assesses the acquisition of academic knowledge and skills in domains including literacy, numeracy, sciences, arts and physical education. It examines how learning trajectories arise from complex interactions between individual brain development and sociocultural environments. The chapter argues that the course of child development involves interactions among neurobiological, cognitive, socio-emotional, cultural and

environmental influences. Literacy and numeracy are key gateways to academic learning and both culturally dependent skills requiring learning invented symbol systems. The fundamental skills that are described and discussed in this chapter are the bases for the development of academic knowledge and the trajectory of learning to know and think, which concerns the pursuit of knowledge and the various modalities of thinking that reflect the different forms of knowledge spanning from knowledge of culture, science, arts, environment and human rights, to knowledge of self and other. Learning to do and evaluate denotes a trajectory of skills such as literacy, numeracy, arts and sciences.

*Identifying and supporting children with learning disabilities (WG3-ch6)* assesses the ways to identify and support children with learning disabilities by describing considerations for children's learning needs. Learning disabilities arise through a dynamic interplay of biological and environmental

Literacy and numeracy are key gateways to academic learning and both culturally dependent skills requiring learning invented symbol systems.



...more work is needed to understand better the impact of different pedagogical practices on students' learning trajectories in various cultural contexts.

factors and therefore are seldom attributable to one specific cause. Recognizing the need to provide inclusive education to support all learners, the chapter asserts that more work is needed to understand better the impact of different pedagogical practices on students' learning trajectories in various cultural contexts. In this respect, the chapter contends that not only early identification of learning disabilities is important to ensure children have access to the support they need, but also a more inclusive education approach to help all learners reach their full potential. This inclusive pedagogy could promote a trajectory of learning to live together supporting children with learning disabilities.

*Learning spaces: built, natural and digital considerations for learning and learners (WG3-ch7)* explores the influence of different learning spaces and places – built spaces, natural spaces and digital spaces – on the learning experience. It looks at the role of these different kinds of spaces for learning, attainment, interpersonal relationships, skills development,

well-being and behaviours across six trajectories of learning: learning to know and think, learning to do and evaluate, learning to be and become and learning to live together. The chapter discusses the growing recognition that where education takes place matters for what is learned and what is afforded or assumed through various learning environments. It also recognizes the need for a broader uptake of non-formal, informal and non-school based learning for furthering socio-emotional and behavioural learning outcomes, as well as increasing cognitive learning outcomes for diversity of learners. This includes the consideration of technological affordance in the configurations of learning environments, as well as non-built and natural spaces – sustainable school design and place-based learning – that can increase the sense of meaning and connection with nature and the development of social awareness and sensitivity to contemporary ecological issues, such as sustainability, global warming and climate change (learning to live with nature).

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