OECD FUTURE OF EDUCATION AND SKILLS 2030

OECD Learning Compass 2030

A SERIES OF CONCEPT NOTES

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OECD Future of Education and Skills 2030

OECD Learning Compass 2030

A Series of Concept Notes

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OECD Future of Education and Skills 2030 project background

How can we prepare students for jobs that have not yet been created, to tackle societal challenges that we cannot yet imagine, and to use technologies that have not yet been invented? How can we equip them to thrive in an interconnected world where they need to understand and appreciate different perspectives and worldviews, interact respectfully with others, and take responsible action toward sustainability and collective well-being?

The future, by definition, is unpredictable; but by being attuned to some of the trends now sweeping across the world (OECD, 2019[1]) we can learn – and help our children learn – to adapt to, thrive in and even shape whatever the future holds. Students need support in developing not only knowledge and skills but also attitudes and values, which can guide them towards ethical and responsible actions. At the same time, they need opportunities to develop their creative ingenuity to help propel humanity towards a bright future.

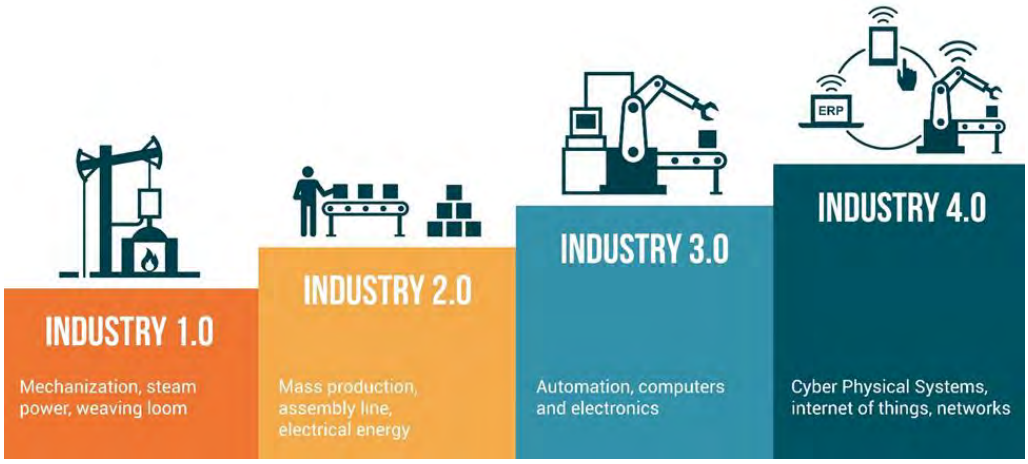
As Andreas Schleicher, Director of the OECD Directorate for Education and Skills, commented in 2019, "Education is no longer about teaching students something alone; it is more important to be teaching them to develop a reliable compass and the navigation tools to find their own way in a world that is increasingly complex, volatile and uncertain. Our imagination, awareness, knowledge, skills and, most important, our common values, intellectual and moral maturity, and sense of responsibility is what will guide us for the world to become a better place" (Schleicher, 2019[2]).

Change – even rapid change – is part of life; it can be both a source of inequality and an opportunity to eliminate inequities. The Industrial Revolution of the 1800s, for example, created a divide between those who benefited from the revolution and those who did not. As a result, there was a period of "social pain" at the societal level.

However, with the advent of universal, compulsory public schooling, access to education improved. Thus, more people could both contribute to and benefit from the industrial revolution; a time of "prosperity" followed a time of "social pain" (Goldin and Katz, 2010[3]).

This first Industrial Revolution was followed by several others. For example, in 2011, the German government inaugurated an Industry 4.0 strategy, proposing to move from "centralised" to "decentralised" smart manufacturing and production methods, blending the worlds of production and network connectivity in an "Internet of Things". The strategy called for creating a "smart industry" in which people, devices, objects and systems combine to form dynamic, self-organising networks of production (Figure 1, next page; (Germany Trade and Invest (GTAI), 2019[4])).

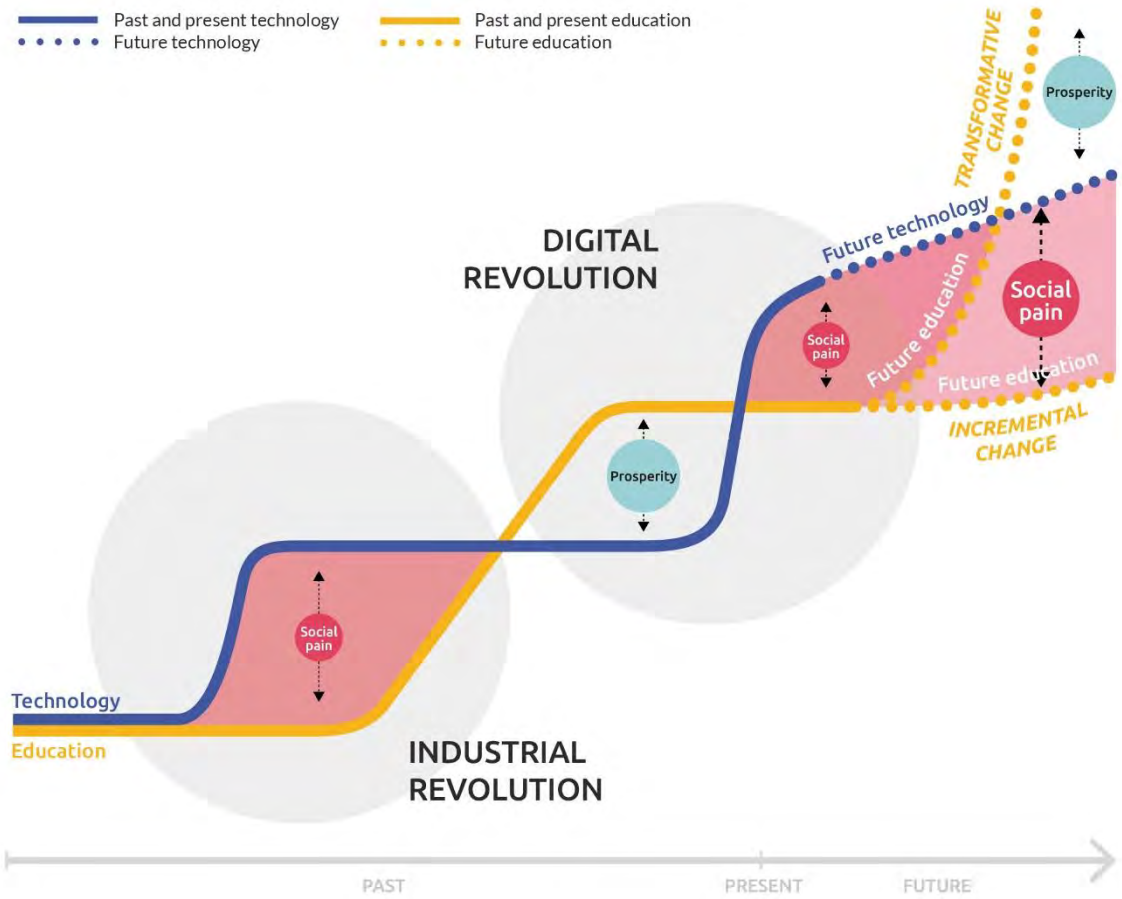
Figure 1. Industry 1.0 to 4.0



Source: McLellan (2018[5]).

As governments like Germany overhaul their economic strategies in the face of unprecedented challenges, including an exponentially faster rate of technological change, meaningful and relevant changes in education are urgently needed to achieve more inclusive and sustainable development for all, not just for the privileged few. Ethical questions about how to harness the knowledge and skills we possess to create new products and opportunities loom large. To shorten the period of "social pain" and maximise the period of "prosperity" for all, education systems need to undergo transformative change too (Figure 2).

Figure 2. The race between technology and education

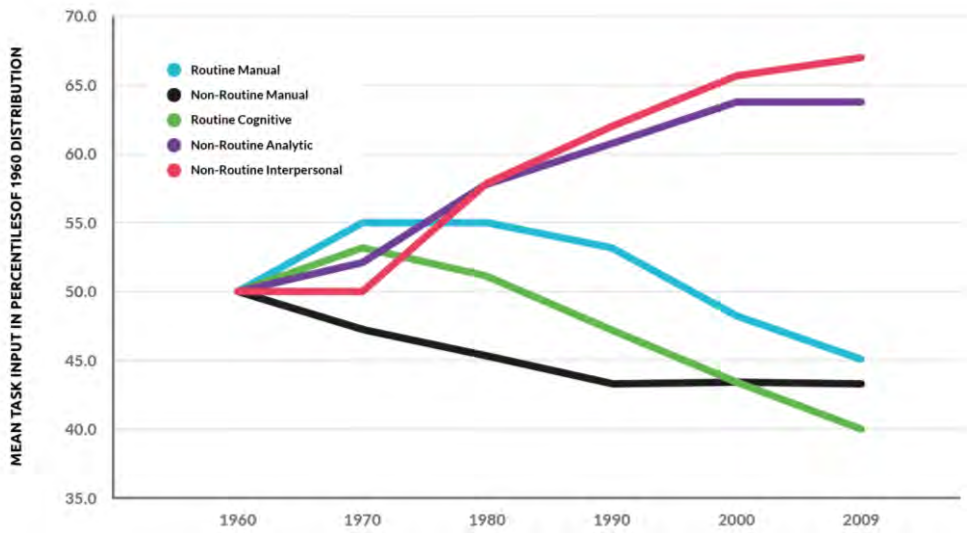


Source: Inspired by "The race between technology and education", Goldin and Katz (2010[3]).

For education to keep abreast with technological and other social and economic changes, we must first recognise what computers are good at and what they are not good at. Computers, including Artificial Intelligence, are not as good as humans at abstract tasks, manual tasks, tasks requiring complex contextual information and tasks requiring ethical judgements (Luckin and Issroff, 2018[6]; Autor and Price, 2013[7]). They are, however, good at routine manual, non-routine manual and routine cognitive tasks.

Due, in part, to these changes, the nature of work has also changed over the past half-century. Since 1960, people spend considerably more of their working hours doing non-routine tasks that require higher-order, analytical thinking and interpersonal skills (Figure 3). This is just one of the many shifts taking place in social and economic spheres. As a result, our relationships with work, with each other, and with our environment also need to shift.

Figure 3. Change since 1960 in prevalence of types of tasks required for work



Note: This figure shows how the task composition performed by US workers has changed from 1960 to 2009.
Source: Autor and Price (2013) in Bialik and Fadel (2018[8]), p.7.

The OECD Future of Education and Skills 2030 project

As these questions and concerns about unprecedented social, economic and social challenges became increasingly urgent, the OECD Education Policy Committee in 2015 recognised the importance of stepping back and looking at the bigger picture – the longer-term challenges facing education – even as policy makers were busy with more immediate policy concerns.

At the same time, the Committee recognised the need to make the process of curriculum design and development more evidence-based and systematic. Learners, rather than political preferences, needed to be placed firmly at the heart of curriculum change.

As a response, the OECD launched the Future of Education and Skills 2030 project in 2015 with the aim of helping countries prepare their education systems for the future. Stakeholders agreed that the project would focus:

- in the **first phase (2015-19)**, on "what" questions – what kinds of competencies (knowledge, skills, attitudes and values) today's students need to thrive in and shape the future for better lives and for individual and societal well-being
- in the **second phase (2019 and beyond)**, on "how" questions – how to design learning environments that can nurture such competencies, i.e. how to implement curricula effectively.

Policy makers, researchers, school leaders, teachers, students and social partners from around the world worked together with the OECD from 2016 to 2018 to co-develop a vision of education and a learning framework that sets out the types of competencies today's students need to thrive in and shape their future.

Although the project focuses on secondary education as a starting point, it recognises the importance of all levels of formal and informal education, and of lifelong learning, and the applicability of project principles to all levels of learning. The framework can thus serve as a common language to build a shared understanding – from the local to the global level – that every learner, no matter his or her age or background, can develop as a whole person, fulfil his or her potential, and participate in shaping a future that improves the well-being of individuals, communities and the planet.

Such a shared language can also facilitate comparisons and learning across a wide range of education systems. With a shared learning framework, stakeholders can communicate with each other, and learn about and compare best practices. The OECD Future of Education and Skills 2030, in other words, stimulates a discussion we need to have now (Schleicher, 2018[9]).

How education systems have (or have not) evolved in response to demands from societies

Some education experts have noted that most 21st-century students are still being taught by teachers using 20th-century pedagogical practices in 19th-century school organisations (Schleicher, 2018[9]) (Table 1).

19th century

The 19th century was an age of civil wars, colonialism and imperialism. The natural environment – water, air, soil and minerals – was seen as the source of economic growth. Nature was thus was viewed as something for humans to exploit in order to produce goods and services.

With these natural resources and the inventions that sparked the first Industrial Revolution, including electricity, the flying shuttle and the water frame, new industries, such as the textile industry, flourished. Mass production, based on assembly lines and the division of labour, became possible. For those who had access to capital, such as land, labour and money, profit making became the goal. Hierarchical decision making was seen as the most efficient.

With economic growth, standards of living and average income improved; and with the introduction of universal public schooling, more people benefitted from the gains of the industrial revolution. However, schooling was modelled to respond to societal demands for

industrial revolution. However, schooling was modelled to respond to societal demands for labour, and thus the goal of education was largely to prepare students for jobs. Teaching was also made "efficient": in mass education, one teacher was to teach as many students as possible with standardised content. Thus, the curriculum model that matched the demands of the labour market was static, linear and standardised.

20th century

The 20th century was marked by two world wars and the restoration of independence for many nations after a period of colonialism and imperialism. Thus, autonomy, liberation and independence became human and societal aspirations. Late in the century, it was also the age of the Internet, when new industries and jobs in computers, electronics and finance were created, and when the automation of manual tasks accelerated.

It was a time of competition among businesses. Competition for land resulted in ecological destruction, including deforestation, water depletion, and the extinction of many species. Population growth added more pressure to already stretched natural resources. Social awareness about the need to protect the environment grew along with the existential threat posed by climate change. The concept of "corporate social responsibility" was promoted during this period. Humans were seen as "capital", or as the subject of investment, rather than as "labour" to exploit.

Expectations for work organisation changed accordingly. To be more efficient, some organisations delegated responsibilities for decision making to those who knew best the particular contexts for those decisions and, in turn, these decision makers were held accountable for outcomes.

Broader goals for education were set during this period. Education was not just about learning for jobs, but for individual fulfilment too. The scope of curricula widened to include non-academic subjects, such as physical education. The curriculum was still static, linear and standardised; and assessment through standardised testing was valued to ensure accountability. Schools were expected to be accountable for their outcomes. Teachers were increasingly expected to comply with standards ensuring that all students, regardless of their background, were provided equitable opportunities to learn.

21st century

So far, the 21st century is characterised by interdependence among nations facilitated by global communication, the decentralisation of power, which has been accelerated by social media, emerging nationalism, and increasing incidents of terrorism. Workplaces have become more flat, open, flexible and transparent; in organisations, teamwork is valued more highly than hierarchy.

It is also the age of accelerated technological innovations, such as cyber physical technology, social media, Artificial Intelligence, robotics, the Internet of Things and 3-D printing, among many others. These innovations bring both opportunities and challenges, including questions about ethics and morals. Social media has provided some businesses with new opportunities, and business models have shifted to include those based on a shared economy. Social entrepreneurship has broadened the discussion about businesses to include purpose. Some entrepreneurs consider the purpose of business to be not solely for making profits but for creating social value and solving society's most urgent problems. Businesses are moving from a model of "corporate social responsibility" to models of "creating shared values" (Moore, 2014[10]).

But at the same time, challenges are also emerging: the use of big data threatens individual privacy; and the easy manipulation and creation of false data and stories, aided by digitalisation and social media, has spawned fake news and a "post-truth" era.

The paradigm has shifted so that the environment is viewed as a larger ecological system of which humans are merely a part. Humans are expected to co-exist with nature. Thus, a current aspiration is to ensure the well-being not only of humans but also of the planet.

To turn this vision into reality, everyone needs to take action. To move from the "division of labour" to "shared responsibility", everyone needs to have the skills, knowledge and the desire to contribute.

In the education sector, some changes are already emerging. Schools are no longer seen as closed entities in themselves, but as part of the larger eco-system in which they operate. Some schools collaborate with each other, forming networks or partnerships with other schools. Some schools have started to collaborate more widely with other organisations in their communities, such as scientific organisations, theatres, universities, social service organisations, technology companies and businesses, where teachers and students can become familiar with the skills and competencies that employers and other community members deem critical.

These schools aspire to operate with a curriculum that recognises the need for interdependence and broadens the goals of education to include "education for citizenship". Such a curriculum would recognise the differences between individual students, and

acknowledge that each student has different prior knowledge and skills, as well as different attitudes and values, and, therefore, may learn differently. Thus, curricula will have to be dynamic rather than static. They will have to allow for non-linear learning paths rather than expect all students to follow linear progressions along a single, standardised path. They will have to be more flexible and personalised to ensure that each student's unique talents are developed so that all students can realise their full potential.

Table 1. Comparison of society, industry and education across the 19th and 20th centuries, and the aspirational vision for the 21st century [1]

	19th century	20th century	Vision for the 21st century
World events	Civil wars, racial segregation, colonialism and imperialism	World Wars I and II, independence of nation states, Cold War	Interdependence among national states, decentralisation of power, terrorist attacks, nationalism
Technological innovations	Electricity, telephone	Internet	Cyber physical technology (social media, AI, 3-D printing, robotics)
Main industry types and business climates	Oil industry, textile industry Mass production by machine Focus on profit making	Computers, electronics, financing Shift from manual to machines – automation Tailored production of goods and services for individual consumers Corporate social responsibility (CSR)	Social media, Internet of things, big data, digitalisation, post-truth (fake news) Shared economy, social entrepreneurship Consumers take part in the production of goods and services Focus on value making, sense making Corporate shift to creating shared value (CSV) and considering to contribute towards the UN Sustainable Development Goals (SDGs)
Environmental stewardship	Humans conquer nature Humans own nature (in particular, land) besides labour, capital as key factors of production	Humans begin to realize the need to protect nature (environmental conservation/ protection) Focusing on human capital	Humans co-exist with nature; humans are part the mother nature Focus on sustainable development Support green growth Nature is considered as one of the important capitals – natural capital, human capital, cultural capital and social capital.
Changes in society/life	Improved standards of living and average income	Globalisation, baby boom, increased access to information	Accelerated migration, urbanisation, longer life expectancy, falling fertility rate, growing inequality, depletion of natural resources, climate change
Work organisation	Division of labour – e.g. assembly in factories – assembly lines Hierarchical organisation	Transparency in organisation Organisation with delegation of responsibility and accountability	Transparency in organisation Organisation with delegation of responsibility and accountability as well as shared responsibility Flat organisation - Flat, open, flexible, transparent, and team-work oriented organisation
Work organisation in education and changes in compulsory schooling	Universal public schooling (primary and secondary education)	Emerging divergence of schooling (e.g. private, home schooling), Competition among schools	Emerging networks/partnerships of schools Emerging collaboration among schools Emerging collaboration between schools and communities at all levels, meta-, meso-, micro, capturing education system as part of a larger eco-system
Curriculum	Prepare for labour market; education for jobs Academic disciplines only (mathematics, language) Static, linear and standardised	Prepare for independence; education for individual fulfilment Widened scope (added physical education, other domains); Still static, linear and standardised	Preparing for interdependence; education for citizenship Balanced scope (breadth and depth) Non-linear, dynamic, flexible curricula; focus on more personalised learning

Note: For an animated version of this information visit www.youtube.com/watch?v=mlXvQKUS-_Q .

Creating a "new normal" in education: A 21st-century model?

Today's innovations often become tomorrow's commonplace. The OECD Future of Education and Skills 2030 project has observed some innovative features of education systems that are just emerging but that may become the "new normal"[2] in tomorrow's education systems, e.g. something which was previously uncommon has become commonplace (Table 2).

As mentioned above, while education systems have been thought of traditionally as independent entities, they are now being considered as part of a larger eco-system to which they contribute and by which they are influenced. In line with this shift, a sense of shared responsibility for the education system and stakeholder engagement has also evolved: decision-making is no longer controlled by a select group of people, rather it is shared among stakeholders of the education system, e.g. parents, employers, communities and students. Additionally, all stakeholders increasingly work together and assume responsibility for a student's education, including the student. Rather than students being acted up by the education system, they have become active participants and change agents in the system alongside teachers and principals, and are learning to be responsible for their own learning.

Likewise, whereas student learning outcomes and academic achievements traditionally define the effectiveness and the quality of their school experience, student well-being and students' learning experiences – the quality of "learning processes" – have risen in value and expanded the focus beyond "outcomes".

Thus, approaches to curriculum design and learning progression is shifting from a "static, linear learning-progression model" to a "non-linear, dynamic model", which recognises that each student has his/her own learning path and is equipped with different prior knowledge, skills and attitudes when he/she starts school. And, student assessment has thus also shifted from standardised testing only to different types of assessments for different purposes.

In line with these changes, the focus and purpose of monitoring education system performance have shifted from the traditional valuing of accountability and compliance to include valuing of continuous system improvement through feedback at all levels of the system.

Most importantly, the role of students in the education system is changing from participants in the classroom learning by listening to directions of teachers with emerging autonomy to active participants with both student agency and co-agency in particular with teacher agency, who also shape the classroom environments.

Table 2. The "new normal" in education[1]

Features	Traditional education system	**An education system embodying the "new normal"**
Education system	Education system is an independent entity	Education system is part of a larger eco-system
Responsibility and stakeholders engagement	Decisions made based on a selected group of people and thus they become held accountable and responsible for the decisions made	Decision-making and responsibilities shared among stakeholders, including parents, employers, communities, and students
	Division of labour (Principals manage schools, teachers teach, students listen to teachers and learn)	Shared responsibility (everyone works together and assumes responsibility for a student's education and students also learn to be responsible for their own learning)
Approach to effectiveness and to quality of school experience	Outcomes most valued (student performance, student achievements are valued as indicators to evaluate systems for accountability and for system improvement) Focus on academic performance	Val**uing not only "outcomes" but also "process"** (in addition to student performance and student achievements, students' learning experiences are in and of itself recognised as having intrinsic value)
		Focus on not only academic performance but also on holistic student well-being
Approach to curriculum design and learning progression	Linear and standardized progression (the curriculum is developed based on a standardised, linear learning-progression model)	Non-linear progression (recognising that each student has his/her own learning path and is equipped with different prior knowledge, skills and attitudes when he/she starts school)
Focus of monitoring	Valuing accountability and compliance	System accountability as well as system improvements (e.g. continuous improvement through frequent feedback at all levels)
Student assessment	Standardised testing	Different types of assessments used for different purposes
Role of students	Learning by listening to directions of teachers with emerging student autonomy	Active participant with both student agency and co-agency in particular with teacher agency

Note: For an animated version of this information visit www.youtube.com/watch?v=9YNDnkph_Ko.

From OECD Key Competencies to OECD Transformative Competencies

The Education and Skills 2030 project began by revising the OECD Definition and Selection of Competencies: Theoretical and Conceptual Foundations (DeSeCo) project. This latter project was developed by the OECD between 1997 and 2003 with an aim of providing theoretical and conceptual foundations for identifying the competencies needed for a successful life and a well-functioning society. The DeSeCo project identified three categories of competencies as OECD Key Competencies:

- **Use tools interactively (e.g. language, technology)**
  - The ability to use language, symbols and text interactively
  - The ability to use knowledge and information interactively
  - The ability to use technology interactively
- **Interact in heterogeneous groups**
  - The ability to relate well to others
  - The ability to co-operate
  - The ability to manage and resolve conflicts
- **Act autonomously**
  - The ability to act within the "big picture"
  - The ability to form and conduct life plans and personal projects
  - The ability to assert rights, interests, limits and needs.

Building on the DeSeCo framework, the OECD Learning Framework 2030 includes new insights and emerging concepts from thought leaders that may not be fully researched yet. It aims to increase its relevance to policy makers by linking the framework to curriculum design issues. The framework was constructed, and is understood by stakeholders, as actionable and multi-directional. It is both globally relevant and informed, and flexible enough for local contextualisation.

The framework was designed through iterative, continuous discussions among national and local governments, academic experts from different disciplines, schools, practitioners, social partners and students. Thematic working groups were established for each of the underlying key concepts that comprise the OECD Learning Framework 2030. The Learning Framework uses the metaphor of the "learning compass" to show the types of competencies students need in order to navigate towards the future we want, individually and collectively.

OECD Learning Compass 2030

Just as a compass orients a traveller, the OECD Learning Compass 2030 indicates the knowledge, skills, attitudes and values students need not just to weather the changes in our environment and in our daily lives, but to help shape the future we want.

The Learning Compass 2030 is composed of seven elements:

1. **Core foundations**

   The OECD Learning Compass 2030 defines core foundations as the fundamental conditions and core skills, knowledge, and attitudes and values that are prerequisites for further learning across the entire curriculum. The core foundations provide a basis for developing student agency and transformative competencies. All students need this solid grounding in order to fulfil their potential to become responsible contributors to and healthy members of society.

2. **Transformative competencies**

   To meet the challenges of the 21st century, students need to be empowered and feel that they can help shape a world where well-being and sustainability – for themselves, for others and for the planet – are achievable. The OECD Learning Compass 2030 identifies three "transformative competencies" that students need in order to contribute to and thrive in our world, and shape a better future: creating new value, reconciling tensions and dilemmas, and taking responsibility.

3. **Student agency/ co-agency**

   Student agency is defined as the belief that students have the will and the ability to positively influence their own lives and the world around them as well as the capacity to set a goal, reflect and act responsibly to effect change. Student agency relates to the development of an identity and a sense of belonging. When students develop agency, they rely on motivation, hope, self-efficacy and a growth mindset (the understanding that abilities and intelligence can be developed) to navigate towards well-being. This enables them to act with a sense of purpose, which guides them to flourish and thrive in society. Students learn, grow and exercise their agency in social contexts and this is why co-agency is also crucial. Students develops co-agency in an interactive, mutually supportive and enriching relationship with their peers, teachers, parents and communities in an organic way in a larger learning eco-system.

4. **Knowledge**

   As part of the OECD Learning Compass 2030, knowledge includes theoretical concepts and ideas in addition to practical understanding based on the experience of having performed certain tasks. The Education and Skills 2030 project recognises four different types of knowledge: disciplinary, interdisciplinary, epistemic and procedural.

5. **Skills**

   Skills are the ability and capacity to carry out processes and be able to use one's knowledge in a responsible way to achieve a goal. The OECD Learning Compass 2030 distinguishes three different types of skills: cognitive and metacognitive; social and emotional; and practical and physical.

6. **Attitudes and values**

   Attitudes and values refer to the principles and beliefs that influence one's choices, judgements, behaviours and actions on the path towards individual, societal and environmental well-being. Strengthening and renewing trust in institutions and among communities require greater efforts to develop core shared values of citizenship in order to build more inclusive, fair, and sustainable economies and societies.

7. **Anticipation-Action-Reflection cycle**

   The Anticipation-Action-Reflection (AAR) cycle is an iterative learning process whereby learners continuously improve their thinking and act intentionally and responsibly. In the anticipation phase, learners become informed by considering how actions taken today might have consequences for the future. In the action phase, learners have the will and capacity to take action towards well-being. In the reflection phase, learners improve their thinking, which leads to better actions towards individual, societal and environmental well-being.

OECD Future of Education and Skills 2030 Phase II

From 2019 onward, Phase II the OECD Future of Education and Skills 2030 project will shifts its focus.

First, it will shift its focus of **concept-making** from "learning for 2030" to "teaching for 2030". Phase II will explore the types of teacher competencies and teacher profiles that can help all students realise their potential. Teachers are key to implementing curricula effectively. While technology may become a superior vehicle for transmitting knowledge, the relational aspects of teaching – being a good coach, a good mentor – will remain human capacities of enduring value (Schleicher, 2018[9]). Identifying the competencies held by the most effective and successful teachers can help countries enhance the quality of their teaching workforce.

Second, the **curriculum analysis** will shift its focus from "curriculum redesign" to "curriculum implementation". Participating countries have agreed to focus on:

- curriculum change as part of a larger system of change management
- aligning curriculum changes with changes in pedagogies and assessments
- aligning curriculum changes with changes in initial teacher education and professional development (including school leaders).

These areas will be examined through an analysis of existing research, an international survey on curriculum implementation, multi-stakeholder consultations and global peer-learning.

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Notes

[1] The table is a simplified representation of complex phenomena in OECD countries; therefore some of the tables may not represent the general trends of the countries/ jurisdictions. For the information concerning the 21st century, the aim is not to summarise general trends but to set out an aspirational vision, a "new normal". Certain trends may still be emerging at the time of writing.

[2] The term "new normal" emerged following the financial crisis of 2007-08 in reference to the altered global financial conditions. The term gradually gained ground in contexts other than business and economics, and is now widely used to indicate that something which was once abnormal has become commonplace.

OECD Future of Education and Skills 2030

Conceptual learning framework

LEARNING COMPASS 2030

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BETTER POLICIES FOR BETTER LIVES

IN BRIEF

OECD LEARNING COMPASS 2030

T he OECD Learning Compass 2030, a product of the OECD Future of Education and Skills 2030 project, is an evolving learning framework that sets out an aspirational vision for the future of education. It supports the wider goals of education and provides points of orientation towards the future we want: individual and collective well-being. The metaphor of a learning compass was adopted to emphasise the need for students to learn to navigate by themselves through unfamiliar contexts, and find their direction in a meaningful and responsible way, instead of simply receiving fixed instructions or directions from their teachers.

The framework offers a broad vision of the types of competencies students will need to thrive in 2030 and beyond. It also develops a common language and understanding that is globally relevant and informed, while providing space to adapt the framework to local contexts.

The components of the compass include core foundations, knowledge, skills, attitudes and values, transformative competencies and a cycle of anticipation, action and reflection (see concept notes on each of these components). The concept of student agency (see concept note) is central to the Learning Compass 2030, as the compass is a tool students can use to orient themselves as they exercise their sense of purpose and responsibility while learning to influence the people, events and circumstances around them for the better.

The metaphor of a learning compass was adopted to emphasise the need for students to learn to navigate by themselves through unfamiliar contexts.

KEY POINTS

- The OECD Learning Compass 2030 is neither an assessment framework nor a curriculum framework. It recognises the intrinsic value of learning by elaborating a wide range and types of learning within a broad structure, and acknowledges that learning does not only happen in school.
- The learning framework is the product of collaboration among government representatives, academic experts, school leaders, teachers, students and social partners from around the world who have a genuine interest in supporting positive change in education systems.
- The notion of societal well-being has changed over the years to encompass far more than economic and material prosperity. Even though there may be many different visions of the future we want, the well-being of society is a shared destination.

For the full concept note, click ***here***.

More content at: ***www.oecd.org/education/2030-project***

OECD LEARNING COMPASS 2030

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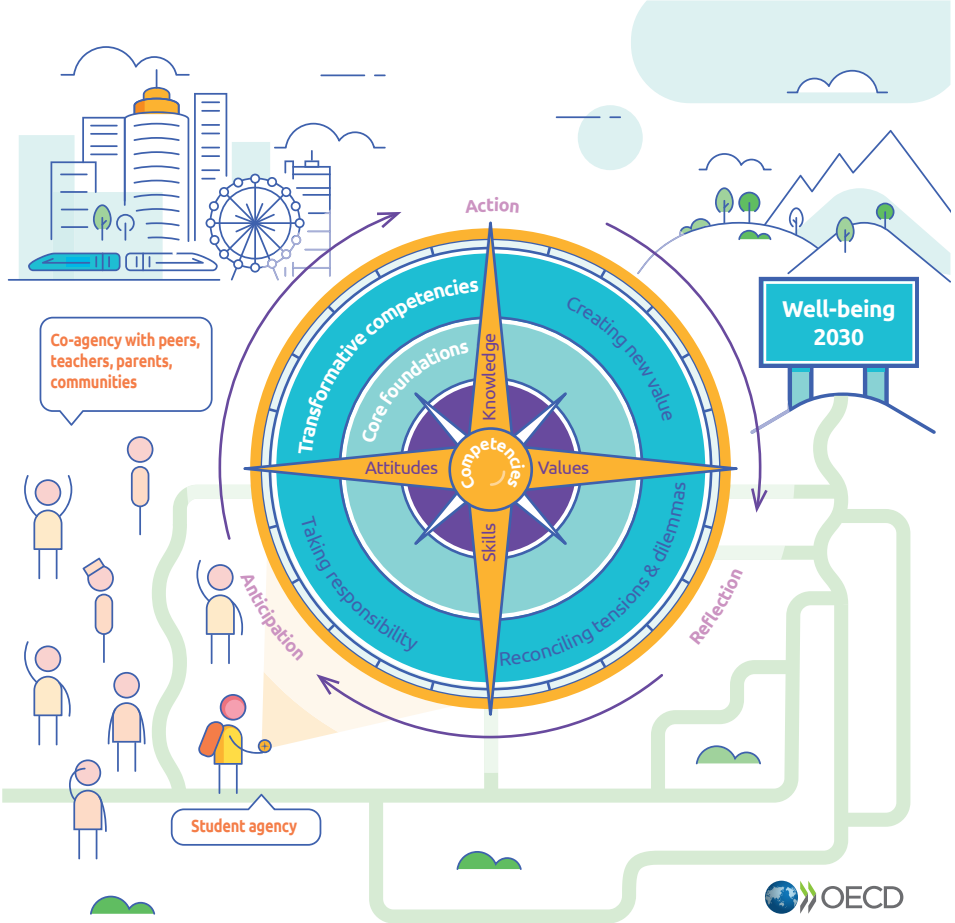
Source: *www.oecd.org/education/2030-project/learning/learning-compass-2030*

WHAT IS THE LEARNING COMPASS?

An animation explaining the OECD Learning Compass 2030
Source: *www.oecd.org/education/2030-project/learning/learning-compass-2030*

OECD LEARNING COMPASS 2030



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OECD Learning Compass 2030

Historically, education has often been slow to react to changes in society. During the 19th and 20th centuries, education systems sometimes changed through rapid bursts of expansion and restructuring. But in between these moments, curriculum structures and delivery often remained static, linear and rigid. The industrial form of schooling meant that students were often expected to be passive participants in classrooms (see the OECD Future of Education and Skills 2030 project background). Now, in the face of deep and widespread changes that are transforming our world and disrupting the institutional status quo in many sectors, there is a growing recognition of the need to re-think the goals of education, and the competencies students need to thrive. Global trends like digitalisation, climate change, and advances in artificial intelligence, to name just three, pose fundamental challenges to both the goals and the methods of education.

In 2015, the Education Policy Committee of the OECD agreed to launch the OECD Future of Education and Skills 2030 project as an opportunity to step back, explore the longer-term challenges facing education, and help make the process of curriculum design and development more evidence-based and systematic. The aim of the project is to help countries find answers to two far-reaching questions:

- **What** knowledge, skills, attitudes and values will today's students need to thrive in and shape their world?
- **How** can instructional systems develop these knowledge, skills, attitudes and values effectively?

As one response to these questions, the OECD Future of Education and Skills 2030 project developed the OECD Learning Compass 2030 (Figure 1), an evolving learning framework that sets out an aspirational vision of education in 2030. It provides points of orientation towards the future we want: individual and collective well-being. The OECD Learning Compass 2030 aims to articulate core goals and elements of a shared future in a way that can be used at multiple levels – by individual learners, education practitioners, system leaders, policy designers and institutional decision makers – to clarify, connect and guide their efforts.

The OECD Learning Compass 2030 is an "evolving framework" in that it will be refined over time by the wider community of interested stakeholders. It is the product of a collaboration among government representatives, academic experts, school leaders, teachers, students and social partners who have a genuine interest in supporting positive change in education systems. These stakeholders come from a wide variety of countries.[1] Thus the framework also serves to develop a common language and understanding that is globally relevant and informed, while providing space to adapt the framework to local contexts.

The OECD Learning Compass 2030 is neither an assessment framework nor a curriculum framework

The OECD Learning Compass 2030 sets out a "learning framework", not an "assessment framework". The framework offers a broad vision of the types of competencies students need to thrive in 2030, as opposed to what kind of competencies should be measured or can be measured. While it is often said that "what gets measured gets treasured", this learning framework allows for what cannot be measured (at least, for the time being) to be treasured. The OECD Learning Compass 2030 recognises the intrinsic value of learning by elaborating a wide range and types of learning within a broad structure. At the same time, assessment initiatives can use the learning framework to help focus discussions on what kinds of learning could be prioritised in particular contexts, for example for the purpose of monitoring and supporting student progress.

The OECD Learning Compass 2030 is not a "curriculum framework" either. It acknowledges the importance of formal, non-formal and informal learning alongside education that is bounded by formal curricula and instructional strategies. Moving towards 2030, it is increasingly important to recognise the multiple layers and directions of learning in which students participate, including at school, at home and in the communities to which they belong.

The "points of orientation" in the OECD Learning Compass 2030 help students navigate towards the future we want

Figure 1. OECD Learning Compass 2030

Student agency/co-agency

The metaphor of a learning compass was adopted to emphasise the need for students to learn to navigate by themselves through unfamiliar contexts and find their direction in a meaningful and responsible way, instead of simply receiving fixed instructions or directions from their teachers. Thus, the concept of **student agency** is closely associated with the OECD Learning Compass 2030 (see concept note on Student Agency). The visual above, showing a student holding the OECD Learning Compass 2030, represents the student exercising his or her sense of purpose and responsibility while learning to influence the people, events and circumstances around him/her for the better.

However, student agency does not mean student autonomy or student choice. People learn, grow and exercise their agency in social contexts. Thus, as the visual also shows, students are surrounded by their peers, teachers, families and communities, all of whom interact with and guide the student towards well-being. This the concept of **co-agency**.

Core foundations

For all learners to exercise their agency and navigate by themselves towards fulfilling their potential, research suggests that students need core foundations. These are "the fundamental conditions and core knowledge, skills, attitudes and values (see the concept notes on Skills, Knowledge, and Attitudes and Values) that are prerequisites for further learning across the entire curriculum" (see the concept note on Core Foundations). Core knowledge, skills, attitudes and values for 2030 will cover not only literacy and numeracy, but also data and digital literacy, physical and mental health, and social and emotional skills. All of these are increasingly recognised as essential for thriving in the 21st century, and as important facets of human intelligence.

Competencies can be built on these core foundations. A competency is a holistic concept that includes knowledge, skills, attitudes and values. The OECD Future of Education and Skills 2030 project defines a competency as more than just "skills". Skills are a prerequisite for exercising a competency. To be ready and competent for 2030, students need to be able to use their knowledge, skills, attitudes and values to act in coherent and responsible ways that change the future for the better.

Competency and knowledge are neither competing nor mutually exclusive concepts. Students need to learn core knowledge as a fundamental building block of understanding; they can also exhibit competencies based on knowledge, and use their growing competency to update and apply their knowledge, and deepen their understanding. Thus, the concept of competency implies more than just the acquisition of knowledge and skills; it involves the mobilisation of knowledge, skills, attitudes and values to meet complex demands in situations of uncertainty.

Transformative competencies

Learners need to develop a sense of themselves in the world. In order to adapt to complexity and uncertainty, and be able to help shape a better future, every learner needs to be equipped with certain **transformative competencies** (see the concept note on Transformative Competencies). These specific competencies are transformative both because they enable students to develop and reflect on their own perspective, and because they are necessary for learning how to shape and contribute to a changing world. Creating new value, taking responsibility, and reconciling conflicts, tensions and dilemmas are essential for thriving in and helping shape the future.

Anticipation – Action – Reflection (AAR) cycle

The Anticipation-Action-Reflection (AAR) cycle is an iterative learning process whereby learners continuously improve their thinking and act intentionally and responsibly towards collective well-being (see the concept note on the Anticipation-Action-Reflection cycle). Through planning, experience and reflection, learners deepen their understanding and widen their perspective. The AAR cycle is a catalyst for the development of the transformative competencies: each of those competencies depends on the learner's ability to be adaptive and reflective and to take action accordingly, and to continually improve his or her thinking.

Students can use the learning compass to find their way towards well-being

Understanding the trends shaping our world can help prepare us for the future, and identify the kinds of competencies today's students will need to thrive (see the OECD Future of Education and Skills 2030 project background; (OECD, 2019[1])). For example, emerging technologies, such as Artificial Intelligence and Big Data, have changed the ways people work, live, learn and interact.

What has also changed is society's definition of well-being. What does the OECD Future of Education and Skills 2030 project mean when it refers to "well-being"? It has become widely recognised that economic prosperity accounts for only one part of an individual's - or a society's – well-being (European Commission, 2019[2]; Gurria, 2015[3]). The OECD Better Life Index identifies 11 factors that contribute to an individual's well-being – including economic factors such as jobs, income and housing, and other factors that affect the quality of life, such as work-life balance, education, safety, life satisfaction, health, civic engagement, the environment and community (OECD Better Life Index, 2018[4]) (Figure 2).

Figure 2. The OECD framework for measuring well-being and progress

Source: Asmussen, K. (2017[5]), *Language, wellbeing and social mobility*, www.eif.org.uk/blog/language-wellbeing-and-social-mobility.

Individual well-being helps build economic, human, social and natural capital – which, in turn, enhances individual well-being over time.

For example, the OECD Future of Education and Skills 2030 recognises that humans are one part of the complex natural ecosystem (Kolert, 2014[6]) and thus its learning framework includes "environmental quality" as a factor that affects individual well-being. Students are thus expected to learn to care not only for their personal well-being, but also for the well-being of their friends, families, communities and the planet itself. (To illustrate what these well-being indicators mean in real life, the OECD Future of Education and Skills 2030 project asked students to describe their vision of the future they wish to create for each well-being domain. Their responses can be viewed in the "Future We Want" videos).

Each individual student should "hold" his or her own learning compass. Where the student stands – his or her prior knowledge, learning experiences and dispositions, family background – will differ from person to person; therefore the student's learning path and the speed with which he or she moves towards well-being will differ from those of his/her peers. Yet, even though there may be many visions of the future we want, the well-being of society is a shared "destination".

The United Nations Sustainable Development Goals

In 2015, the United Nations (UN) defined 17 Sustainable Development Goals for 2030. They cover various domains, including eradicating poverty and hunger, ensuring good health, well-being, quality education, gender equality and calling for action on climate change, among others (United Nations, 2015[7]) (Figure 3).

Figure 3. The United Nations Sustainable Development Goals

Source: www.un.org/sustainabledevelopment/sustainable-development-goals/

The OECD Learning Compass 2030 was developed to help students attain individual well-being and collective well-being, including at the global level. To this end, the OECD Future of Education and Skills 2030 project works closely with UN partners, particularly UNESCO. The table below shows the relationships between the facets of well-being identified by the OECD and the UN Sustainable Development Goals.

Table 1. How the OECD concept of well-being aligns with the United Nations Sustainable Development Goals

Destination: OECD Well-Being	UN Sustainable Development Goals
1. Jobs	8. Decent work and economy growth 9. Industry, innovation, and infrastructure
2. Income	1. No poverty 2. Zero hunger 10. Reduced inequalities
3. Housing	1. No poverty 3. Good health and well-being
4. Work-life balance	3. Good health and well-being 5. Gender equality 8. Decent work
5. Safety	16. Peace, justice and strong institutions
6. Life satisfaction	Related to all goals
7. Health	3. Good health and well-being
8. Civic engagement	5. Gender equality
9. Environment	6. Clean water and sanitation 7. Affordable and clean energy 12. Responsible consumption and production 13. Climate action 14. Life below water 15. Life on land
10. Education	3. Good health and well-being 4. Quality education 5. Gender equality
11. Community	11. Sustainable cities and communities 17. Partnership for the goals

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Note

[1] OECD Future of Education and Skills 2030 stakeholders come from the following countries and economies: Argentina, Australia, Belgium, Brazil, Canada (the provinces of British Columbia, Ontario, Quebec and Saskatchewan), Chile, China (People's Republic of), Costa Rica, the Czech Republic, Denmark, Estonia, France, Finland, Germany, Greece, Hong Kong (China), Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Japan, Kazakhstan, Korea, Latvia, Lebanon, Lithuania, Luxembourg, Malaysia, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russia, Saudi Arabia, Singapore, Slovenia, South Africa, Sweden, Switzerland, Turkey, United Arab Emirates, United Kingdom (England, Northern Ireland, Scotland and Wales), United States and Viet Nam. OECD Future of Education and Skills 2030 stakeholders also come from the following international organisations: Council of Europe, European Union, UNESCO, and UNESCO IBE.

OECD Future of Education and Skills 2030

Conceptual learning framework

STUDENT AGENCY FOR 2030

OECD
BETTER POLICIES FOR BETTER LIVES

IN BRIEF

STUDENT AGENCY FOR 2030

The concept of student agency, as understood in the context of the OECD Learning Compass 2030, is rooted in the principle that students have the ability and the will to positively influence their own lives and the world around them. Student agency is thus defined as the capacity to set a goal, reflect and act responsibly to effect change. It is about acting rather than being acted upon; shaping rather than being shaped; and making responsible decisions and choices rather than accepting those determined by others.

When students are agents in their learning, that is, when they play an active role in deciding what and how they will learn, they tend to show greater motivation to learn and are more likely to define objectives for their learning. These students are also more likely to have "learned how to learn" – an invaluable skill that they can and will use throughout their lives.

Agency can be exercised in nearly every context: moral, social, economic, creative. For example, students need to use moral agency to help them make decisions that recognise the rights and needs of others. While a well-developed sense of agency can help individuals achieve long-term goals and overcome adversity, students need foundational cognitive, social and emotional skills so that they can apply agency to their own – and society's – benefit.

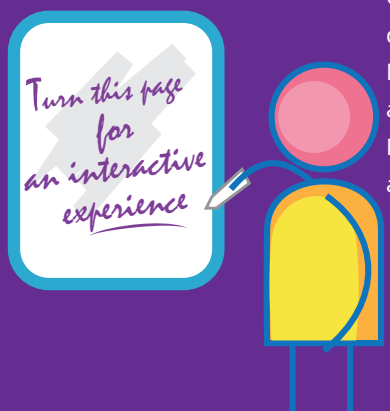
Agency is perceived and interpreted differently around the world. Some languages have no direct translation for the term "student agency" as it is used in the OECD Learning Compass 2030; interpretations will vary across different societies and contexts. Nonetheless, the notion of students playing an active role in their education is central to the Learning Compass and is being emphasised in a growing number of countries.

When students are agents in their learning, they are more likely to have "learned how to learn" – an invaluable skill that they can use throughout their lives.

In education systems that encourage student agency, learning involves not only instruction and evaluation but also co-construction. Co-agency is when teachers and students become co-creators in the teaching-and-learning process. The concept of co-agency recognises that students, teachers, parents and communities work together to help students progress towards their shared goals.

KEY POINTS

- Agency implies having the ability and the will to positively influence one's own life and the world around them.
- In order to exercise agency to the full potential, students need to build foundation skills.
- The concept of student agency varies across cultures and develops over a lifetime.
- Co-agency is defined as interactive, mutually supportive relationships–with parents, teachers, the community, and with each other– that help students progress towards their shared goals.



For the full concept note, click ***here***.

More content at: ***www.oecd.org/education/2030-project***

AGENCY IN ACTION

Student Agency, India, The Duke of Edinburgh's International Award Foundation
Source: *www.oecd.org/education/2030-project/learning/student-agency*

STUDENT AGENCY

Ms Kiran BIR SETHI, Founder, Riverside School and Design For Change, India
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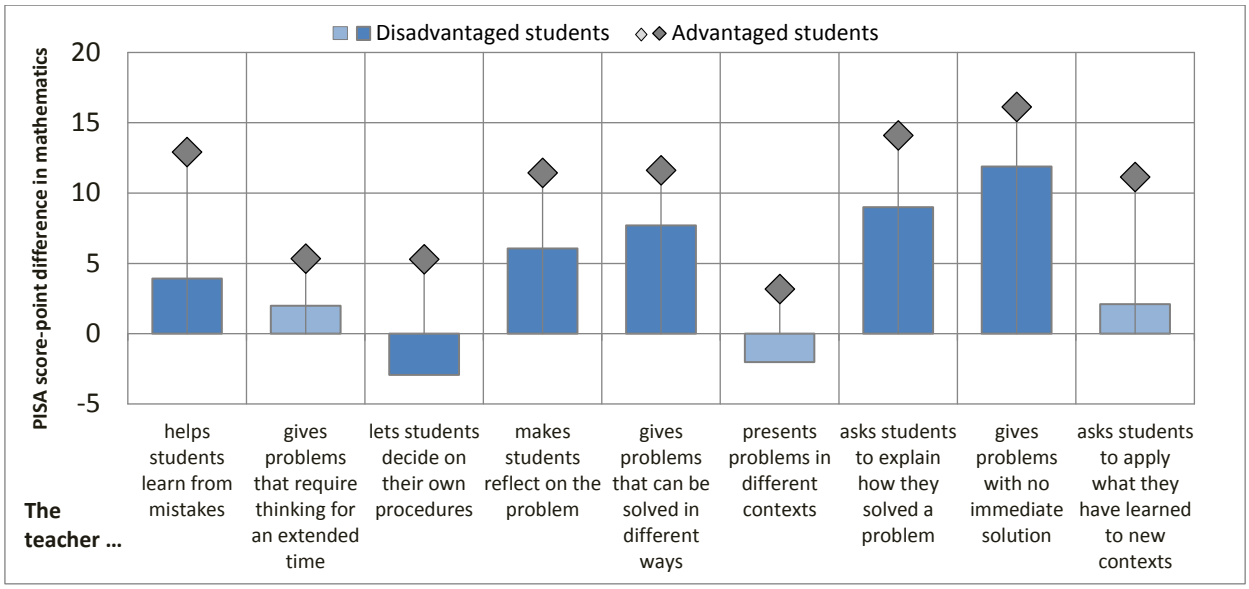
Student Agency for 2030

There is no global consensus on the definition of "student agency". In the context of the OECD Learning Compass 2030, student agency implies a sense of responsibility as students participate in society and aim to influence people, events and circumstances for the better. Agency requires the ability to frame a guiding purpose and identify actions to achieve a goal (OECD, 2018[1]). It is about acting rather than being acted upon; shaping rather than being shaped; and making responsible decisions and choices rather than accepting those determined by others.

Student agency is not a personality trait; it is something malleable and learnable. The term "student agency" is often mistakenly used as a synonym for "student autonomy", "student voice" and "student choice"; but it is much more than these concepts. Acting autonomously does not mean functioning in social isolation, nor does it mean acting solely in self-interest. Similarly, student agency does not mean that students can voice whatever they want or can choose whatever subjects they wish to learn.

Indeed, students need support from adults in order to exercise their agency and realise their potential. For example, the OECD Programme for International Student Assessment found that certain methods teachers use in class may be more effective for some students than for others. When mathematics teachers let 15-year-old students decide on their own procedures to solve a problem in class, or when they present problems in different contexts, not only do socio-economically advantaged students benefit more from these approaches than disadvantaged students do, but the approaches can have an adverse impact on disadvantaged students' performance (Figure 1) (OECD, 2012[2]). It is thus particularly important to ensure that disadvantaged students receive adequate support when teachers use teaching strategies that call for student agency.

Figure 1. Mathematics teachers' teaching strategies and student performance in mathematics, by socio-economic status



Note: Disadvantaged (advantaged) schools are those whose mean PISA index of economic, social and cultural status is statistically lower (higher) than the mean index across all schools in the country/economy.
Source: OECD, PISA 2012 Database.

Box 1. Key constructs related to "student agency"

Student agency relates to the development of an **identity** and a **sense of belonging**. When students develop agency they rely on **motivation**, **hope**, **self-efficacy** and a **growth mindset** (the understanding that abilities and intelligence can be developed) to navigate towards well-being. This enables them to act with a sense of **purpose**, which guides them to flourish and thrive in society.

Developing agency is both a learning goal and a learning process

From their earliest years, children learn to understand the intentions of people around them and develop a sense of self, an important step towards agency (Woodward, 2009[3]; Sokol et al., 2015[4]). As they progress through schooling, students should be able to find a sense of purpose in their own lives, and believe they can fulfil that purpose by setting goals and taking action to achieve those goals. That is when student agency is a learning goal.

As a learning process, student agency and learning have a circular relationship. When students are agents in their learning, that is, when they play an active role in deciding what and how they will learn, they tend to show greater motivation to learn and are more likely to define objectives for their learning. The development of agency is a relational process, involving interactions with family members, peers and teachers over time (Schoon, 2017[5]). It is a process that continues and evolves throughout a lifetime.

Student agency can be exercised in a variety of contexts

Agency can be exercised in nearly every context: **moral, social, economic, creative**. For example, students need to use **moral agency** to help them make decisions that recognise the rights and needs of others. Exercising moral agency requires that a student thinks critically and asks such questions as "What should I do? Was I right to do that?" (Leadbeater, 2017[6]).

In addition to moral agency, students also need to develop **social agency**, which involves an understanding of the rights and responsibilities related to the society in which they live. Going to school is one step towards acquiring social agency, as it introduces students to a community, to authority represented by strangers, and to the need to learn how to build relationships with other people outside of their family (Leadbeater, 2017[6]).

In addition to this, students should be able to identify and seize opportunities to contribute to the local, national or global economy to exercise **economic agency** (Leadbeater, 2017[6]). **Creative agency** allows students to add new value to the world by using their imagination and ability to innovate, whether for artistic, practical or scientific purposes (Leadbeater, 2017[6]).

In all of these contexts, agency is the foundation for developing the competencies students need to shape the future (see the concept note on Transformative Competencies). Agency can be developed as students learn, receive feedback and reflect on their work (see the concept note on Anticipation-Action-Reflection Cycle).

Building a sense of agency is critically important in overcoming adversity

A well-developed sense of agency can help individuals overcome adversity (Talreja, 2017[7]). For example, a child's background – his or her parents' level of education, the socio-economic status of the family – can affect a child's sense of agency (Brooks-Gunn and Duncan, 1997[8]; OECD, 2017[9]; Yoshikawa, Aber and Beardslee, 2012[10]) and influence the likelihood that he or she will have access to quality education and to the means of realising his or her potential (Schoon, 2017[5]).

Research shows that children who had faced adversity in childhood, including physical, sexual or emotional abuse or neglect, tend to have lower aspirations for their future, less of a sense of achievement and less motivation (Duckworth and Schoon, 2012[11]). Those negative attitudes, in turn, undermine their self-confidence and well-being (Ahlin and Lobo Antunes, 2015[12]).

While a sense of agency can help students overcome adversity, disadvantaged students need carefully designed support to build foundation skills, such as literacy and numeracy, and social and emotional skills (see the concept note on Core Foundations). Without these skills, students will not be able to use their agency to their – and society's – advantage (Talreja, 2017[7]).

There are different interpretations of "agency" across cultures

Agency is perceived and interpreted differently around the world. In some languages, such as Portuguese, there is no direct translation for the term "student agency" as it is used in the OECD Learning Compass 2030. In Korean, a new term was created in order to communicate the concept accurately (학생주도 and 학생주체). The words are often equated with related, but not identical, concepts, such as "student-centred" or "independent" or "active" learning (Abiko, 2017[13]; Steinemann, 2017[14]).

Differences in interpretation are usually related to culture. For example, in many Asian cultures, self-regulation is important in maintaining harmony in society, whereas in Western culture, self-regulation is often applied in the service of attaining personal goals (Trommsdorff, 2012[15]). For example, in Japan, the word "agency" is often used in the context of collectivity, where maintaining harmony within communities is more important than an individual's opinion (Abiko, 2017[13]). In China, the concept of agency often refers to the traditional values of prioritising harmony within groups and the individual's obligation to contribute to his or her country's growth (Xiang et al., 2018[16]). In South Africa, the interpretation of student agency asserts that "a person is a person through other people" (Desmond, 2017[17]).

The definitions of harmony and conformity, and their relative priority in relation to values such as individualism and personal autonomy, lie at the heart of differences between many Eastern and Western cultures. However, in all societies, these relationships between belief, motivation, and personal and social identity are vital aspects of cultural and educational change. How students develop an understanding of their own role in wider processes of change, and the role of education in this understanding, are central to student outcomes. While it may be impossible to formulate a universally applicable definition of "agency", the concept has relevance in every context. Student agency – students' ability to play an active role in their education – is thus central to the OECD Learning Compass 2030 (see the concept note on the OECD Learning Compass 2030).

Co-agency implies relationships with others: parents, peers, teachers and the community

Parents, peers, teachers and the wider community influence a student's sense of agency, and that student influences the sense of agency of his or her teachers, peers and parents – a virtuous circle that positively affects children's development and well-being (Salmela-Aro, 2009[18]). Thus, "co-agency", often referred to as "collaborative agency", implies the influence of a person's environment on his or her sense of agency.

An effective learning environment is built on "co-agency", i.e. where students, teachers, parents and the community work together (Leadbeater, 2017[6]). One of the aims of education is to provide students with the tools they need to realise their potential. In the broader education ecosystem, education goals are shared not only among students and teachers, but also with parents and the wider community. Therefore, students can find the "tools" they need to thrive not only in school, but also at home and in their community. In this context, everyone can be considered a learner, not only students but also teachers, school managers, parents and communities.

Teachers play a key role in designing a learning environment that values agency

To help students develop agency, teachers can not only recognise learners' individuality, but also acknowledge the wider set of relationships – with peers, families and communities – that influence their learning.

In the traditional teaching model, teachers are expected to deliver knowledge through instruction and evaluation. In a system that encourages student agency, learning involves not only instruction and evaluation but also co-construction. In such a system, teachers and students become co-creators in the teaching-and-learning process. Students acquire a sense of purpose in their education and take ownership of their learning (Figure 2). For teachers to be effective co-agents, they need "the capacity to act purposefully and constructively to direct their professional growth and contribute to the growth of their students and colleagues" (Calvert, 2016[19]). In order to achieve this, teachers need support, including in initial teacher education and through professional development, in designing learning environments that support student agency.

Peers influence each other's agency

Co-agency also happens at the student-to-student level. When students play an active role in shaping their lessons, they are more likely to participate, ask questions, have open and candid discussions, express opposing opinions and make challenging statements (Salmela-Aro, 2017[20]). They not only gain a higher level of analysis and communication skills but are also more creative while solving problems (Greig, 2000[21]; Hogan, Nastasi and Pressley, 2000[22]). Students acquire a stronger sense of autonomy and are more confident working in teams (Gafney and Varma-Nelson, 2007[23]). This results in better student achievement outcomes, attitudes and persistence, a greater sense of empowerment, and improved analytical thinking and problem-solving ability.

Parents also play a key role as the co-agent of students' learning

Students also learn from and with their parents. Research shows that responsible and positive family engagement with schools improves student achievement, reduces absenteeism and strengthens parents' confidence in their child's education (Davis-Keen, 2005[24]). Students with involved parents or caregivers earn higher grades and test scores, have better social skills and behave better at school. In some cases, however, schools compensate for a lack of resources or cognitive stimulation at home. In disadvantaged communities, where parents may have less knowledge, language skills or confidence to help their children with their schoolwork, it can be more difficult to create a learning environment where parents play an active role in their child's schooling (Davis-Keen, 2005[24]).

The wider community is also part of students' learning environment

School is not the only place where children learn. Educating children is a responsibility shared among parents, teachers and the wider community. It is the responsibility of adults to help children develop the skills they need to shape the future. The sense of agency is difficult for children to develop on their own; they need the collaboration of adults to "co-regulate" their actions and development (Talreja, 2017[7]). When the community is also involved in children's education, children can learn about the opportunities for their future and also how to be engaged, responsible citizens, while the community can learn about the needs, concerns and views of its younger members.

"Collective agency" is needed to make change happen for the common good

Collective agency refers to the idea of individual agents acting together for a community, a movement or a global society. In contrast with co-agency, collective agency is exercised on a larger scale and includes shared responsibility, a sense of belonging, identity, purpose and achievement. Many complex challenges demand collective responses, such as the growing distrust of governments, increases in migration and climate change. Entire societies need to address these challenges. Collective agency requires that individuals put their differences and tensions aside and come together to achieve a common goal (Leadbeater, 2017[6]). Doing so also helps build more solid and unified societies.

Students develop the Sun Model of Co-agency

Some have considered children to be the most ignored members of society (Hart, 1992[25]). Many projects for children are fully designed and run by adults, where the students either have no role to play or are manipulated by adults. In the early 1990s, sociologist Roger Hart developed the Ladder of Participation to illustrate the level of children's participation in activities and decision making (Hart, 1992[25]).

Figure 2. The ladder of participation

Eight levels of young people's participation

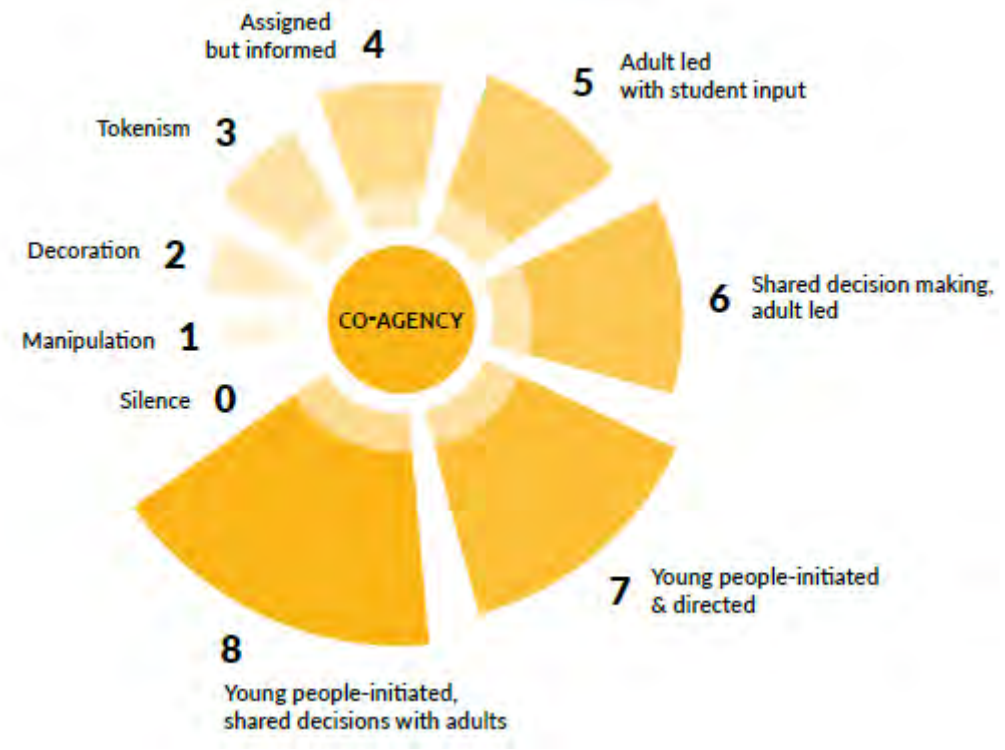
Note: The ladder metaphor is borrowed from Sherry Arnstein (1969); the categories are from Roger Hart (1992).
Source: Arnstein (1969[26]) and Hart (1992[25]).

A little less than 30 years later, in 2018, the OECD Student Focus Group – students from 10 countries who had volunteered to help steer the development of the Learning Compass 2030 and were selected by their respective countries to do so – created the "Sun Model of Co-agency" based on the ladder schema.

Students changed the visualisation from a ladder to a sun (see Figure 3, next page), as they determined that agency is better represented by a circular image than a linear one. They also wanted to show that in every degree of co-agency, students work with adults (except in the newly added degree of "silence", or 0, where neither young people nor adults believe that young people can contribute, and young people remain silent while adults initiate all activities and make all decisions. By comparison, in the first three degrees of co-agency ("manipulation", "decoration" and "tokenism"), students believe that they could contribute to decision making, but they are not given the opportunity to do so. The stronger the degree of co-agency, the better for the well-being of both students and adults.

Figure 3. Sun Model of Co-Agency

The light is brightest when we shine together



Source: OECD Future of Education and Skills 2030 Student Focus Group.

Table 1. Degrees of co-agency

0. Silence	Neither young people nor adults believe that young people can contribute, and young people remain silent while adults take and lead all initiatives and make all decisions.
1. Manipulation	Adults use young people to support causes, pretending the initiative is from young people.
2. Decoration	Adults use young people to help or bolster a cause.
3. Tokenism	Adults appear to give young people a choice, but there is little or no choice about the substance and way of participation.
4. Assigned but informed	Young people are assigned a specific role and informed about how and why they are involved, but do not take part in leading or taking decisions for the project or their place in it.
5. Adult led with student input	Young people are consulted on the projects designed, and informed about outcomes, while adults lead them and make the decisions.
6. Shared decision making, adult led	Young people are a part of the decision-making process of a project led and initiated by adults.
7. Young people-initiated and directed	Young people initiate and direct a project with support of adults. Adults are consulted and may guide/advise in decision making, but all decisions are ultimately taken by young people.
8. Young people-initiated, shared decisions with adults	Young people initiate a project and the decision making is shared between young people and adults. Leading and running the project is an equal partnership between young people and adults.

Source: Hart (1997[27]). Modified from the Ladder of Student Participation by the OECD Student Sphere (Linda Lam, Peter Suante, Derek Wong, Gede Witsen, Rio Miyazaki, Celina Færch, Jonathan Lee and Ruby Bourke).

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OECD Future of Education and Skills 2030

Conceptual learning framework

CORE FOUNDATIONS FOR 2030

OECD
BETTER POLICIES FOR BETTER LIVES

IN BRIEF

CORE FOUNDATIONS FOR 2030

The OECD Learning Compass 2030 defines core foundations as the fundamental conditions and core skills, knowledge, attitudes and values that are prerequisites for further learning across the entire curriculum. The core foundations provide a basis for developing student agency and transformative competencies. They are also the building blocks upon which context-specific competencies for 2030, such as financial literacy, global competency or media literacy, can be developed.

The international stakeholders of the OECD Future of Education and Skills 2030 project highlight three foundations as particularly important: cognitive foundations, which include literacy and numeracy; health foundations, including physical and mental health, and well-being; social and emotional foundations, including moral and ethics and digital literacy and data literacy.

While the OECD Learning Compass 2030 recognises the importance of moral and ethical foundations in decision making, self-regulation, and the conduct of self and society, it does not presume to articulate what moral or ethical norms are or should be, as these are contingent upon culture, history, place and society.

The core foundations provide a basis for developing student agency and transformative competencies

KEY POINTS

- What it means to be literate and numerate in 2030 and beyond will continue to evolve. Given the expansion of digitalisation and big data into all areas of life already, all children need to be digital and data literate.
- With health as a core foundation, people can understand and act on the knowledge that will keep them well and healthy over their lifetime.
- To avoid curriculum overload, newer competencies, such as financial literacy or global competence, could be embedded within the existing curriculum in a meaningful way, so that all students benefit from both deeper learning experiences and quality learning in the core foundations.

For the full concept note, click ***here***.

More content at: ***www.oecd.org/education/2030-project***

PHYSICAL AND MENTAL HEALTH

Prof. Uwe PUHSE, Head, Department of Sport, Exercise and Health, University of Basel, Switzerland
Source: *www.oecd.org/education/2030-project/learning/core-foundations*

DATA LITERACY IN ACTION

Data Literacy, Kazakhstan, Mathematics
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Core Foundations for 2030

The OECD Learning Compass 2030 defines core foundations as the fundamental conditions and core skills, knowledge, attitudes and values that are prerequisites for further learning across the entire curriculum. The core foundations provide a basis for developing student agency and transformative competencies. All students need this solid grounding to fulfil their potential to become responsible contributors to and healthy members of society.

The international stakeholders of the OECD Future of Education and Skills 2030 project highlight three foundations as particularly important:

- cognitive foundations, which include literacy and numeracy, upon which digital literacy and data literacy can be built
- health foundations, including physical and mental health, and well-being
- social and emotional foundations, including moral and ethics

These core foundations are the building blocks upon which context-specific competencies for 2030, such as financial literacy, global competency or media literacy, can be developed. They also form the basis of transformative competencies, which can be transferred across a wide range of contexts (see concept note on Transformative Competencies).

Literacy and numeracy remain fundamental

The definition of literacy is complex, and changes with culture and context (Ntiri, 2009[1]). At its root, literacy is "the ability to read, write, speak and listen in a way that lets people communicate effectively and make sense of the world". More specifically, it can be understood to be the ability to comprehend, interpret, use and create textual and visual information in various formats, contexts and for diverse purposes (making meaning based on encoding and decoding signs/sign systems). Literacy therefore underpins human communication, particularly through oral and written language systems.

The concept of numeracy is also subject to interpretation, based on context. Numeracy is "the ability to access, use, interpret and communicate mathematical information and ideas to engage in and manage mathematical demands of a range of situations" (PIAAC Numeracy Expert Group, 2009[2]). Specifically, numeracy can be understood as the ability to use mathematical tools, reasoning and modelling in everyday life, including in digital environments. In the latter, people draw on combinations of numeracy, data literacy and digital literacy skills. The fundamental importance of developing learners' literacy and numeracy is underpinned by decades of education research – and common wisdom. To function effectively in modern society, people need to be able to read and write, make meaning out of the many signs – numerical and linguistic – that populate our daily lives, and communicate meaningfully through a variety of media. Literacy and numeracy will be as essential in 2030 (and beyond) as they are today.

But some cognitive core foundations need to be updated

What it means to be literate and numerate in 2030 and beyond will continue to evolve.

Already, personalised health and fitness apps on mobile phones collect real-time data from location services and physical movement; finance and budgeting apps gather data from banking transactions or online accounts. Interactive graphs and charts presented on social media or online news sources, video journals (or "vlogs"), and "smart" home appliances that are networked with personal communication devices have irrevocably changed the nature and density of people's interactions with the digital world.

Given this expansion of digitalisation into all areas of life, digital and data literacy are already considered to be core foundations. Being literate in this context requires the ability to read, interpret, make meaning of and communicate through digital texts and sources from a variety of online media. It also requires the ability to evaluate critically and filter information that is so easily produced, accessed and made public.

Being numerate requires not just being able to work through mathematical formula in an exercise book, but being proficient in navigating, interpreting and computing diverse data in daily life and professional contexts, and to communicate with data. As the means of communicating information become more diverse, students need to be able to locate, evaluate and interpret a range of digital and printed material (Rouet and Britt, 2012[3]). **Digital literacy** relies on the same fundamental abilities as "traditional" literacy; but digital literacy is applied in digital contexts and draws on new digital tools and competencies.

With the explosion of data and the advent of "big data", all children will need to be data literate. **Data literacy** is the ability to derive meaningful information from data, the ability to read, work with, analyse and argue with data, and understand "what data mean, including how to read charts appropriately, draw correct conclusions from data, and recognise when data are being used in misleading or inappropriate ways" (Carlson et al., 2011[4]).

Data literacy focuses on both the technical and social aspects of data. It encompasses activities related to data management, including data curation, data citation and fostering data quality. When data are processed, interpreted, organised, structured or presented so as to make them meaningful or useful, they are called information. Information in any format is produced to convey a message; it is shared through communication.

In 2012, people generated more data than all of mankind had from the beginning of recorded history to 2010 (Weigend, 2012[5]). Every minute, YouTube users upload over 48 hours of new video. In 2018, nearly 500 million tweets were posted every day (Omnicore, 2019[6]); roughly 30 billion pieces of content are shared on Facebook every month (Bhatia, 2019[7]). Data is being produced at an unprecedented rate and this growth is not only in size but also in number of sources.

Since businesses today need to deal with large amounts of data, the business model of "platforms" is increasingly being used. Platforms are an "efficient way to monopolise, extract, analyse and use the increasingly large amounts of data that [are] being recorded" and have been used in a variety of businesses, such as Google, Uber, Siemens and Monsanto (Srnicek, 2017[8]).

The explosive growth and influence of big-data industries create vast new opportunities, pressures and ethical challenges and dilemmas. Becoming data literate is essential. Living in a digitalised world requires reconciling tensions, such as the paradox of an increasingly interconnected world, on the one hand, and the rise of social isolation on the other, or the emergence of a "post-truth" culture in an era of a nearly limitless number and scope of media sources.

Health is also a core foundation

Students need to develop good physical and emotional well-being if they are to learn effectively. With health as core foundation, people can understand and act on the knowledge that will keep them well and healthy over their lifetime. This entails people's capacities, skills, knowledge, motivation and confidence to access, understand, appraise and apply health information so that they can form valid judgements and make responsible decisions concerning healthcare, disease prevention and health promotion to improve their quality of life ((HLS-EU) Consortium Health Literacy Project European, 2012[9]; Zarcadoolas, Pleasant and Greer, 2005[10]; Kickbusch and Maag, 2008[11]).

Acute or chronic disruptions to student health not only interrupt students' social and emotional well-being, but can impede their opportunities to learn and progress at school (Aston, 2018[12]; WHO, 2017[13]; WHO, 2017[14]) If students are to develop the cognitive skills of literacy, numeracy, digital literacy and data literacy through sustained learning, they also need to be in good overall health and be able to adapt to evolving health issues. While it is important to have health-literate students, that is, students who have the knowledge, skills, attitudes and values to lead physically active and healthy lives, students should also be able to sustain healthy behaviours. That is why "health", rather than health literacy, is included as a core foundation in the OECD Learning Compass 2030.

Research shows that physical and mental health habits in youth are carried into adult life, and that there is a link between physical activity, which is central to our overall health, and academic achievement (Cook and Kohl, 2013[15]). Results from the OECD Programme for International Student Assessment (PISA) reveal a positive correlation between the average science performance of an education system and the number of days 15-year-old students in that country engage in moderate physical activity outside of school (OECD, 2017[16]). As the OECD's 21st-Century Children project finds, "children who exercise regularly, have good nutrition and sleep well are more likely to attend school, and do well at school" (Burns, 2018[17]). There is also growing evidence that good health habits in youth are associated with the quality of life and social engagement throughout a lifetime (Halfon, Verhoef and Kuo, 2012[18]; Dietz, 1998[19]).

But today's children and adolescents report higher levels of stress and less sleep than previous generations (Aston, 2018[12]). New technologies pose new risks, such as cyberbullying, potentially harmful online behaviours, and less time spent in physical activities (Hooft Graafland, 2018[20]). However, some studies also suggest that moderate Internet use can lead to positive outcomes, such as greater rapport with peers (Gottschalk, 2019[21]). More research is needed to understand the impact of technology use on children's health, and how this impact may change, depending on when and why technology is used (Gottschalk, 2019[21]). In the meantime, it is crucial to encourage students to develop good sleep behaviours and engage in activities associated with healthy development, such as spending quality time with family and peers (Burns and Gottschalk, 2019[22]).

The capacity to adapt, learn new skills and work with others is built on social and emotional foundations

Social and emotional foundations, which include emotional regulation, collaboration, open-mindedness and engaging with others – affect how well individuals adapt to and engage with their environments, including at home, at school and at work. A growing body of evidence demonstrates the impact of our social and emotional skills on a range of life outcomes, including education, jobs, relationships and even our health (Kankaraš, 2017[23];

OECD, 2015[24]; Kautz et al., 2014[25]). For example, early development of social and emotional skills, such as self-awareness and self-regulation, have a medium to strong long-term predictive power of positive outcomes for children later in their lives (Schoon et al., 2015[26]).

Social and emotional foundations thus help children and young people meet the challenges of the future. Young people need to be able to adapt constantly, learn new skills, meet and overcome challenges, and work collaboratively to address the big issues confronting our individual and collective lives. The capacity to do so draws on social and emotional skills, such as resilience, self-regulation, trust, empathy and collaboration.

At school, students experience education as a social process: learning is facilitated (or hindered) by their relationships and interactions with other people, including their peers, teachers, parents and the wider community (Zins et al., 2007[27]). A student who has developed social and emotional foundations will be better placed to navigate the challenges and processes of learning in and outside of school.

Social and emotional foundations are linked to **moral and ethical** foundations, which are defined as "the capacity to make decisions and judgements that are moral (i.e. based on internal principles) and to act in accordance with such judgements" (Kohlberg, 1984[28]). Such foundations are fundamentally important for solving dilemmas and conflicts through thinking and discussion on the basis of (shared) principles rather than through violence, deceit and abuse of power (Lind, 2015[29]).

In order for children and young people to navigate through a range of social and emotional situations, to make good personal decisions and avoid risky behaviours, and to protect their own and others' health and well-being, they will need to develop and internalise moral and pro-social principles and self-regulatory skills and behaviours, such as empathy, acting with honesty, and treating others fairly (Gestsdottir and Lerner, 2008[30]). It is thus insufficient for students to develop core knowledge and skills; they also need to develop core moral/ethical reasoning – when "I can…" statements are complemented by "Should I…?" moral self-questioning.

These moral and ethical capacities are vital for children and young people to develop so that they can apply the transformative competencies, such as reconciling tensions and dilemmas, and taking responsibility to promote the health, and social and emotional well-being of themselves and others.

While the OECD Learning Compass 2030 recognises the importance of moral and ethical foundations in decision making, self-regulation, and the conduct of self and society, it does not presume to articulate what moral or ethical norms are or should be, as these are contingent upon culture, history, place and society.

School systems around the world are grappling with the challenge of keeping up with social, technological and economic change

Is calculus – which has long been the pinnacle of mathematics curricula – really the most useful goal for mathematics students? Are schools preparing children to address the big issues and global shifts, such as climate change, increasing urbanisation and an ageing population? Which emerging areas of knowledge should schools be including in their curricula to ensure that young learners have many viable choices for post-secondary education and the future job market?

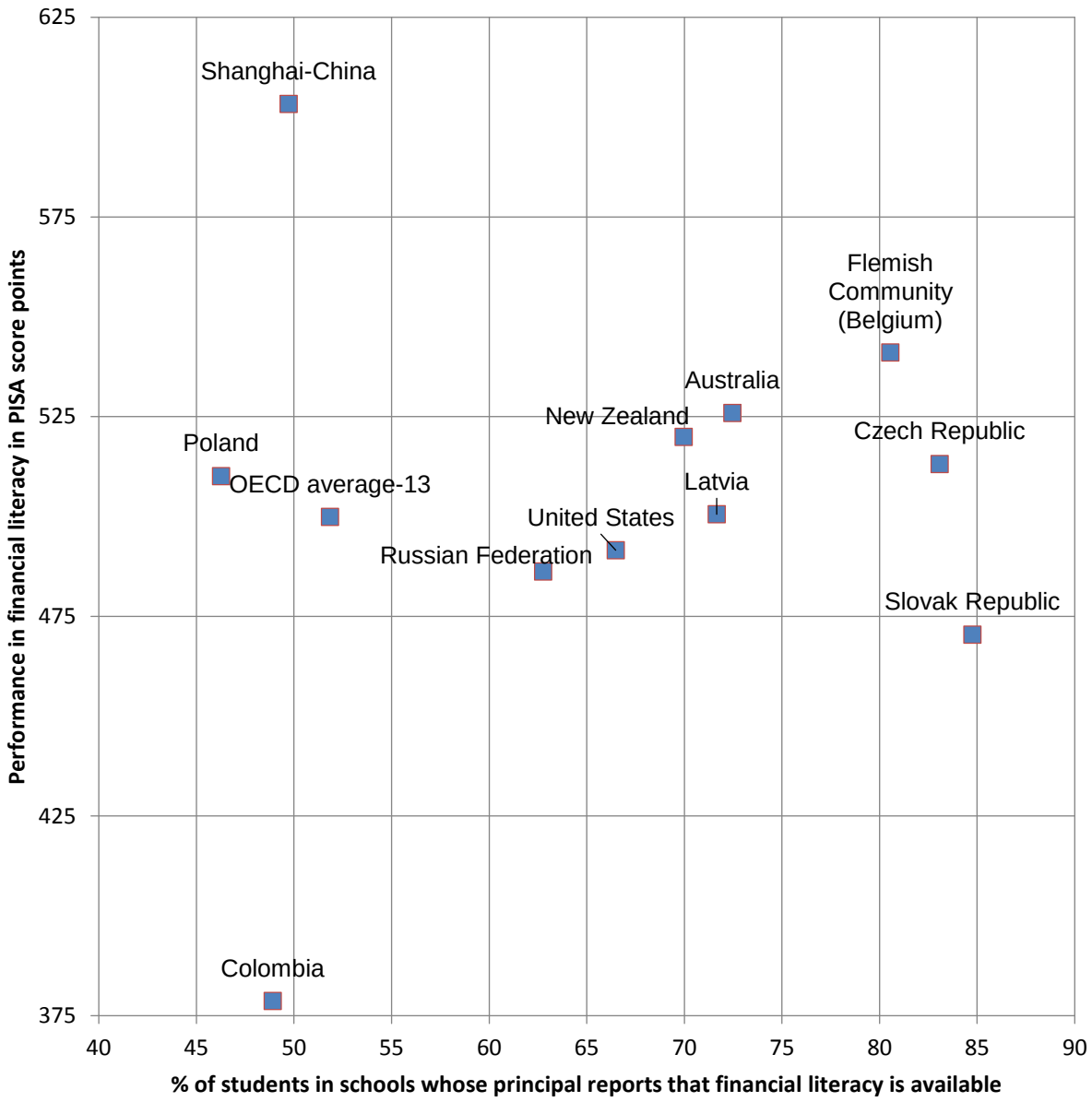
In light of global trends (see the OECD Future of Education and Skills 2030 project background), schools and school systems are under mounting pressure to modernise their curricula so that students can develop a broader set of knowledge, skills, values and attitudes to help them cope with new realities and new demands. For example, following the global financial crisis in 2008, some sectors of society called for schools to develop students' financial literacy. Similarly, with a growing wave of "fake news" and digital technologies transforming traditional news media, there are growing demands for schools to develop students' media literacy – the ability to derive meaning from and assess the credibility of multiple media sources through critical thinking. With the explosion of "start-up" culture, and the corresponding disruption to traditional workforce models and professional pathways, there are growing calls for students to develop their entrepreneurial skills. And in a world increasingly scarred by terror attacks and threats to civilian life and peace, the need for students to develop global competencies, including empathy, tolerance and respect for others, is urgent. Indeed, promoting peace and sustainable development through education is now enshrined in the United Nations Sustainable Development Goal (SDG) Target 4.7.

All of these "new" competencies draw on the core foundations, although they are applied in different situations and contexts.

But curricula are already overloaded

The curricula taught in schools are traditionally designed around specific disciplines and/or learning areas. Adding new subjects or learning areas can lead to curriculum overload, while embedding them within existing subjects can prove challenging, given the conceptual complexity of some of these competencies. Some evidence suggests that learning context-specific subjects in isolation may not be effective. For example, PISA results (OECD, 2014[31]) reveal that there is no correlation between exposure to financial literacy programmes at school and scores on the PISA financial literacy test (Figure 1, see next page).

Figure 1. Exposure to financial literacy education at school and performance in financial literacy



Source: OECD, PISA 2012 Database, Table VI.1.1. and Table VI.2.2.

This suggests that one answer may be to embed these newer competencies within the curriculum in a meaningful way that will lead to deep learning experiences for all students, in addition to quality learning in the core foundations. For example, on average across countries that participated in the OECD Future of Education and Skills 2030 Curriculum Content Mapping exercise,[1] financial literacy is usually embedded in such subjects as mathematics, humanities and technologies/home economics. Table 1 (next page) shows how a subject like financial literacy can be "decomposed" into its knowledge, skills, values and attitudes components.

Table 1. Deconstructing financial literacy into knowledge, skills, values and attitudes

	Knowledge		Skills	Attitudes and values
	Disciplinary ("financial literacy" subject)*	Inter-disciplinary/cross curricular (including for example mathematics, social sciences, economics, business, citizenship)*	Cognitive skills	
Money and transactions	Understanding that money can be exchanged for goods or services Being aware that money spent on something is no longer available to be spent on something else	Understanding that money held as cash or in the bank loses value in real terms if there is inflation Being aware of the common forms of money, payment methods and income sources	Being able to recognise and count money (in own and foreign currency) Being able to compare different ways of transferring money, making payments and receiving money Being able to use arithmetic to make choices based on price and quantity, check change and evaluate discounts Being able to read and check financial documents, such as bank statements	Being confident to talk about money matters with family and other trusted adults Being confident to handle money and simple transactions Being confident to make one's own spending decisions even if peers make different choices Understanding that spending choices can have an ethical component and can impact on others
Planning and managing finances	Knowing the difference between needs and wants Understanding the benefits of planning finances and keeping track of expenses	Understanding the implications of saving and borrowing, and how they are affected by compound interest	(Appreciating the importance of) living within one's means and paying debt on time Being able to plan ahead for expenses expected to occur in the near future Being able to make informed decisions (possibly with parents) about saving and investment in further education	Being confident to manage personal spending, saving and credit Being motivated to save for a particular item or future event Being prepared to delay gratification in order to gain more in the future
Risk and reward	Understanding that financial products can come with both risks and rewards, and that usually greater rewards are associated with higher risks Understanding the importance of creating financial safety nets	Having basic awareness of how savings and insurance products can help manage risk	Being able to assess the relative risks and rewards of simple financial products, choices or business ventures Being able to make informed decisions about the need for insurance when buying products or services	Being cautious about making financial decisions hastily, or without having access to good-quality information or advice about the risk and rewards. Being confident to take some calculated financial risks
Financial landscape		Being aware of financial regulation Understanding the difference between impartial financial information, and marketing or advertising Having a general understanding of how tax and benefits can affect one's own spending and saving decisions Understanding how a person's financial decisions can have consequences for others	Being able to identify and compare information before buying a financial product or service Taking care to keep personal data, passwords and money safe Being able to assess whether financial communication is genuine or potentially fraudulent Being able to make complaints when necessary	Being confident and motivated to apply rights and responsibilities as a consumer

* The distinction between disciplinary and interdisciplinary competencies is not intended in a strict sense, as all of these could be integrated into existing school subjects or could, in principle, be part of a separate "financial literacy" subject.
Source: Monticone (2016[32]).

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Note

[1] The Curriculum Content Mapping exercise aims to identify the extent to which competencies that meet emerging demands (such as global competencies, digital literacy, collaboration, critical thinking, creativity and empathy) are present in countries' existing curricula. Doing so will allow policy makers to identify the learning area (including mathematics, natural sciences the arts) in which a given competency (such as creativity) appears most prominently in written curricula. The results will provide important benchmarking and comparative data, which can help future curriculum development.

OECD Future of Education and Skills 2030

Conceptual learning framework

TRANSFORMATIVE COMPETENCIES FOR 2030

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IN BRIEF

TRANSFORMATIVE COMPETENCIES FOR 2030

To meet the challenges of the 21st century, students need to be empowered and feel that they can aspire to help shape a world where well-being and sustainability – for themselves, for others, and for the planet – is achievable. The OECD Learning Compass 2030 has identified three "transformative competencies" that students need in order to contribute to and thrive in our world, and shape a better future.

Creating new value means innovating to shape better lives, such as creating new jobs, businesses and services, and developing new knowledge, insights, ideas, techniques, strategies and solutions, and applying them to problems both old and new. When learners create new value, they question the status quo, collaborate with others and try to think "outside the box".

Reconciling tensions and dilemmas means taking into account the many interconnections and inter-relations between seemingly contradictory or incompatible ideas, logics and positions, and considering the results of actions from both short- and long-term perspectives. Through this process, students acquire a deeper understanding of opposing positions, develop arguments to support their own position, and find practical solutions to dilemmas and conflicts.

Taking responsibility is connected to the ability to reflect upon and evaluate one's own actions in light of one's experience and education, and by considering personal, ethical and societal goals.

Three transformative competencies can help students thrive in our world and shape a better future.

KEY POINTS

- Students need to acquire three transformative competencies to help shape the future we want: creating new value, reconciling tensions and dilemmas, and taking responsibility.
- When students create new value, they ask questions, collaborate with others and try to think "outside the box" in order to find innovative solutions. This blends a sense of purpose with critical thinking and creativity.
- In an interdependent world, students need to be able to balance contradictory or seemingly incompatible logics and demands, and become comfortable with complexity and ambiguity. This requires empathy and respect.
- Students who have the capacity to take responsibility for their actions have a strong moral compass that allows for considered reflection, working with others and respecting the planet.

For the full concept note, click ***here***.

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TRANSFORMATIVE COMPETENCIES

Tom Bentley, Executive Director, Policy RMIT University, Australia
Source: *www.oecd.org/education/2030-project/learning/transformative-competencies*

TAKING RESPONSIBILITY

Taking Responsibility, Japan, Technologies
Source: *www.oecd.org/education/2030-project/learning/transformative-competencies*

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Transformative Competencies for 2030

Building on the "OECD Key Competencies" identified through the DeSeCo[1] project, the OECD Learning Compass 2030 defines "transformative competencies" as the types of knowledge, skills, attitudes and values students need to transform society and shape the future for better lives. These have been identified as creating new value, reconciling tensions and dilemmas, and taking responsibility.

These transformative competencies can be used across a wide range of contexts and situations – and they are uniquely human. All three transformative competencies can be seen as higher-level competencies that help learners navigate across a range of different situations and experiences (Grayling, 2017[1]). In that sense, they are highly transferable: these competencies can be used throughout a lifetime.

The ability to cope with uncertainty, develop new attitudes and values, and act productively and meaningfully, even when goals shift, remains, for the moment, a uniquely human skill (Laukonnen, Biddel and Gallagher, 2018[2]). As of this writing, artificial intelligence (AI) cannot compete with humans' capacity to create new value, reconcile tensions or take responsibility.

These competencies are needed more in societies that continue to become more diverse and more interdependent as they develop, and in economies where the impact of new technologies requires new levels of skills and human understanding. Jobs that require creative intelligence are less likely to be automated in the next couple of decades (Berger, T. and Frey, B., 2015[3]). Reconciling tensions and dilemmas requires reading and understanding complex and ambiguous contexts – a skill that, to date, cannot be easily programmed into an algorithm. Similarly AI does not (yet) have a will of its own, nor a sense of ethics, and so cannot make the kinds of ethical decisions responsible citizens do. Students will need to be able to use their ability to consider the moral and ethical implications of their actions to, among many other things, ensure that the great and growing power of artificial intelligence is used to the benefit of all people.

The transformative competencies can be taught and learned in schools by incorporating them into existing curricula and pedagogy. For example, countries can embed the competency of "creating new value" into such subjects as the arts, language, technology, home economics, mathematics and science, using an inter-disciplinary approach. Transformative competencies can also be acquired at home, in the family, and in the community, during interactions with others.

Creating new value: Innovation is at the core of inclusive growth and sustainable development

Creating new value refers to a person's ability to innovate and act entrepreneurially, in a general sense, by taking informed and responsible actions (Bentley, T., 2017[4]). The OECD Innovation Strategy 2015 articulates the importance of innovation as a driver of economic growth and social development that addresses urgent global challenges, such as demographic shifts, resource scarcity and climate change. Innovation is needed to create new jobs, new businesses, and new products and services, particularly in light of the accelerated pace of change in the 21st century.

But innovation is about more than creating new jobs, businesses, products and services; it is also about developing new knowledge, insights, ideas, techniques, strategies and solutions, and applying them to problems both old and new. It requires a vision of sustainability and resilience, both for society and for the economy (Bentley, T., 2017[4]), as the new value created is not just economic, but also social and cultural (Rychen, 2016[5]).

When learners create new value, they ask questions, collaborate with others and try to think "outside the box". In doing so, they can become more prepared and resilient when confronted with uncertainty and change, and can develop a greater sense of purpose and self-worth. Pedagogical approaches that give students the opportunity to apply their learning to real-life scenarios and challenges, such as how to attain food and water security, how to reduce youth unemployment or how to adapt to urbanisation, help students develop new thinking, ideas and insights.

Box 1. Key constructs associated with "creating new value"

In order to create new value, students need to have a **sense of purpose**, **curiosity** and an **open mindset** towards new ideas, perspectives and experiences. Creating new value requires **critical thinking** and **creativity** in finding different approaches to solving problems, and **collaboration** with others to find solutions to complex problems. In evaluating whether their solutions work or not, students may need **agility** in trying out new ideas and may need to be able to **manage risks** associated with these new ideas. Students also need **adaptability** as they change their approaches based on new and emerging insights and findings.

Reconciling tensions and dilemmas: Balancing competing, contradictory or incompatible demands

In a world of interdependency, finding solutions to global challenges requires the ability to handle tensions, dilemmas and trade-offs – for instance, between equity and freedom; autonomy and solidarity; efficiency and democratic processes; ecology and simplistic economic models; diversity and universality; and innovation and continuity. This requires the skill of balancing seemingly contradictory or incompatible demands.

Understanding the needs and interests of others is essential to securing one's own well-being, and that of families and communities, over time. Developing the capacity to understand and work alongside the needs, interests and perspectives of others is therefore essential. The challenge is to reconcile multiple and often conflicting ideas or positions, and recognise that there may be more than one solution or method to finding a solution.

For example, the concept of sustainable development is one possible answer to the tension among economic growth, environmental stewardship and social cohesion, as it recognises the complex and dynamic interplay among them instead of treating them as separate and unrelated, if not mutually exclusive, issues (Rychen, 2016[5]).

Striking a balance between competing demands will rarely lead to an either/or choice or even a single solution. To thrive in the future, learners will have to be able to take into account the many interconnections and inter-relations between seemingly contradictory or incompatible ideas, logics and positions, and consider the result of their actions from both short- and long-term perspectives. The competency required to understand a more complex picture of the world is the "ability to manage diversity and dissonance in a creative and coping way" (Haste, 2001[6]). By holding conflicting ideas in tension, learners can come up with new ideas to test. Through this process they can acquire a deeper understanding of opposing positions, develop arguments to support their own position, and find solutions to dilemmas and conflicts (Eberly Center, 2016[7]).

For example, a systems-thinking approach, whereby students develop an understanding of how complex systems behave by studying real-life examples, such as the water-energy-food nexus or the circular economy, can help students see various opportunities for making change within a system. This type of work will help learners develop their ability to recognise multiple solutions and work successfully with ambiguity (Senge, 2015[8]).

Box 2. Key constructs associated with "reconciling tensions and dilemmas"

To reconcile tensions and dilemmas, students need first to have **cognitive flexibility and perspective-taking skills** so that they can see an issue from different points of view and understand how these differing views result in tensions and dilemmas. Students also need to show both **empathy** and **respect** towards others who hold views different from their own. They may also need both **creativity** and **problem-solving skills** to devise new and different solutions to seemingly intractable problems, particularly skills in **conflict resolution**. Reconciling tensions and dilemmas can involve making complex and sometimes difficult decisions; therefore students need to develop a sense of **resilience**, **tolerance for complexity and ambiguity**, and a sense of **responsibility** towards others.

Taking responsibility: Considering the ethics of action

Dealing with novelty, change, diversity, ambiguity and uncertainty, and meeting challenges responsibly assumes that individuals can think for themselves and work with others (OECD, 2018[9]). Responsibility is at the core of a mature sense of agency (see the concept note on Student Agency), as it implies an understanding that actions have consequences and that people have the power to affect others (Leadbeater, 2017[10]). Taking responsibility means that a person can reflect upon and evaluate his or her actions in light of his or her experience, personal and societal goals, what he or she has been taught, and what is right and wrong (Canto-Sperber and Dupuy, 2001[11]; Haste, 2001[6]).

Advances in developmental neuroscience have demonstrated the ability of the brain to change and develop over a lifetime, with pronounced bursts during adolescence. Brain regions and systems that are especially plastic are those implicated in the development of self-regulation, which includes the ability to plan ahead, consider consequences of decisions, weigh risk, and control impulses and emotions (Steinberg, 2017[12]). Adolescence can now be seen as a time not just of vulnerability but of opportunity for developing a sense of responsibility.

Acting responsibly implies considered reflection and asking questions related to norms, values, meanings and limits, such as: What should I do? Was I right to do that? Where are the limits? Knowing the consequences of what I did, should I have done it? By critically analysing and evaluating alternatives through an ethical lens, students become morally and intellectually mature (Nussbaum, 1997[13]).

Box 3. Key constructs associated with "taking responsibility"

Taking responsibility requires having a strong moral compass, **locus of control** and sense of **integrity**, whereby decisions are made based on whether the resulting action will be for the broader benefit of others. **Compassion** and **respect** for others are also important for this competency. **Critical thinking** can be used as one reflects on one's actions and the actions of others. For this competency, having a sense of **self-awareness**, **self-regulation** and **reflective thinking** is of particular importance. It is also important to build **trust** before taking responsibility. When students are trusted by their peers, teachers and parents, they are more likely to take responsibility for their actions.

A powerful influence on the capacity to act responsibly comes through the opportunity to reflect on and learn from everyday situations, including learning from the example of others (Grayling, 2017[1]). Volunteer work, service learning or working on community-based problem-solving projects, whereby students learn through taking part in volunteer activities or tackling real-life problems in their communities, offer good opportunities for students to learn about taking responsibility (Grayling, 2017[1]).

Box 4. Students learn to "take responsibility" through service learning

Singing with Friends is a service learning activity in which 16-17 year-old students from the United World College of South East Asia (UWCSEA) meet weekly with ten young adults from the Down Syndrome Association of Singapore (DSA). Since 2014, Singing with Friends has harnessed the power of music to bring people together and share in the joy of song. Each week, the students visit children with Down Syndrome, play games and choose a song to learn together, which they practice, with the UWCSEA students taking responsibility for leading the activity. The mutually beneficial programme seeks to strengthen the confidence, musical abilities and communication skills of the children with Down Syndrome while simultaneously teaching the UWC students the importance of listening to and learning from the experiences of others. The group has performed at several community events, including recently in front of Singapore's Minister for Culture, Community and Youth.

When students join the service activity, they will have had very little contact with people who are differently abled and will probably only have read about Down through online research. Through Singing with Friends, they are able to interact with children with Down Syndrome and develop relationships by engaging in a common activity. Inevitably, their perspectives on Down Syndrome change. For the students, the experience embeds a sense of responsibility for improving the lives of others who are differently abled. As one participating student said, "By working with them, I am able to come back home and tell my family of the things I've learnt and how it is that we can help stop those condescending stereotypes and ideas of Down Syndrome."

Box 5. Building "transformative competencies" through experiential learning

Rethink Secondary Learning - Thames Valley District School Board, Ontario, Canada

The Thames Valley District School Board's dedication to preparing students for the 21st century is manifested in its Rethink Secondary Learning project. Through consultation with stakeholders, and based on research and innovative practices, changes to secondary school programming and delivery include fostering engagement and autonomy over compliance and reliance; differentiating for inclusion over organising for efficiency; and providing inspiring integrated, interdisciplinary learning experiences over single-subject approaches (p. 7, https://goo.gl/7BchsM).

Through a hands-on, immersive pedagogy, students have the opportunity to engage in experiential learning that reflects their interests, meets curricular expectations in a more meaningful and relevant manner, and allows students to transfer their knowledge and skills to real-world contexts. The Greenhouse Academy is a 60,000-square foot learning environment that is run by students. It offers valuable first-hand experience in using **transformative competencies** as students manage a greenhouse business. Students **reconcile dilemmas** as they consider what plants to grow, shade requirements, the amount of soil and size of pots needed, layout considerations and budget. Students assume further responsibility as they reach out to local industries, including irrigation companies, to ensure that the plants are adequately watered, and to conservation authorities and vendors who can sell what they produce. By **taking responsibility** for the various aspects of the business, with the guidance and mentoring of teachers and specialised staff, students develop agency and co-agency. They **create new value** for themselves, for the business and for the communities they serve as they develop their familiarity with the challenges and opportunities of running a business.

Box 6. Embedding transformative competencies in the curriculum

Visual and written narratives shared with the OECD Education 2030 project by school networks around the world illustrate how transformative competencies are embedded in the curriculum. Three examples are described below. The video narratives are available at http://www.oecd.org/education/2030-project/teaching-and-learning/learning/well-being/.

Reconciling tensions and dilemmas

A visual narrative from the Australian Science and Mathematics School (Adelaide, South Australia) shows a lesson that explores pseudoscientific claims and has students investigate these claims to determine what evidence would be needed to consider the claims to be true. This lesson follows a mathematics-focussed module on proofs and conjectures, with a focus on circle and triangle theorems. The idea of what is "truth" and what evidence is required to claim that something is true is investigated. Students then work in groups to justify their claim. This contributes to developing the students' ability to reconcile tensions and dilemmas in a real world context.

The Futaba Future High School (Hirono Town, Fukushima Prefecture) was opened in April 2015, to accommodate students who were displaced by the nuclear power plant disaster in 2011. The school fully shares the missions of the Futaba region that focus on rebuilding communities, innovating renewable energy sources and exploring new ways of life in the region. One course offered at the school, "Future-Creating Education" incorporates project based learning (PBL) for grade 11 and 12 students. In this course, students choose one topic that links to challenges in Fukushima (e.g. community rebuild, renewable energy sources, health and welfare). Students work in groups over two years to collect information, create an action plan, reflect and present their ideas to real world stakeholders such as government officials. Students and teachers work together to produce the final presentation. Ultimately, this course helps students to understand the complexity of real-world dilemmas and to reconcile tensions to lead to a workable solution.

Taking Responsibility

In a Home Economics lesson sequence from the Tokyo Gakugei University International Secondary School (Tokyo, Japan) students develop an understanding of how to choose and use washing detergent responsibly. They complete activities to determine the environmental impact of detergent and the individual economic impact of purchasing and using detergents. They are asked to create packaging that would inform a responsible consumer. In this way, students are able to understand the influence of their own behaviours on society and take responsible action.

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Note

[1] In late 1997, the OECD initiated the DeSeCo (Definition and Selection of Competencies) Project with the aim of providing a sound conceptual framework to inform the identification of key competencies and strengthen international surveys measuring the competence level of young people and adults. This project brought together experts in a wide range of disciplines to work with stakeholders and policy analysts to produce a policy-relevant framework. Individual OECD countries contributed their own views to inform the process. The project acknowledged diversity in values and priorities across countries and cultures, yet also identified universal challenges of the global economy and culture, as well as common values that inform the selection of the most important competencies (Find out more information about the OECD DeSeCo project at www.oecd.org/education/skills-beyond-school/definitionandselectionofcompetenciesdeseco.htm).

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KNOWLEDGE FOR 2030

As part of the OECD Learning Compass 2030, knowledge includes theoretical concepts and ideas as well as practical understanding based on the experience of having performed certain tasks. The OECD Future of Education and Skills 2030 project recognises four different types of knowledge: disciplinary, interdisciplinary, epistemic and procedural.

Knowledge and skills are both interconnected and mutually reinforcing. Researchers have emphasised the growing importance of being able to understand, interpret and apply knowledge and skills in various situations.

Over the past few decades, there has been growing emphasis on thinking of the world as made up of inter-related systems, rather than solely as a series of discrete units. Education systems around the world have been moving from defining subjects and required curriculum knowledge as collections of facts, towards understanding disciplines as inter-related systems.

Knowledge and skills are both interconnected and mutually reinforcing

KEY POINTS

- Disciplinary knowledge, or subject-specific knowledge, continues to be an essential foundation for understanding, and a structure through which students can develop other types of knowledge. The opportunity to acquire disciplinary knowledge is also fundamental to equity.
- Interdisciplinary knowledge can be integrated into curricula: by transferring key concepts, identifying connectedness, through thematic learning; by combining related subjects or creating a new subject; and by supporting project-based learning.
- Epistemic knowledge involves knowing how to think and act like a practitioner. It shows the relevance and purpose in students' learning and helps deepen their understanding.
- Procedural knowledge is the understanding of how a task is performed, and how to work and learn through structured processes. It is particularly useful for solving complex problems.

For the full concept note, click ***here***.

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PROCEDURAL KNOWLEDGE

Procedural Knowledge, Australia, STEM
Source: *www.oecd.org/education/2030-project/learning/knowledge*

EPISTEMIC KNOWLEDGE

Epistemic Knowledge, Israel, Interdisciplinary learning
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Knowledge for 2030

Knowledge, a key component of the OECD Learning Compass, encompasses the established facts, concepts, ideas and theories about certain aspects of the world. Knowledge usually includes theoretical concepts and ideas as well as practical understanding based on the experience of having performed certain tasks. While there are many other definitions of knowledge, this one was tested and adopted by the international group of stakeholders involved in the OECD Future of Education and Skills 2030 project.

The OECD Learning Framework 2030, a product of the OECD Future of Education and Skills 2030 project, distinguishes four different types of knowledge: disciplinary, interdisciplinary, epistemic and procedural.

- **Disciplinary knowledge** includes subject-specific concepts and detailed content, such as that learned in the study of mathematics and language, for example.
- **Interdisciplinary knowledge** involves relating the concepts and content of one discipline/subject to the concepts and content of other disciplines/subjects.[1]
- **Epistemic knowledge** is the understanding of how expert practitioners of disciplines work and think. This knowledge helps students find the purpose of learning, understand the application of learning and extend their disciplinary knowledge.
- **Procedural knowledge** is the understanding of how something is done, the series of steps or actions taken to accomplish a goal. Some procedural knowledge is domain-specific, some is transferable across domains. The OECD Learning Compass 2030 highlights transferable procedural knowledge, which is knowledge that students can use across different contexts and situations to identify solutions to problems.

Knowledge, skills, attitudes and values are developed interdependently

The concept of competency implies more than just the acquisition of knowledge and skills; it involves the mobilisation of knowledge, skills, attitudes and values in a range of specific contexts to meet complex demands (see also the concept notes on Skills and on Attitudes and Values).

In practice, it is difficult to separate knowledge and skills; they develop together. As Klieme et al. (2004[1]) assert, "higher competency levels are characterised by the increasing proceduralisation of knowledge, so at higher levels, knowledge is converted to skills" (as cited in (Cedefop, 2006[2])).

Researchers have recognised how knowledge and skills are interconnected. For example, the National Research Council's report on 21st-century competencies (2012[3]) notes that "developing content knowledge provides the foundation for acquiring skills, while the skills in turn are necessary to truly learn and use the content. In other words, the skills and content knowledge are not only intertwined but also reinforce each other".

Similarly, UNESCO researchers have emphasised the growing importance of being able to understand, interpret and apply knowledge and skills in various situations. Scott (2015[4]) states that learning to know is not the only necessary skill for students. Also important are: learning to do, which includes problem-solving skills, critical thinking and collaboration; learning to be, which includes social and cross-cultural skills, personal responsibility and self-regulation; and learning to live together, which includes teamwork, civic and digital citizenship, and global competence.

Researchers note that over the past few decades there has been growing emphasis on thinking of the world as made up of inter-related systems, rather than solely as a series of discrete units (Ackoff, cited in (Kirby and Rosenhead, 2005[5])). Education systems around the world have been moving from defining subjects and required curriculum knowledge as collections of facts, towards understanding disciplines as inter-related systems.

Recent evidence from learning science research shows that the patterns of learner development vary widely, rather than following fixed, linear progressions or moving predictably through formal hierarchies of curriculum-based knowledge. A learner can display different levels of skill, competence or understanding at different moments, depending on the situation in which they are learning. Over time, however, learners do progress through recognisable stages of maturity and awareness of their learning, especially as they grow through childhood and adolescence and into adult maturity. They are guided and challenged by the social relationships and cultural values surrounding them.

As Fischer and Bidell (2006[6]) put it: "An examination of the evidence shows a familiar pattern: There is high variability in developmental sequences, but this variability is neither random nor absolute. The number and order of steps in developmental sequences vary as a function of factors like learning history, cultural background, content domain, context, co-participants, and emotional state."

As students develop their competence and understanding in different areas of knowledge, they may go through rapid and repeated cycles of learning in which performance and skills level develop quickly and then fall back as the focus of the task or the context in which it is being performed vary. Over time, the cognitive development, self-awareness, attitudes and beliefs, and ability to adapt and transfer learning across different settings, can all reinforce each other, supporting both deeper levels of understanding and higher levels of competency among learners. The interactions between disciplinary, interdisciplinary, epistemic and procedural knowledge take place in this context, helping connect and integrate different aspects of knowledge with the ability of each learner to adapt and apply what they know to a changing landscape.

Box 1. A holistic understanding of knowledge and learning

Knowledge alone is smart. Knowledge interconnected with time, humanity and earth is wise. (Denise Augustine)

The knowledge of indigenous peoples (in this note, including peoples who originated in a particular place; nomads; and those who inhabited or existed in a land from earliest times) is complex. It encompasses culture, language, systems of classification, social practices, the use of resources, ritual and spirituality. These unique and holistic ways of knowing are facets of the world's cultural diversity.

Augustine et al. (2018[7]) report that indigenous peoples agree that indigenous knowledge cannot be defined from a Western orientation, and that there is no single definition. Indigenous knowledge is diverse and action-oriented, and considered to be neither a subject nor an object. Although indigenous knowledge is place-based and unique to a people, there are shared understandings of this knowledge, including:

- Interconnectedness: Everything is connected, nothing is excluded, and everything is related.
- Everything in the universe is fluid and in motion.
- Reciprocity, generosity, kindness, harmony, balance and beauty are words spoken about the world and contribute to the health and well-being of a community.
- Knowledge is expressed, transmitted, transferred and practiced in varied forms.

Disciplinary knowledge is a fundamental component of understanding, providing essential structure and foundational concepts through which other types of knowledge can also be learned and developed

Disciplinary knowledge is needed in order to understand the world, and as a structure through which other types of knowledge can also be learned and developed. Disciplinary knowledge contains subject-specific concepts and detailed content of what students learn in specific disciplines. As students acquire disciplinary knowledge, they also become able to connect knowledge across different disciplines (interdisciplinary knowledge), they learn how this knowledge is applied in different situations by practitioners (epistemic knowledge), and they learn about different processes and methods for using this knowledge (procedural knowledge). Thus disciplinary knowledge is the foundation of the conceptual structure leading to understanding and expertise (Gardner, 2006[8]). When students learn a basic level of disciplinary knowledge they are able to develop this knowledge further into specialised knowledge or to create new knowledge.

The subject-specific concepts and detailed content of disciplinary knowledge that students learn are also influenced by the knowledge, skills, attitudes and values that are prized in society at the time. One major trend shaping the economy and society is the increasing use of artificial intelligence (AI). Because of this technological development, researchers find that students will need to acquire different types of knowledge and understanding. According to Luckin and Issroff (2018[9]), people should understand basic AI concepts, be digitally literate, be data literate, know online safety, understand basic AI programming, understand the ethics of AI, and, for some people, know how to build AI systems (see the concept note on Core Foundations for more information on digital and data literacy).

Acquiring disciplinary knowledge is a step towards ensuring equity and opportunity to learn. Voogt, Nieveen and Thijs (2018[10]) define equity as when "*all* students have opportunities to access a quality curriculum to reach at least a basic level of knowledge and skills, and that the curriculum does not set barriers or lower expectations due to socio-economic status, gender, ethnic origin or location". They define opportunity to learn as when "the curriculum supports *all* students to realise their full potential. Opportunity to learn refers to the way the curriculum is organised to provide maximum opportunity for all learners to develop their talents and reach their potential". Young and Muller (2016[11]) refer to equity and opportunity to learn as the idea of "knowledge of the powerful".

Interdisciplinary knowledge is increasingly important for understanding and solving complex problems

Identifying multiple solutions to complex problems requires thinking across disciplines, or "connecting the dots" (OECD, 2018[12]). The OECD Future of Education and Skills 2030 project describes five approaches to designing curricula for students so they can acquire interdisciplinary knowledge:

- Students can learn to **transfer key concepts** or "big ideas" across different disciplines. Big ideas are broad, interdisciplinary concepts that transcend specific subject areas and address deeper understanding (Harlen, 2010[13]). Teaching big ideas can lead to deeper learning and more effective transfer of knowledge and skills. Key concepts or big ideas exist within each subject but they can be recognised across different subjects as "meta-concepts" or "macro-concepts" (Erickson, Lanning and French, 2017[14]) (Box 2).
- Students can learn to **identify interconnectedness** among various concepts across disciplines. In education as in life, everything is interconnected (see the OECD Future of Education and Skills 2030 project background). Since disciplines influence each other, it can be useful to present knowledge in an interconnected way, reflecting the complexities of the world in which we live.
- Students can learn to connect different disciplines through **thematic learning**. In an effort to avoid curriculum overload, some countries provide opportunities for students to explore inter-disciplinary issues/phenomena/themes by embedding them into existing curricula instead of creating new subjects.
- Interdisciplinary learning can be organised and facilitated by **combining related subjects or creating new subjects**. Subject regrouping is one of the strategies used to acknowledge the importance of interdisciplinary knowledge, while addressing the challenges of curriculum overload and competing subjects. One example of regrouping is to reorganise specific subjects into key learning areas (Box 3).
- Creating space in the curriculum for **project-based learning** can facilitate interdisciplinary studies as students need to combine knowledge from different disciplines to work on complex topics. Project-based learning does not only refer to pedagogy but also to an approach to the curriculum.

Box 2. "Big ideas" in British Columbia, Canada

Big ideas occupy a big place in the curriculum of British Colombia, Canada. Big ideas refer to the generalisations, principles and key concepts that are important in a certain area of learning. They reflect the "understand" component of the Know-Do-Understand model of learning. They represent what students are expected to understand at the completion of their grade and will contribute to future understanding.

Key or cross-cutting concepts can be thought of in two ways. First, there are concepts that are subject-specific and those that are found across subjects but within the same area of learning, such as in science or social studies. Second, there are cross-cutting concepts that provide links across several areas of learning. In the curriculum for British Columbia, these are defined as "macro concepts".

Source: Walt, Toutant and Allen (2017[15]).

Box 3. Combining related subjects into thematic areas

The movement towards STEM – science, technology, engineering and mathematics (with some variations, e.g. STEAM – stem + art and design) is another example of grouping certain subjects for a particular purpose. While combining subjects or creating new subjects might be beneficial as a way of avoiding curriculum overload, there is a chance that countries perceive the creation of new subjects as increasing, rather than reducing, curriculum overload.

Interdisciplinary knowledge can help students transfer knowledge from one setting to another. According to Mestre (2002[16]), "we can define transfer of learning broadly to mean the ability to apply knowledge or procedures learned in one context to new contexts". If this transfer occurs in relatively similar contexts, it is known as "near transfer"; if this transfer occurs in a different context, it is known as "far transfer".

Transferring knowledge to different situations seems more difficult than transferring knowledge to similar situations. In a comprehensive review of the literature on transfer and learning, Day and Goldstone (2012[17]) note that while near transfer is easy, what is actually difficult about far transfer is recognising that transfer is possible at all. A person must recognise structural or conceptual similarities in order to invoke previous knowledge to apply in the new context. Day and Goldstone warn: "The literature on similarity and transfer suggests that students may often fail to recognise the relevance of these ideas when they are confronted with analogous situations in the real world, particularly when the specific concrete details of those situations do not closely match those presented by teachers" (2012, p. 156[17]).

Given the challenge of far transfer, Dixon (2012[18]) suggests that it is important for teachers to help students see the more abstract conceptual and structural similarities between previous knowledge and new situations so that what is seen as far transfer can be perceived more like the easier near transfer (Benander, 2018[19]). Bereiter (1995[20]) notes that while knowledge and skills can transfer readily to new situations, it is more challenging to teach students to transfer conceptual orientations, such as scientific analysis or statistical problem solving, to novel situations (Benander, 2018[19]).

Knowledge that can be transferred across different contexts arguably has higher value for curriculum design. Many countries grapple with curriculum overload. Knowledge that is suitable for far transfer, such as the concepts used in big ideas, has the potential to reduce curriculum overload and encourage deeper understanding over time as it is inter-related with different topics or subjects. This means that there is a potential for reducing the amount of content if certain transversal knowledge is learned in multiple contexts.

Epistemic knowledge, or knowing how to think and act like a practitioner, is important for finding relevance and purpose in students' learning

Knowledge about different forms and uses of knowledge, or epistemic knowledge, allows students to extend their disciplinary knowledge and use this understanding to help solve problems and work purposefully towards valued future outcomes, contributing over time to well-being. This creates authenticity and a connection to their lives and concerns. Students are able to understand how they can use their knowledge and, with reflection informed by values and ethics, how they can make their community a better place.

Connecting knowledge to real-life issues can lead to greater student motivation. Many educators argue that in order to motivate students, it is important to link the teaching of content knowledge to an understanding of how the subject can be applied to students' daily lives and their possible future work. Among other things, this could involve learning what it means to think like a mathematician, an historian and an engineer. Epistemic knowledge can be stimulated by questions such as, "What am I learning in this subject and why?"; "What can I use the knowledge for in my life?"; "How do certain professionals from this disciplinary field think?"; "What kinds of ethical codes of conduct do professionals like doctors, engineers, artists and scientists follow?".

Ensuring that students recognise the relevance and purpose of their learning is not easy. Young and Muller (2016[11]) suggest that if curriculum designers and policy makers want students in 2030 to be critical thinkers, good problem solvers and able to develop the skill of "learning to learn", they need to focus on the pedagogies and curricula of the different knowledge domains. How far do they encourage these outcomes in their knowledge domain? And to what extent do formal curricula and assessments help students and teachers connect what they learn to the applications of knowledge in those domains? As one example, engineers learn to solve engineering problems, but their curricula rarely teach them to think about what problems engineers should be trying to solve.

Procedural knowledge – the knowledge of "how" – can be particularly useful for solving complex problems

Procedural knowledge about frameworks, such as systems thinking and design thinking, can help students develop thought patterns and structured processes that can enable them to identify and solve problems. For example, understanding how something is done or made may involve a series of steps, or actions, taken to accomplish a goal – which can be characterised as a strategy, production and interiorised action (Byrnes and Wasik, 1991[21]). Some procedural knowledge is domain-specific, such as that in mathematics, while other kinds of procedural knowledge are transferrable across different domains.

Mobus (2018[22])defines systems thinking for the classroom as "being able to see how the systems are organised for purposes and how, if they fail to serve those purposes, they will not be able to persist as systems". Mobus believes that when students learn systems

thinking, they can transfer the disciplinary knowledge of what a system is and the procedural knowledge of how a system works, to recognise and understand the ill-defined systems of the real world (Benander, 2018[19]).

Design thinking, similar to systems thinking, also focuses on solving complex problems that resist neat definition. While it embraces a holistic view of the problem, it concentrates on specific perspectives (Benander, 2018[19]). Goldman (2017[23]) describes design thinking as "a process, a set of skills and mindsets that help people solve problems through novel solutions. The aim is to move beyond simply teaching the steps of the process and providing students with experiences, such as the development of empathy, participation in 'team collaborations', commitment to action-oriented problem solving, a sense of efficacy, and understanding that failure and persistence to try again after failure is a necessary and productive aspect of success". Design thinking is concerned with the methods used to solve a problem; whether the solution actually works; what the potential users of the solution need; the contemporary social and cultural appropriateness of the solution; and the aesthetic appeal of the solution (Pourdehnad, Wexler and Wilson, 2011[24]).

In empirical studies of teaching systems thinking and design thinking in primary education, Kelley, Capobianco and Kaluf (2014[25]) find that students in a primary school science class who were asked to solve problems that were unfamiliar and ill-defined were able to come up with multiple design solutions (Benander, 2018[19]).

Procedural and disciplinary knowledge function together to create a mutually informed understanding of novel contexts. A challenge for education is to help students develop deeper understanding by facilitating both disciplinary and procedural knowledge, and connecting them with the skills, attitudes and ability to transfer knowledge (Benander, 2018[19]).

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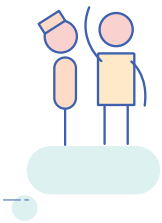
Note

[1] UNESCO uses the term "transdisciplinary" which the organisation defines as "an approach to curriculum integration which dissolves the boundaries between the conventional disciplines and organises teaching and learning around the construction of meaning in the context of real-world problems or themes."
See: www.ibe.unesco.org/en/glossary-curriculum-terminology/t/transdisciplinary-approach.

OECD Future of Education and Skills 2030

Conceptual learning framework

SKILLS FOR 2030



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IN BRIEF

SKILLS FOR 2030

Skills are the ability and capacity to carry out processes and be able to use one's knowledge in a responsible way to achieve a goal. Skills are part of a holistic concept of competency, involving the mobilisation of knowledge, skills, attitudes and values to meet complex demands. The OECD Learning Compass 2030 distinguishes between three different types of skills: cognitive and meta-cognitive skills; social and emotional skills; and physical and practical skills.

As trends such as globalisation and advances in artificial intelligence change the demands of the labour market and the skills needed for workers to succeed, people need to rely even more on their uniquely (so far) human capacity for creativity, responsibility and the ability to "learn to learn" throughout their life.

Social and emotional skills, such as empathy, self-awareness, respect for others and the ability to communicate, are becoming essential as classrooms and workplaces become more ethnically, culturally and linguistically diverse. Achievement at school also depends on a number of social and emotional skills, such as perseverance, efficacy, responsibility, curiosity and emotional stability.

Physical and practical skills are not only associated with daily manual tasks, such as feeding and clothing oneself, but also with the arts. To date, researchers have been unable to identify a comparable activity that develops the cognitive capacity of children in the same ways or to the same extent as music and arts education does. Engaging with the arts also helps students develop empathic intelligence, which enhances their emotional engagement, commitment and persistence.

Social and emotional skills, such as empathy and respect for others, are becoming essential as classrooms and workplaces become more diverse.

KEY POINTS

- As computer technologies have displaced labour in routine tasks, they have also created new employment opportunities for workers with non-routine cognitive skills, such as creativity, and social and emotional skills.
- To remain competitive, workers will need to acquire new skills continually, which requires flexibility, a positive attitude towards lifelong learning and curiosity.
- Social and emotional skills can be equally – and in some cases even more – as important as cognitive skills in becoming a responsible citizen.

For the full concept note, click ***here***.

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SOCIAL AND EMOTIONAL SKILLS

Prof. Dr. Ingrid SCHOON, Human Development and Social Policy, The Institute of Education, University of London, UK
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Skills for 2030

As defined by the international group of stakeholders involved in the OECD Future of Education and Skills 2030 project, skills are the ability and capacity to carry out processes and to be able to use one's knowledge in a responsible way to achieve a goal. Skills are part of a holistic concept of competency, involving the mobilisation of knowledge, skills, attitudes and values to meet complex demands.

The OECD Learning Compass 2030 distinguishes between three different types of skills (OECD, 2018[1]):

- cognitive and meta-cognitive skills, which include critical thinking, creative thinking, learning-to-learn and self-regulation
- social and emotional skills, which include empathy, self-efficacy, responsibility and collaboration
- practical and physical skills, which include using new information and communication technology devices

Cognitive skills are a set of thinking strategies that enable the use of language, numbers, reasoning and acquired knowledge. They comprise verbal, nonverbal and higher-order thinking skills. Metacognitive skills include learning-to-learn skills and the ability to recognise one's knowledge, skills, attitudes and values (OECD, 2018[1]).

Social and emotional skills are a set of individual capacities that can be manifested in consistent patterns of thoughts, feelings and behaviours that enable people to develop themselves, cultivate their relationships at home, school, work and in the community, and exercise their civic responsibilities (OECD, 2018[1]; OECD, n.d[2]).

Physical skills are a set of abilities to use physical tools, operations and functions. They include manual skills, such as the ability to use information and communication technology devices and new machines, play musical instruments, craft artworks, play sports; life skills, such as the ability to dress oneself, prepare food and drink, keep oneself clean; and the ability to mobilise one's capacities, including strength, muscular flexibility and stamina (OECD, 2018[1]; OECD, 2016[3]). Practical skills are those required to use and manipulate materials, tools, equipment and artefacts to achieve particular outcomes (OECD, 2016[3]).

Cognitive skills, such as creative thinking and self-regulation, and social skills, such as taking responsibility, require the capacity to consider the consequences of one's actions, evaluate risk and reward, and accept accountability for the products of one's work. This suggests moral and intellectual maturity, with which a person reflects upon and evaluates his or her actions in light of his or her experiences, personal and societal goals, what he or she has been taught and told, and what is right or wrong (OECD, 2018[1]). While good decision making and ethical judgement are encompassed in the concept of skills, these competencies are addressed in the concept note on Attitudes and Values.

The transfer of knowledge and skills takes place in social contexts

The concept notes on Knowledge and on Attitudes and Values mention that knowledge, skills, and attitudes and values are not competing competencies but rather are developed interdependently. The acquisition of knowledge requires certain cognitive skills. Those skills and relevant content knowledge are not only intertwined, they also reinforce each other. In addition, attitudes and values are integral to developing knowledge and skills – as motivation for acquiring and using knowledge and skills, and in framing the definitions of what constitutes "well-being", good personhood and citizenship (Haste, 2018[4]).

The transfer of knowledge and skills from one situation to another takes place in social contexts. Abuzour, Lewis and Tully (2018[5]) completed a study that supports this social foundation of transfer. They find that, first, students must have sufficient basic knowledge to be able to transfer skills. Then, support from colleagues and adherence to guidelines helps students transfer their skills from the classroom to the workplace. Reinforcement is an important component of transfer as, without it, students and employees may perceive that the transfer is not valued and thus not bother to apply learned skills in new contexts (Benander, 2018[6]). Educators can help beginners apply routine skills, such as information processing, in a range of unfamiliar and loosely defined situations. That will help learners practice applying their knowledge and skills in different ways.

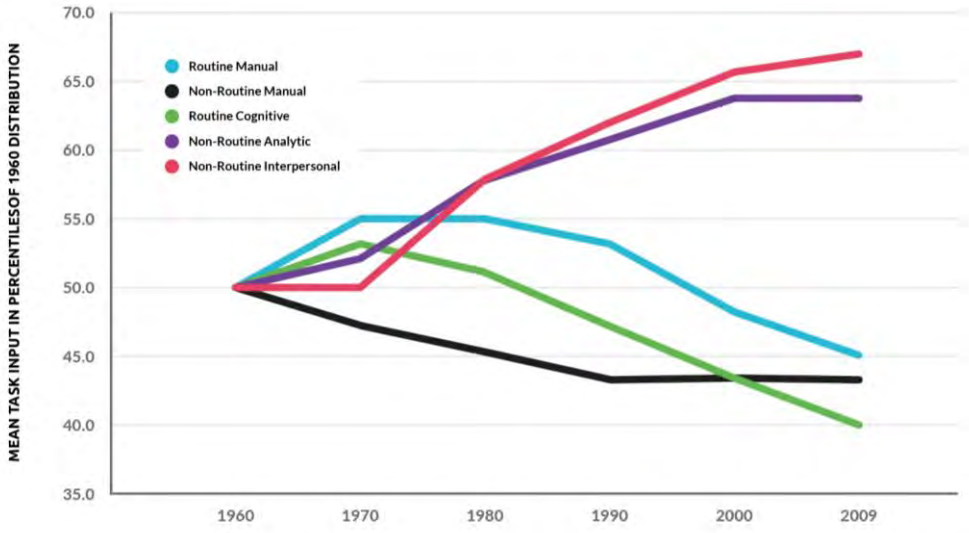
Some research has been conducted on the transfer of knowledge and skills through formats such as play (DeKorver, Choi and Towns, 2017[7]) and project-based learning (Lee and Tsai, 2004[8]). Considerably more research has focused on the cognitive and metacognitive transfer between languages. For example, Baker, Basaraba and Polanco (2016[9]) review the literature on student learning in bilingual education. They find that bilingual language instruction helped students perform better in reading skills in both languages, although they report that there are few studies on writing skills and bilingual programmes. See Ciechanowski (2014[10]), Martinez-Alvarez, Bannan, and Peters-Burton (2012[11]), Keung and Ho (2009[12]) for other studies.

Cognitive skills are essential; metacognitive skills are becoming so

Creativity and critical thinking are needed to find solutions to complex problems

Technology influences how we think about human intelligence and the demand for the types and level of skills needed for the future. Over recent decades, computer-controlled equipment has replaced workers in a wide range of jobs that consist of routine tasks – tasks that follow well-defined procedures that can easily be expressed in computer code. Most routine work, such as repetitive calculating, typing or sorting, and production tasks that revolve around performing repetitive motions, have been automated since the early 1980s (Figure 1). At around the same time, the demand for non-routine interpersonal and analytical skills increased dramatically. The explanation is straightforward: as computer technologies have displaced labour in routine tasks, they have also created new employment opportunities for workers with non-routine cognitive skills, such as creativity, and social and emotional skills (Berger and Frey, 2015[13]; Bialik and Fadel, 2018[14]). Non-routine manual jobs at first declined in number then plateaued at a baseline level, an indication that there remains some demand for the products and services these jobs provide.

Figure 1. Changing prevalence of types of tasks required for work over time



Note: This figure shows how the task composition performed by US workers changed between 1960 and 2009.
Source: Autor and Price (2013) in Bialik and Fadel (2018[14]), p.7, https://curriculumredesign.org/wp-content/uploads/CCR_Knowledge_FINAL_January_2018.pdf.

Artificial intelligence (AI) is adding depth and scale to the challenges posed by technology. Societies will need to determine what is wanted from human intelligence, how best human intelligence can work with AI, how human and artificial intelligence can complement each other and, as a consequence, what new knowledge and skills must be acquired and cultivated. By creating AI systems that are able to learn in increasingly sophisticated ways, human intelligence also becomes more sophisticated (Luckin and Issroff, 2018[15]).

Compared with other technologies, AI has an unprecedented range of applications that can only be maximised through the creativity and imagination of the users and designers of AI. This malleability is a major advantage for AI, robotics and big data; but the benefits of these technologies can be reaped only if they are put to the service of original, visionary ideas developed by humans (Berkowitz and Miller, 2018[16]). These advances will profoundly affect the demand for skills by 2030 (Berger and Frey, 2015[13]). According to some researchers (Avvisati, Jacotin and Vincent-Lancrin, 2013[17]), the skill that most clearly distinguishes innovators from non-innovators is creativity – more specifically, the ability to "come up with new ideas and solutions" and the "willingness to question ideas".

AI appears less likely to replace jobs that require creativity. Workers in jobs that require originality – "the ability to come up with unusual or clever ideas about a given topic or situation, or to develop creative ways to solve a problem" – are substantially less likely to see themselves replaced by computer-controlled equipment, reflecting the current limitations of automation. Art directors, fashion designers and microbiologists are thus unlikely to be out of work anytime soon. In other words, although computers are making inroads into many domains, they are unlikely to replace workers whose jobs involve the creation of new ideas. Thus, in order to adapt to current trends in technology, many workers and future learners will need to acquire creative skills (Berger and Frey, 2015[13]).

Higher-order skills, such as problem solving, critical thinking, goal setting and decision making, overlap with other domains. Critical thinking includes inductive and deductive reasoning, making correct analyses, inferences and evaluations (Facione et al., 1995[18]). Components of cognitive skills are interwoven with social and emotional skills so closely that it is difficult to tease apart and attribute the acquisition of these skills to one category or another. For instance, critical thinking involves questioning and evaluating ideas and solutions. This definition encompasses components of metacognition, social and emotional skills (reflection and evaluation within a cultural context), and even attitudes and values (moral judgement and integration with one's own goals and values), depending on the context. Critical thinking skills are also significantly affected by both traditional school experiences and by life experiences outside the classroom (OECD, 2016[3]).

Citizens with critical thinking skills are also more likely to be self-sufficient and, thus, less dependent on the state's social spending (Facione, 1998[19]). They are more likely to be equipped to give back to society, for example through social entrepreneurship and prosocial behaviours (Peredo and McLean, 2006[20]). Critical thinking skills are seen as necessary to enter the workforce. Critics of the quality of higher education frequently cite the proportion of recent college graduates who are ill-prepared to enter the workforce and deficient in critical thinking skills (Flores et al., 2012[21]; OECD, 2016[3]).

Metacognition, lifelong learning and understanding other cultures are needed to adapt to a changing environment

Metacognition refers to the skills of "thinking about thinking". Metacognition can be understood as "non-routine analytical skills" in which awareness of one's own learning and thought processes leads to the intentional application of specific learning techniques to different situations (Bialik and Fadel, 2018[14]; Berger and Frey, 2015[13]). Learning strategies, or "learning to learning", are also widely seen as a key competency for lifelong learning, and are emphasised as a goal for education in many European countries (Kikas and Jõgi, 2016[22]).

Metacognitive skills are vital to education because of their impact on the process of learning (Veenman, Kok and Blöte, 2005[23]). For instance, metacognition significantly predicts critical thinking, a key component of learning (Magno, 2010[24]). Components of metacognition become increasingly important as children enter secondary school, where reasoning, regulation and reflection become more integral to the curriculum. A proliferation of mindfulness-based interventions in schools specifically targets these skills. Preliminary findings show that these interventions can reduce stress and anxiety, increase optimism, help improve social and cognitive skills, and raise academic achievement (Schonert-Reichl et al., 2015[25]; Schonert-Reichl and Lawlor, 2010[26]; Beauchemin, Hutchins and Patterson, 2008[27]).

As trends such as globalisation and advances in artificial intelligence change the demands of the labour market and the skills needed for workers to succeed, people need to rely even more on their ability to "learn to learn" throughout their life. The *OECD Skills Outlook 2017* (OECD, 2017[28]) reports that "workers' cognitive skills and readiness to learn play a fundamental role in international integration, as workers need them to share and assimilate new knowledge, allowing countries to participate and grow in evolving markets".

Given the hyper connectivity of today's – and tomorrow's – world, another key area of cognitive development is the knowledge and understanding of other cultures. Some developmental scientists (Eccles and Gootman, 2002[29]) identify in-depth knowledge of more than one culture as crucial to cognitive development, particularly as young people mature.

Humans are likely to be able to handle uncertainty better than AI

Humans can cope with uncertainty through their actions, by developing their beliefs and understanding of what is happening in the world, and through their ability to discard beliefs when they are inaccurate or damaging. In other words, humans navigate through uncertainty by being adaptable learners. When placed in a novel circumstance – such as a new country, new school or new workplace – people learn the new structure in the environment and adapt or replace old structures or beliefs that are no longer relevant.

Machines are not (yet) able to respond to uncertainty. AI can complete specific tasks efficiently, and respond effectively to complexity and to some characteristics of uncertainty, but if the goals and context of the task are ambiguous or change, then a "breakdown" often occurs. Put simply, humans possess the capacities to deal with volatility, uncertainty, complexity and ambiguity but sometimes fail to do so productively, while, in many cases, machines lack those capacities entirely (Laukkonen, Biddell and Gallagher, 2018[30]).

Students' digital skills need to evolve with technological developments

As digital technologies are adopted in the workplace, acquiring and maintaining a set of digital skills is becoming increasingly important for the vast majority of workers. The OECD also foresees employment in ICT industries increasing as advances in "smart-grid" technology reshapes the management of energy systems, infrastructure and transportation. According to the European Commission, the demand for workers with specialist digital skills is already growing by about 4% each year (Berger and Frey, 2015[13]).

As the workplace continues to undergo substantial restructuring in response to new technologies, many digital skills will rapidly become outdated. For example, coding skills tend to become obsolete in only a few years' time. According to a study by the European Centre for the Development of Vocational Training, 16% of workers in Finland, Germany, Hungary and the Netherlands saw their skills become obsolete over the previous two years; digital and ICT-related skills were identified as particularly vulnerable to rapid obsolescence (Cedefop, 2012[31]).

Thus, to remain competitive, workers will need to acquire new skills continually, which requires flexibility, a positive attitude towards lifelong learning and curiosity. While ICT specialists will be needed, a combination of skillsets that makes workers adaptable to technological change will be even more important. Therefore, education should focus on imparting "fusion skills" – the combination of creative, entrepreneurial and technical skills that enable workers to shift into new occupations as they emerge (Berger and Frey, 2015[13]). Box 1 (next page) provides an overview of new and emerging jobs.

Box 1. Examples of new and emerging jobs

Occupation	Description	Examples of skills	Examples of knowledge	Example of attitudes and values
Robotics engineers	Research, design, develop or test robotic applications	Critical thinking, complex problem solving, quality-control analysis	Engineering and technology, robotics, design	Exploration, precision, observation
Biostatisticians	Develop and apply biostatistical theory and methods to the study of life sciences	Inductive reasoning, oral expression, mathematical reasoning	Mathematics, English language, education and training	Project/programme management, execution, inquisitiveness
Fuel-cell engineers	Design, evaluate, modify or construct fuel-cell components or systems for transportation, stationary or portable applications	Judgement and decision making, writing, critical thinking	Physics, mathematics, chemistry	Focus, reliability, feedback
Solar sales representatives and assessors	Contact new or existing customers to determine their solar equipment needs, suggest systems or equipment or estimate costs	Active listening, persuasion, social perceptiveness	Sales and marketing, engineering and technology, customer and personal service	Accountability, focus, results orientation
Video game designers	Design core features of video games; specify innovative game and role-play mechanics, story lines, and character biographies; create and maintain design documentation; guide and collaborate with production staff to produce games as designed	Programming, critical thinking, complex problem solving	Design, communications and media, psychology	Inquisitiveness, playfulness, passion

Source: O*NET (www.onetonline.org) in (Berger and Frey, 2015[13])

Social and emotional skills are increasingly recognised as essential

Workers whose jobs require social and emotional skills are unlikely to be replaced by technology

As discussed above, AI is unlikely to replace workers whose jobs require creativity; similarly, AI is unlikely to replace workers who jobs require complex social interactions. Thus, in order to adapt to advances in technology, workers will also have to acquire social skills, including persuasion and negotiation (Berger and Frey, 2015[13]).

There is a danger that the increasing reliance on sophisticated machines will lead some people to devalue others; some scholars (Turkle, 2017[32]) are convinced this devaluation is already occurring. If these scholars are right, then it will be increasingly important for people to learn how to recognise the value of their own humanity, and that of others (Putnam, 2000[33]). Valuing the contributions that people make to society is necessary not only for individual and societal well-being, but also for the health and relevance of institutions (Berkowitz and Miller, 2018[16]).

Demographic and societal changes demand more social and emotional skills

As populations age, the demand for healthcare will continue to rise. This is reflected in the wide range of new and emerging healthcare-related occupations, which require both scientific skills, and social and emotional skills, such as caring, sociability and respect. For example, acute care nurses and hospital staff require a high degree of social perceptiveness to understand emotional patterns and interact with patients (Berger and Frey, 2015[13]).

In addition, social and emotional skills, such as empathy, self-awareness, respect for others and the ability to communicate, are becoming essential as classrooms and workplaces become more ethnically, culturally and linguistically diverse. To acknowledge and respond to these global connections, education may promote certain social and emotional skills that are considered to be related to cognitive skills. For example, social emotional skills such as "empathy" would require cognitive skills such as "perspective-taking". Education may also foster the types of attitudes and values, such as openness and respect for others as individuals, that students need in order to be more inclusive and reflective of more diverse societies. In this context, this particular set of skills has come to be known as global competence (OECD, 2018[34]).

Social and emotional skills improve academic and labour market prospects

Achievement at school depends on a number of social and emotional skills, such as perseverance, self-control, responsibility, curiosity and emotional stability. Some social and emotional skills are a prerequisite for successful participation and performance in academic settings. In other words, poor social and emotional skills can impede the use of cognitive skills. For example, studies that investigated the relationships between social and emotional indicators and years of schooling show that conscientiousness and openness to experience is a good predictor of how many years students will spend in school (OECD, n.d[2]).[1]

Another study (Heckman and Kautz, 2012[35]) finds evidence of the relationship between personality and cognitive skills in results from the General Education Development (GED) programme. The GED allows high-school dropouts to earn a high-school diploma by passing an academic performance test. The study finds that GED graduates who had dropped out of high school and later passed the GED test to earn a high-school diploma have similar levels of cognitive skills as regular high-school graduates, but poorer social and emotional skills (OECD, n.d[2]).

While cognitive skills have also long been considered the most important determinants of success in employment, recent studies show that social and emotional skills also directly affect occupational status and income. In fact, social and emotional skills can be equally – and in some cases even more – important as cognitive skills in determining future employment (OECD, n.d[2]).

Practical and physical skills help students develop other types of skills

Developing physical skills through music and arts can help promote cognitive and metacognitive skills

Music and the arts are learned physically. To both understand and demonstrate learning in the arts, children must experience them. To date, researchers have been unable to identify a comparable activity that develops the cognitive capacity of children in the same ways or to the same extent as music and arts education does. In undertaking the acquisition of physical skills in the arts, significant cognitive and metacognitive processes must take place. While the arts are expressed through physical skills, mastery of the arts requires cognitive and metacognitive processes too (OECD, 2016[3]).

The effects of including high-quality, meaningful and ongoing arts education in children's education experience has been researched extensively (Winner, Goldstein and Vincent-Lancrin, 2013[36]). The Dana Consortium (Asbury and Rich, 2008[37]) conducted a meta-analysis of arts research in the area of intelligence and found that engagement in arts

activities improves a child's attention, which, in turn, can improve their cognition (Posner and Patoine, 2010[38]). Engagement with the arts develops students' empathic intelligence (Davis, 2008[39]), which enhances their connectivity, emotional engagement, and sense of identification with and responsibility for others. Studying and producing visual arts enables students to engage, persist, commit to a project and follow through with a task (Hetland et al., 2007[40]). These skills, used in conjunction with divergent thinking, are rarely developed elsewhere in the school curriculum. Hetland et al. also find that the arts teach students to "envision", that is, think about that which they can't see. These skills are transferable to other areas, such as developing hypotheses or imagining past events or predicting future ones. The intelligences developed through the arts have positive impacts on external measures of students' success too. For example, Walker, Tabone and Weltsek's (2011[41]) study in the United States finds that students who received an integrated arts curriculum were 77% more likely to pass their state assessment (OECD, 2016[3]).

Physical and practical skills are essential for students' overall functioning and well-being

Practical skills are often associated with manual dexterity and craftwork. Yet, practical skills have a far wider range of applications. For instance, many daily functions, such as getting dressed, keeping clean, preparing food, engaging in written work or using technologies of any kind, require practical skills. For example, the use of smartphones and communicating by text presumes mastery of a set of practical skills that allow the user to create messages and send them using a small keypad (OECD, 2016[3]).

Student health and well-being is a global priority. Physical education can help students develop healthy habits and acquire knowledge about health. Research increasingly shows that the habits established in youth carry over into adulthood, so establishing healthy habits early helps young people make healthy choices as adults.

Over the past few decades, research has revealed the benefits of exercise on children's physical and mental health, cognition and academic achievement. Longitudinal research shows that the development of fundamental motor skills at preschool age predicts cognitive efficiency and academic achievement (Roebers et al., 2014[42]) when children transition to school (van der Fels et al., 2015[43]). Recent research links motor co-ordination and skills competence to cognitive efficiency and academic achievement in children (Haapala, 2012[44]; Haapala et al., 2014[45]; Rigoli et al., 2012[46]) and adolescents (Marchetti et al., 2015[47]; Rigoli et al., 2012[48]). These associations are consistent with neurodevelopmental research that reveals linkages among brain structures involved in controlled motor actions and executive functions (Diamond, 2012[49]). Another review provides additional support for the inter-relationship between physical activity and motor-skill proficiency, on the one hand, and children's cognitive function and academic achievement on the other (Vazou et al., 2016[50]).

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Note

[1] Conscientiousness and openness to experience are two of the five dimensions of the Big Five, a well-known framework for social and emotional skills (Rothmann and Coetzer, 2003[51]).

OECD Future of Education and Skills 2030

Conceptual learning framework

ATTITUDES AND VALUES FOR 2030

OECD
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IN BRIEF

ATTITUDES AND VALUES FOR 2030

Attitudes and values are a key component of the OECD Learning Compass 2030, which helps students navigate towards well-being and the future we want. They refer to the principles and beliefs that influence one's choices, judgements, behaviours and actions on the path towards individual, societal and environmental well-being.

Strengthening and renewing trust in institutions and among communities hinges on developing core shared values of citizenship (respect, fairness, personal and social responsibility, integrity and self-awareness) at school in order to build more inclusive, fair, and sustainable economies and societies.

Knowledge, skills, attitudes and values are not competing concepts; they are developed interdependently. As schools, workplaces and communities become more ethnically, culturally and linguistically diverse, it will be more important than ever to emphasise the inter-relatedness of knowledge, skills, attitudes and values.

Approaches to developing attitudes and values often draw on cultural and societal traditions while addressing global challenges.

KEY POINTS

- Attitudes and values are increasingly integrated into curriculum frameworks – an acknowledgement that competencies require more than knowledge and skills.
- A diverse range of education systems are pursuing integrated approaches to developing values and attitudes, often drawing on cultural and societal traditions, while addressing global challenges.
- Recent trends in technology, notably the use of artificial intelligence, have put ethics high on the education agenda. Today's students will benefit from the capacity to evaluate the extent to which technology may or may not ensure a fair and equitable world.

For the full concept note, click ***here***.

More content at: ***www.oecd.org/education/2030-project***

CHANGING ATTITUDES AND VALUES THROUGH SOCIO-EMOTIONAL LEARNING

Socioemotional Learning, USA, Facebook and Yale Center for Emotional Intelligence
Source: *www.oecd.org/education/2030-project/learning/attitudes-and-values*

VALUES AND INDIGENOUS KNOWLEDGE

Values and Indigenous knowledge, Chile, Siemens Stiftung
Source: *www.oecd.org/education/2030-project/learning/attitudes-and-values*

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Attitudes and Values for 2030

The OECD Learning Compass 2030 defines attitudes and values as the principles and beliefs that influence one's choices, judgements, behaviours and actions on the path towards individual, societal and environmental well-being.

Values are the guiding principles that underpin what people believe to be important when making decisions in all areas of private and public life. They determine what people will prioritise in making a judgement, and what they will strive for in seeking improvement (Haste, 2018[1]).

Attitudes are underpinned by values and beliefs and have an influence on behaviour (UNESCO IBE, 2013[2]). It reflects a disposition to react to something or someone positively or negatively and attitudes can vary according to specific contexts and situations (Haste, 2018[1]).

The OECD Learning Compass 2030 was co-created by multiple stakeholders as a tool that is globally informed but locally contextualised. To acknowledge local differences, "values" are classified into four categories:

- **Personal** values are associated with who one is as a person, and how one wishes to define and lead a meaningful life and meet one's goals.
- **Social** values relate to those principles and beliefs that influence the quality of interpersonal relationships. They include how one behaves towards others, and how one manages interactions, including conflict. Social values also reflect cultural assumptions about social well-being, i.e. what makes a community and society work effectively.
- **Societal** values define the priorities of cultures and societies, the shared principles and guidelines that frame the social order and institutional life. These values endure when they are enshrined in social and institutional structures, documents and democratic practice, and when they are endorsed through public opinion.
- **Human** values have much in common with societal values. However, they are defined as transcending nations and cultures; they apply to the well-being of humanity. These values can be identified across spiritual texts and indigenous traditions spanning generations. They are often articulated in internationally agreed conventions, such as the Universal Declaration of Human Rights and the United Nations Sustainable Development Goals (SDGs).

Different terminologies for "attitudes and values" are used in different contexts

Depending on social and cultural contexts, different terms may be used instead of "attitudes and values". These terms include "affective outcomes", "aptitudes", "attributes", "beliefs", "dispositions", "ethics", "morality", "mindset", "social and emotional skills", "soft skills" and "virtues" (or "character qualities").

Personal, social, societal and human attitudes and values can be incorporated into curricula using a variety of approaches and terms. While this concept note uses the term "attitudes and values" throughout, it does not exclude other terms. Indeed, clarifying these terms is essential for developing a common language and shared understanding. Haste (2018[1]) provides definitions for the following concepts[1] related to attitudes and values:

- **Affective outcomes** refer to the emotional consequence of a person's experience of events, performance or judgement – for example, anger, disgust, elation or regret.
- **Aptitudes** refer to potential areas of capability, skill, talent, or a predisposition to learn or adapt easily in a particular domain.
- **Attributes** refer to characteristics of a person's beliefs, values, skills or personality.
- **Beliefs** refer to both facts and strong convictions associated with values. Factual beliefs are those based on (or claimed to be based on) evidence and data. Beliefs as strong convictions are based on core commitments to values, through which factual data is filtered to create a convincing argument.
- **Dispositions** refer to a tendency to respond in particular ways to a situation due to pre-existing values that affect judgement or action. Dispositions may reflect preferences based on aesthetics or what is enjoyed (e.g. sport). They may also reflect general personality or mood states, such as a tendency towards optimism or pessimism, or qualities such as risk-avoidance or curiosity.
- **Ethics and morality** are terms related to values and behaviour associated with causing or preventing intentional harm to others, and to protecting and helping others. The terms are also used in conjunction with maintaining integrity with regard to one's values, especially when these values match the dominant values of one's culture, such as trustworthiness, honesty, loyalty or fairness. Ethical and moral judgement derives from values, but not all values derive from ethics and morals.
- **Mindset**, a term popularised by Carol Dweck, means a disposition to frame experience, information or problems within a set of strategies based on values or purposes. For example, a student with a "growth mindset" understands that his or her talents and abilities can be developed through effort. A mindset predetermines a person's responses to and interpretations of situations. Depending on the type, mindsets can be productive and motivating, or rigid and resistant to change.
- **Social and emotional skills** refer to the abilities to interact and communicate with others; form and sustain relationships; manage conflicts; take others' perspectives and empathise; manage one's own responses, especially affective responses, in social situations; and understand one's own emotional experiences in ways that enable affect to be positive and growth-oriented.
- **Soft skills** is a term often used as a generic category for social and emotional skills, but the term may also include managing motivation and applying values.
- **Virtues (or character qualities)** are one way of looking at morality. A virtue is an enduring and consistent pattern of responses – affective, cognitive and behavioural – within a moral/ethical classification. Virtues are seen as attributes of a person, like traits, and are formed over time as habits of response. Character is a constellation of virtues.

International bodies have identified attitudes and values as integral to individual and social well-being

The importance of developing attitudes and values through education is increasingly discussed in international forums. The OECD is committed to helping countries strengthen and renew trust in institutions and among communities. This will require stronger efforts to develop shared values of citizenship (respect, fairness, personal and social responsibility, integrity and self-awareness) at the school level in order to build more inclusive, fair and sustainable economies and societies. The table below shows the values articulated by various international bodies and instruments.

Table 1. Values articulated by international bodies and instruments

OECD Global Competency Framework	Includes values ("valuing human dignity" and "valuing cultural diversity") as guiding principles for attitudes such as "openness towards people from other cultures", "respect for cultural otherness", "global-mindedness", and "responsibility"
Sustainable Development Goal 4.7 on Education	Focuses on Global Citizenship Education and Education for Sustainable Development; knowledge of global issues and universal values, such as "justice", "equality", "dignity" and "respect", as well as aptitudes for "networking and interacting with people of different backgrounds, origins, cultures and perspectives", and behavioural capacities to "act collaboratively and responsibly to find global solutions for global challenges", and to "strive for the collective good"
Council of Europe Competence Framework for Democratic Culture	Includes values (i.e. valuing "human dignity and human rights", "cultural diversity", "democracy, justice, fairness, equality and the rule of law") and attitudes (i.e. "openness to cultural otherness and other beliefs", "world views and practices", "respect", "civic-mindedness", "responsibility", "self-efficacy", and "tolerance of ambiguity")
G7 Summit Leaders' Declaration 2016	Recognises the importance of common values and principles for all humanity (e.g. "freedom", "democracy and respect for privacy", "human rights", "human dignity") at a time of violent extremism, terrorist attacks and other challenges
United Nations instruments	Values articulated in the Universal Declaration of Human Rights, the UN Charter and the UN Millennium Declaration include "equality", "freedom", "justice", "dignity", "solidarity", "tolerance", "peace and security", and "sustainable development"

Although the terminologies used to articulate the values above are not identical, a common thread emerges on the importance given to certain values, such as **human dignity, respect, equality, justice, responsibility, global-mindedness, cultural diversity, freedom, tolerance and democracy**. These values would help shape a shared future built on the well-being of individuals, communities and the planet.

For example, values such as **respect** includes a wider scope, including research for self, others including cultural diversity, and the environment. Studies show that self-respect improves academic outcomes, e.g. Rosenberg et al. (1995[3]). Self-respect also allows the students to take a healthy middle ground between self-loathing and self-forgiveness (Dillon, 2001[4]). Respect also improves societal relations as valuing others is essential for forming close relationships.

As for the value of **equality** and social equity, low inequality is a strong predictor of democratic stability (Anderson and Singer, 2008[5]). Income equality is associated with greater child well-being, more trust, less mental illness, less drug use, greater life expectancy, lower infant mortality, less obesity, higher educational performance, and less homicides (Wilkinson and Pickett, 2009[6]). Valuing equality helps people to understand the situation of people of different social status and of people who are suffering from

inequality as well as take responsibility to reduce inequality (Reysen and Katzarska-Miller, 2013[7]). Research suggests that **integrity** is associated equity and equality (Lippman et al., 2014[8]). **Justice** is also closely associated with equality; in order to make just decisions, an individual must take into consideration the ways in which issues of equality and equity for all others are achieved (Lerner, 2015[9]). The value of equality helps us to take **responsibility** to reduce inequality (Reysen and Katzarska-Miller, 2013[7]).

Justice is another example that is integral to individual and social well-being. Valuing justice has been found to increase tolerance and reduce prejudice across ages (Killen and Smetana, 2010[10]). The development of justice values is critical because values toward justice are considered to be an important bridge between moral judgment and moral action to protect the rights of others (Hardy and Carlo, 2011[11]) and necessary for promoting positive intergroup relations across cultures (Lerner, 2015[9]). Adolescents who have a sense of justice also exhibit prosocial behaviours (i.e. helping, co-operating, sharing), which in turn are associated with both academic achievement and school success (Caprara et al., 2000[12]; Jones, Greenberg and Crowley, 2015[13]; Wentzel, 1993[14]).

Attitudes and values are increasingly integrated into curriculum frameworks, an acknowledgement that competencies go beyond knowledge and skills

Attitudes and values appear not just in international documents but in curriculum frameworks around the world. Countries acknowledge that curriculum content is underpinned by a set of explicit or implicit values. Many countries note that education is never value-free. Even if a formal, intended curriculum may not articulate explicitly the teaching of attitudes and values, attitudes and values may still inform and govern the experiences in schools, including how expectations about desirable behaviour are communicated; how conflict and consensus-making between and amongst young people and adults in schools are managed; how student voice and choice matter or do not matter in schools; and how young people experience and act in their school cultures and learning environments. In their responses to the Policy Questionnaire on Curriculum Redesign, countries most frequently mentioned the values such as respect (for self, others, country, diversity, and the environment), empathy, integrity and resilience.

The curriculum in Singapore, for example, highlights that competencies are to be learnt with core values – care, integrity, respect, resilience, responsibility and harmony – at the centre of their learning framework. Singapore's Ministry of Education believes that 21st-century competencies are not learned in a vacuum, but in specific contexts (Box 1, next page). These values are expected to be embedded into every subject. At the same time, a particular subject, called "character and citizenship education", is included in the syllabus. Guiding principles for this subject are provided along with examples of content, pedagogies and assessments.

Box 1. Singapore's new National Learning Framework

Singapore's 21st-Century Competencies Framework emphasises the values of **respect, responsibility, resilience, integrity, care and harmony.**

Singapore believes that values shape a young person's social and emotional competencies, such as self- and social awareness, relationship management, self-management and responsible decision making. Values also inform 21st-century competencies, such as civic literacy, global awareness and cross-cultural skills, critical and inventive thinking skills, and communication, collaboration and information skills. These competencies are needed to address globalisation, changing demographics, technological advances and other trends. Together, they are intended to nurture a confident person, a self-directed learner, a concerned citizen and an active contributor.

Figure 1. Singapore's Framework for 21st Century Competencies and Student Outcomes

Source: www.moe.gov.sg/education/education-system/21st-century-competencies.

In 2009, the Estonian Ministry of Education and Research approved the national programme, "Values Development in Estonian Society 2009–2013"; the programme was subsequently renewed for the years 2015-20. The values described in the national curriculum derive from the ethical principles specified in the Constitution of the Republic of Estonia, the Universal Declaration of Human Rights, the Convention on the Rights of the Child and the foundational documents of the European Union.

Box 2. Values Development in Estonian Society

The objective of the programme Values Development in Estonian Society is to support the formation of common values in Estonia and contribute to the development of attitudes that would become the basis for a happy personal life and successful functioning of the society.

The programme focuses on the principal values formulated in the national curricula for basic and upper secondary schools. These are divided into **general human values (honesty, consideration, reverence for life, justice, human dignity, respect for oneself and others)** and **social values (freedom, democracy, respect for mother tongue and culture, patriotism, cultural diversity, tolerance, sustainability of the environment, adherence to law, solidarity, responsibility and gender equality)**. The programme supports the implementation of basic and upper secondary curricula, the realisation of the Estonian strategy of lifelong learning 2020, and several other national strategies and development plans.

The programme concentrates on values education for children and young people in order to help them grow into versatile and creative people who can find fulfilment in the family, at work and in public life. Systematic values education presupposes a broader agreement on the aims of education and on what kind of a society citizens would like. The programme thus emphasises public discussions on social values and the aims of education.

The main objectives of the programme are to:

- support children's and young people's values education and systematic values development in educational institutions and youth-work institutions so that each child and young person can grow up in an environment that facilitates the development of the person and integration into society. It is essential to give everyone the ability to reflect on values in connection with their everyday lives, to interpret their deeds, motives for action and the potential consequences.
- reduce the gap between rhetoric on values and actual choices. Values education develops young people's ability to assess situations of everyday life against their own personal values and those agreed by society. It also develops the ability to assess the alignment between the values that are considered essential and one's actual behaviour.
- enhance the level of discussions on ethics and values in the society by helping different social groups reach a common understanding of general human and social values that help to live a good life, and implement the constitutional objectives of the Republic of Estonia.

Source: www.eetika.ee/en/values-development-0.

The revised Norwegian Core Curriculum – values and principles for primary and secondary education and training – was established by Royal Decree. As part of the national curriculum, the core curriculum elaborates the key values and the general principles for primary and secondary education and training. These values, the foundation of Norwegian democracy, helps Norwegians live, learn and work together.

Box 3. Excerpts from the revised Norwegian Core Curriculum

School shall base its practice on the values in the objects clause of the Education Act.

The objects clause expresses values that unite the Norwegian society. These values, the foundation of our democracy, shall help us to live, learn and work together in a complex world and with an uncertain future. The core values are based on Christian and humanist heritage and traditions. They are also expressed in different religions and worldviews and are rooted in human rights.

These values are the underpinning of the activities in school. They must be used actively and have importance for each pupil in the school environment through the imparting of knowledge and development of attitudes and competence. The values must have impact on the way the school and teachers deal with the pupil and the home. What is in the best interests of the pupil must always be a fundamental consideration. There will always be tensions between different interests and views. Teachers must therefore use their professional judgment so that each pupil is given the best possible care within the school environment.

Human dignity

School shall ensure that human dignity and the values supporting this underpin the education and training and all activities.

The objects clause is based on the inviolability of human dignity and that all people are equal regardless of what makes us different. When teachers show care for the pupils and acknowledge each individual, human dignity is then recognised as a fundamental value for the school and society.

Based on human dignity, human rights are an important part of the foundation of our constitutional state. They are based on universal values that apply to all people regardless of who they are, where they come from and where they are. The UN Convention on the Rights of the Child is also a part of human rights, giving children and young people special protection. The education and training given must comply with human rights, and the pupils must also acquire knowledge about these rights.

Equality and equal rights are values that have been fought for throughout history and which are in constant need of protection and reinforcement. School shall present knowledge and promote attitudes which safeguard these values. All pupils shall be treated equally, and no pupil is to be subjected to discrimination. The pupils must also be given equal opportunities, so they can make independent choices. School must consider the diversity of pupils and ensure that every pupil experience belonging in school and society. We may all experience that we feel different and stand out from the others around us. Therefore, we need acknowledgement and appreciation of differences.

Critical thinking and ethical awareness

School shall help pupils to be inquisitive, so they will ask questions, develop scientific and critical thinking and act with ethical awareness.

The teaching and training shall give the pupils understanding of critical and scientific thinking. Critical and scientific thinking means applying reason in an inquisitive and systematic way when working with specific practical challenges, phenomena, expressions

and forms of knowledge. The teaching and training must create understanding that the methodologies for examining the real world must be adapted to what we want to study, and that the choice of methodology influences what we see.

If new insight is to emerge, established ideas must be scrutinised and criticised by using theories, methods, arguments, experiences and evidence. The pupils must be able to assess different sources of knowledge and think critically about how knowledge is developed. They must also be able to understand that their own experiences, points of view and convictions may be incomplete or erroneous. Critical reflection requires knowledge, but there is also room for uncertainty and unpredictability. The teaching and training must therefore seek a balance between respect for established knowledge and the explorative and creative thinking required to develop new knowledge.

Ethical awareness, which means balancing different considerations, is necessary if one is to be a reflecting and responsible human being. The teaching and training must develop the pupils' ability to make ethical assessments and help them to be cognisant of ethical issues.

Source: www.regjeringen.no/contentassets/53d21ea2bc3a4202b86b83cfe82da93e/core-curriculum.pdf.

Knowledge, skills, attitudes and values are developed interdependently

Attitudes and values are integral to developing knowledge, skills and agency:

- as motivation for acquiring and using knowledge and skills, and providing the cognitive and affective engine for agency (Cerasoli, Nicklin and Ford, 2014[15]; Clary and Orenstein, 1991[16]; Haste, 2018[1])
- as framing the priorities for what comprises "well-being", good personhood and good citizenship (Banks, 2006[17]; Haste, 2018[1]; Reysen and Katzarska-Miller, 2013[7]; Killen and Smetana, 2010[10]; Hardy and Carlo, 2011[11])
- as endorsing and supporting societal and human values that promote social capital and societal well-being (Haste, 2018[1]; Lerner, 2015[9]; Mattessich and Monsey, 1992[18]; Wood and Gray, 1991[19]; Noddings, 1992[20]; Vorauer and Sasaki, 2009[21])
- for moral agency (Berkowitz and Miller, 2018[22]; Gough, McClosky and Meehl, 1952[23]; Hardy and Carlo, 2011[11]; Malin, Liauw and Damon, 2017[24]).

The concept of competency implies more than just the acquisition of knowledge and skills; it involves the mobilisation of knowledge, skills, attitudes and values to meet complex demands. Acquiring these competencies leads to desirable individual development and well-being, and to flourishing cultures and societies (Keyes and Haidt, 2002[25]). For example, critical thinking is the cognitive process by which one evaluates and chooses among alternatives consistent with ethical principles. The perception and assessment of what is right or wrong, good or bad in a specific situation is about ethics. It implies asking questions related to values and limits, such as: What should I do? Was I right to do that? Where are the limits? Knowing the consequences of what I did, should I have done it? This supports a holistic understanding of a competency, assuming attitudes and values are inseparable from cognitive processing. To shape the future we want, students need to be able to use their knowledge, skills, attitudes and values to act in responsible ways (see the concept note on Core Foundations).

Some researchers note that knowledge and skills overlap when knowledge is transferred from one situation to apply to other situations (Meyer, 2004[26]; Oliver and Butler, 2004[27]). Problem solving, in general, requires the use of a combination of knowledge, skills, attitudes and values. For example, design thinking is one method of problem solving as it is "a process, a set of skills and mindsets that help people solve problems through novel solutions" (Goldman, 2017[28]). It is concerned with the methods of solving a problem, whether the solution works, what users need, the social and cultural appropriateness of the solution, and the aesthetic appeal of the solution (Pourdehnad, Wexler and Wilson, 2011[29]). Thus, design thinking requires not only knowledge about the problem, but also social and emotional skills to develop solutions empathetic with and suitable for users, and attitudes and values to ensure that procedures and products are ethical and culturally appropriate.

Attitudes influence the transfer of knowledge and skills

Not only do knowledge, skills, attitudes and values develop interdependently, but research has shown that attitudes influence the transfer of knowledge and skills. For example, Pea (1987[30]) suggests that learner beliefs about the appropriate context for a skill will strongly influence its transfer. He used the example of Brazilian street children who could do calculations when they were selling merchandise on the street, but who were unable to do basic mathematics when they got to school.

In later research, Liu and Su (2011[31]) and Cooley, Burns and Cumming (2016[32]) present research indicating that if learners are enjoying the learning process and valuing the lesson, they are more likely to transfer the knowledge and skills to a new context. McCombs and Marzano (1990[33]) also show that attitudes are key to self-regulation models affecting metacognition. Before a student can be metacognitively aware, he or she must believe that this is possible and desirable, thus setting up the possibility for transfer.

Cooley, Burns and Cumming (2016[32]) explore how student attitudes might relate to transfer. They find that university students who were sceptical of group work, undertook an outdoor education course that taught the value of group work through experiential learning. Attitudes towards group work improved, and students reported a strong intention to continue to use group work in the traditional university setting. Similarly, in workplace training, Grossman and Salas (2011[34]) find that cognitive ability, beliefs of self-efficacy, motivation, and perceived utility of new skills are strongest in individuals who demonstrate transfer of skills in employment training.

In a 2013 review of the impact of non-cognitive skills (defined in the review as "a set of attitudes, behaviours and strategies that are thought to underpin success in school and at work, such as motivation, perseverance and self-control") on outcomes for young people, Gutman and Schoon (2013[35]) note that children's perception of their ability, their expectations of future success, and the extent to which they value an activity influence their motivation and persistence, leading to improved academic outcomes, especially among low-attaining pupils. They also note that in school, effective teaching, the school environment, and social and emotional learning programmes can play an important role in developing key non-cognitive skills. Elsewhere, researchers note that "self-discipline out-predicts IQ for academic outcomes by about a factor of two" (Duckworth and Seligman, 2005[36]; Seligman, 2017[37]).

The inter-relatedness of knowledge, skills, attitudes and values is not new

Teaching knowledge, skills, attitudes and values in combination is not new: they have been taught and learned in combination across cultures and time. For example, with roots in ancient Greek tradition, the German concept of *Bildung* was originally constructed for combining knowledge and personal growth.[2] The concept was transformed into an aim of schooling not just for the elite, but for all students, and has seen a revival in the Nordic countries from the 1960s onwards.

In an education context, knowledge and skills are prerequisites for *Bildung*. *Bildung* includes knowledge and skills plus something more. A student with all the knowledge and skills taught in the curriculum might still not have attained *Bildung*. *Bildung* implies internalised values embedded in the culture; this means both personal and cultural values in relation to others. This kind of holistic understanding of a competency resonates with the pedagogical "trinity" model ("hand-heart-head") also observed in the West.[3]

The holistic approach to competency can also be found in the curriculum traditions of the East. In recent curriculum reforms, an Asian "trinity" model ("Moral-Knowledge-Body - 德[de]智[zhi]体[ti])" is articulated more explicitly. In China, for example, the trinity model is embedded in its philosophy of "Five Ways of Life (五 wu 育 yu) Moral-Wisdom-Body-Collectivity-Aesthetics 德 [de] 智 [zhi] 体 [ti] 群 [qun] 美 [mei])". From the traditional Chinese culture perspective, 德 (moral values) is considered as the primary virtue of an individual, followed by 智 (knowledge/wisdom/intellect) and 体 (physical well-being/physique). In addition to these individual attributes, 群 (social/collective interaction skills) highlights the importance of being part of a collective group and 美 (aesthetics) supports students' appreciation of art, music and the diversity of human cultures.

In Korea, "知(ji)德(deok)体(che)" is also valued. In particular, Korea promotes the development of a well-rounded person, stressing the needs for 德 and 体. For 德, Korea adopted a Character Education Promotion Act in 2015 to develop intelligent learners who are able to communicate well with others and have a balance of strength, virtue and wisdom. For 体, Korea promotes balanced growth of body and mind by strengthening school sports and physical activities.[4] In Japan, "知(chi)德(toku)体(tai)" is still considered to be the basis of the curriculum, and fundamental to thriving in society.[5]

As schools, workplaces and communities become more ethnically, culturally and linguistically diverse, it will be more important than ever to emphasise the inter-relatedness of knowledge, skills, attitudes and values. Cognitive skills, such as exposure to and training in other languages; and emotional and social skills, such as perspective-taking and empathy (OECD, 2018[38]), are critical for fully participating and thriving in increasingly diverse communities.

The capacity to combine and apply knowledge, skills, attitudes and values in unfamiliar circumstances is uniquely human

When Luckin and Issroff (2018[39]) identify a number of things that people should know and be able to do with artificial intelligence (AI), they mention a combination of knowledge (basic AI concepts, digital literacy, data literacy, online safety protocols), skills (basic AI programming, AI systems building), attitudes and values (ethics of AI). Everyone should understand not just the opportunities that AI offers but also its limitations.

An understanding of the ethics of AI is crucial to the future use of AI, both in how systems are developed and how people can make good and effective use of AI systems (see the concept note on Core Foundations for more information on digital and data literacy).

Other researchers note that AI is unlikely to replace people in jobs that require complex social interactions, such as persuasion and negotiation. These jobs demand not only knowledge, but also skills, attitudes and values. Although a wide range of low-skilled production, sales and service jobs are likely to be automated, as are jobs requiring manual dexterity, some relatively simple tasks, such as assisting and caring for others, are unlikely to be. In other words, although AI is making inroads into some domains, it is unlikely to replace workers whose jobs require complex social interactions.

In order to adapt to accelerating technological advances, workers will have to acquire social skills, along with knowledge, attitudes and values (Berger and Frey, 2015[40]). To remain competitive, workers will need to acquire new knowledge and skills throughout their working life. That requires flexibility, a positive attitude towards lifelong learning and curiosity. Education should thus focus on "fusion skills" – that is, a combination of creative, entrepreneurial and technical skills that allows workers to shift into new occupations as they emerge (Berger and Frey, 2015[40]).

Recent trends in technology have put ethics high on the education agenda

Gilroy (2012[41]) suggests that scientific and technological advances pose ethical questions, such as:

- Is a fully automated vehicle safer and more effective than a human-operated vehicle? Who will be responsible in case of accidents?
- Will 3-D printers offer affordable products and deliver them faster by cutting out the manufacturing process? What will happen when 3-D printers are used to produce home-printed guns or personalised pharmaceuticals?
- How often do we consider the massive amounts of data we give to commercial entities when we use social media, store discount cards or order goods via the Internet?

Recent developments in technology, particularly in AI, have put ethics at the centre of discussion on what kind of competencies today's students need for their future. Being ethical about using AI is crucial to how AI is integrated in our lives.

While the ethical imperative is greatest for students who will be designing, using and evaluating AI systems, an ethical attitude to AI is still essential for every student, as everyone will need to be able to evaluate systems, have knowledge of what is legal and illegal (and of what should be legal and illegal), and have the capacity to decide when it is inappropriate to use AI systems and when to report unethical and/or dangerous systems so that people are kept safe.

In exercising their moral agency (see the concept note on Student Agency), students could think about how AI can be harnessed for good, and learn what to do when AI is not being used for legal and ethical purposes (Luckin and Issroff, 2018[39]).

When considering attitudes and values as part of education, it is useful to ask, now and in the future: what kinds of attitudes and values would we want our leaders and decision makers to have, to ensure a fair and equitable world in which everyone would want to live and thrive? It is important to keep in mind that attitudes and values are often caught, not taught.

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Notes

[1] The definitions of these concepts were drawn from Haste, H. (2018[1]), *Attitudes and Values and the OECD Learning Framework 2030: A critical review of definitions, concepts and data*, which includes the full list of citations used.

[2] www.coe.int/t/dg4/linguistic/Source/Prague07_LS_EN.doc

[3] For instance, this was postulated in the 18th century by the Swiss pedagogue and educational reformer Johann Heinrich Pestalozzi (1746 –1827).

[4] Presentation by Ms. Moonhee Kim at the Future of Education and Skills 2030 4th IWG meeting, November, 2016

[5] www.mext.go.jp/a_menu/shotou/new-cs/idea/index.htm

OECD Future of Education and Skills 2030

Conceptual learning framework

ANTICIPATION-ACTION-REFLECTION CYCLE FOR 2030

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IN BRIEF

ANTICIPATION-ACTION-REFLECTION CYCLE FOR 2030

The Anticipation-Action-Reflection (AAR) cycle is an iterative learning process whereby learners continuously improve their thinking and act intentionally and responsibly, moving over time towards long-term goals that contribute to collective well-being. Through planning, experience and reflection, learners deepen their understanding and widen their perspective.

The AAR cycle builds on and integrates a range of other learning processes. It is informed by developmental and social theories of learning, and by other models of learning cycles used in a range of contexts. It consists of three phases: anticipation, action and reflection. The three stages of the AAR cycle inform, complement and strengthen each other.

In the **anticipation** phase, learners use their abilities to anticipate the short- and long-term consequences of actions, understand their own intentions and the intentions of others, and widen their own and others' perspectives.

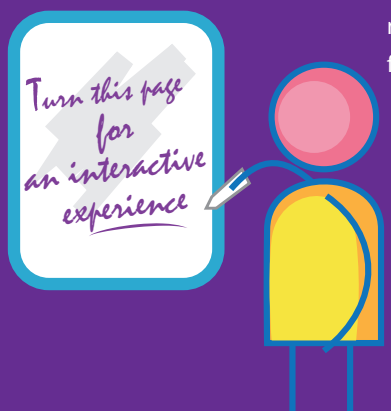
The next phase is where learners take **action** towards specific objectives, contributing to well-being. Whatever the motivation, the consequences of any action can vary widely. An action, in itself, may be neutral, yet could result in anything from very positive to very negative outcomes for the individual, society or the planet. It is therefore important that actions taken are both intentional and responsible – hence the need for anticipation prior to the action, and for reflection following the action.

Through planning, experience and reflection, learners deepen their understanding and widen their perspective.

In the **reflection** phase, learners improve their thinking and deepen their understanding, improving their ability to align future actions with shared values and intentions, and to adapt successfully to changing conditions. Reflection is a systematic, rigorous, disciplined way of thinking, with its roots in scientific inquiry.

KEY POINTS

- Anticipation requires more than just asking questions; it involves projecting the consequences and potential impact of doing one thing over another, or of doing nothing at all.
- Action is a bridge between what learners already know and what they want to bring into being.
- Through reflection, learners gain a sense of perspective and of power over their future actions, leading to the development of agency.



For the full concept note, click ***here***.

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AAR IN ACTION

Anticipation-Action-Reflection (AAR) cycle, Japan, Natural Science
Source: *www.oecd.org/education/2030-project/learning/aar-cycle*

AAR CYCLE: SCIENCE FAIR

Anticipation-Action-Reflection (AAR) cycle, Science Fair, Mexico, Knotion
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Anticipation-Action-Reflection Cycle for 2030

The Anticipation-Action-Reflection (AAR) cycle is an iterative learning process whereby learners continuously improve their thinking and act intentionally and responsibly in the interest of collective well-being.

The AAR cycle consists of three phases:

- In the **anticipation** phase, learners use their abilities to anticipate the short- and long-term consequences of actions, understand their own intentions and the intentions of others, and widen their own and others' perspectives.
- The next phase is where learners take **action** towards well-being.
- In the **reflection** phase, learners improve their thinking, which leads to deeper understanding and better actions towards well-being.

Every day people take decisions with more or less awareness and understanding. While anticipation, action and reflection are competencies in their own right, when combined in a cycle, they can accelerate the development of both agency (see the concept note on Student Agency) and transformative competencies (see the concept note on Transformative Competencies) to help shape a future of individual and societal well-being. The AAR cycle can be understood as part of individual habit, social and organisational routine, and a practical component of lifelong learning. It can therefore enhance and extend the positive impact of education. Students can use the AAR cycle throughout their lives, beyond their formal education.

The AAR cycle builds on and incorporates a range of other learning processes

The learning processes on which the AAR cycle is based can be described as constructivist, in the sense that a cycle of planning, experience and reflection leads to changes in the learner's perspective, understanding and competence. This kind of learning often takes place within a community and in interaction with others (Vygotsky, 1978[1]).

The AAR cycle incorporates developmental theories of learning, for example Jean Piaget on the origins of intelligence (1952[2]), social theories of learning, such as those of Lev Vygotsky (1978[1]), and theories that emphasise concept formation through experience, such as those of Jerome Bruner (1960[3]). These developmental theories also find expression in major bodies of work, such as Ryan and Deci's Self-Determination Theory (2000[4]).

The AAR cycle is not defined to be comprehensive or exclusive; rather it reflects a range of other learning theories and cycles, such as theories of experiential learning (Kolb, 1983[5]); service learning, including the five stages of service learning (Kaye, 2013[6]); early childhood learning, including Reggio Children's Provocation, Observation, Documentation, Relaunch cycle (Reggio Emilia Approach, n.d.[7]); and concept-based learning approaches, such as Sky School and the United World College of South East Asia's "Awareness, Abstraction, Application" model of learning (MacAlpine, 2018[8]).

The AAR cycle is understood as a general heuristic that can be applied and adapted to a wide range of situations, and developed in combination with a variety of specific curriculum approaches or learning traditions. The emphasis on students anticipating and constructing new learning supports not only domain-specific competencies (see the concept note on Core Foundations), but also the three transformative competencies, with their focus on active engagement with the world (see the concept note on Transformative Competencies).

The AAR cycle also shares some features with the Plan-Do-Study-Act and Plan-Do-Check-Act cycles used in the business, healthcare and education sectors as part of their continuous-improvement processes (Tichnor-Wagner, 2018[9]).

Anticipation requires thinking about how actions taken today might have consequences tomorrow

The first stage of the AAR cycle is anticipation – the ability to develop awareness of how actions taken today might have consequences in the future. Anticipation requires more than just asking questions; it involves projecting the consequences and potential impact of doing one thing over another, or of doing nothing at all. In anticipating, learners use their ability to understand issues, manage tensions and dilemmas, and consider the short- and long-term consequences that result from their actions (or inaction) (Rychen, 2016[10]). Learners also consider how the resolution of an issue or the creation of new value anticipates future needs.

A critical element of anticipation is prospection – the ability to "pre-experience the future by simulating it in [the] mind" (Gilbert and Wilson, 2007[11]). Prospection enables the learner to consider and predict the different possible outcomes of their potential actions. Prospection may strengthen children's psychological connection to their future self, increasing their motivation to engage in behaviours that will benefit them later on (Prabhakar, Coughlin and Ghetti, 2016[12]). The ability to forecast and anticipate events grows during childhood and adolescence, and is linked to developments in the prefrontal cortex (Gilbert and Wilson, 2007[11]).

Action is activity undertaken to move towards a valued outcome

After having engaged in deep thinking during the anticipation phase, learners move to the action phase. Action is a bridge between what learners already know and what they want to bring into being (Leadbeater, 2017[13]). Through anticipation, the learner defines a goal of and purpose for acting.

Actions may be investigative, they may be oriented towards taking responsibility or creating new value, or they may be directed towards making changes. Actions can be individual, common or collective (Jensen and Schnack, 1997[14]). While an action, in itself, may be neutral, it could result in anything from very positive to very negative outcomes for the individual, society or the planet. For this reason, it is important that the action taken is both intentional and responsible – hence the need for both anticipation prior to the action and reflection following the action. Perspective-taking is required if the action taken is to be responsible (Selman, 2003[15]; Gehlbach, 2004[16]), and if it can lead to creating new value, and reconciling tensions and dilemmas.

Reflection is a rigorous, disciplined way of thinking

The third stage of the AAR cycle is reflection, "the meaning-making process that moves a learner from one experience into the next with deeper understanding of its relationships with and connections to other experiences and ideas" (Dewey, 1933[17]). Reflection is the thread that makes continuity of learning possible. It enables learners to improve their thinking, which leads to better actions towards well-being over time. Through reflection, learners gain a sense of power over their future actions – and a sense of direction – leading to the development of agency (see the concept note on Student Agency).

Reflection is a systematic, rigorous, disciplined way of thinking, with its roots in scientific inquiry. It requires "attitudes that value the personal and intellectual growth of oneself and of others" (Rodgers, 2002[18]); and it enables learners to integrate greater levels of complexity into their thinking and actions.

Reflection implies the combined use of self-directed skills and creative-thinking skills, and encompasses motivation, ethics, and social and behavioural components in addition to cognitive components (Canto-Sperber and Dupuy, 2001[19]). Reflection also results in a growing awareness of the self, others and the larger society. The transformative competencies are developed and deepened through reflection.

Box 1. Key constructs associated with the AAR cycle

A key aspect of the anticipation phase of the AAR cycle is the ability not just to respond to current events but to anticipate future events. This requires the learner to be **pro-active** – to foresee, and be willing to act on, what may be required for the future. **Perspective taking** is also crucial during the anticipation phase as it allows learners to step back from their own ideas and beliefs, and consider those of others as well.

Critical thinking is required by learners in the anticipation phase, during which the learner assesses his or her own opinions and assumptions and those of others, and in the reflection phase, when learners scrutinise the actions they have taken and consider whether the outcomes are oriented towards well-being. **Reflective thinking**, which occurs during the "action" phase, enables learners to adjust and improve their thinking and actions.

The three stages of the AAR cycle are interconnected

The three stages of the AAR cycle inform, complement and strengthen each other.

Anticipation and action

The willingness and capacity of the learner to take informed action stems from anticipation. If action is taken without anticipation, the learner is not taking into account the possible consequences of the action, either in relation to him- or herself or to others. Anticipation without action may overwhelm the learner with uncertainty about the future. Goal-setting can provide a bridge between anticipation and action; prospection or forecasting can help convert these into motivators of behaviour. As Bandura notes, "Action is motivation directed by cognised goals rather than drawn by remote aims" (Bandura, 1989[20]).

Action and reflection

The literature on reflective practice supports the ideas of both **reflection-on-action**, which describes the individual reflecting on an experience he or she has already had, and also **reflection-in-action**, which describes an individual reflecting on his or her actions while doing them (Schön, 1983[21]). The concept of reflection-in-action indicates not only that the two stages of the cycle are interlinked, but that the two could occur almost simultaneously (a person must assume that the action has already started in order for him or her to reflect on it). It also shows the fluidity and complementarity of the different aspects of the cycle.

Reflection and anticipation

Metacognition, self-awareness, critical thinking and decision making are all skills that are developed through reflection (Rolheiser, Bower and Stevahn, 2000[22]). These are also skills that are required for effective anticipation. Therefore, the practice of any one of them should help strengthen the others. In particular, reflection can enhance learners' anticipation by building knowledge and experience of the implications of their actions.

The AAR cycle is a catalyst for the development of both agency and transformative competencies

While agency (see the concept note on Student Agency) and transformative competencies (see the concept note on Transformative Competencies) may be developed in different ways and in different contexts, the AAR cycle can act as a catalyst for the development of both.

Agency is at the heart of the OECD Learning Compass 2030 and is defined as the competency to think, initiate and act intentionally and responsibly to shape the world towards individual and collective well-being (OECD, 2018[23]).

As learners engage actively in iterative cycles of anticipation, action and reflection, they can gain a sense of responsibility because they feel more connected to the issues and problems being examined. With that sense of responsibility comes the belief that they can make a difference in society. The AAR cycle enables learners to express and develop their agency both in classroom contexts and in life more generally.

In a world of complex, highly networked systems, from the climate to the economy, people need to be able to adapt. An iterative process of anticipation, action and reflection, both in and after action, lies at the heart of this adaptive approach. Each of the three **transformative competencies** – taking responsibility, reconciling tensions and dilemmas, and creating new value – depends on the ability of learners to be adaptive and reflective, to take action accordingly, and to improve their thinking continuously.

Taking responsibility means seeing any course of action in relation to its impact on a variety of stakeholders and relationships, and requires the perspective-taking that is developed in the anticipation and reflection phases of the AAR cycle.

Reconciling tensions and dilemmas may involve anticipating the effects of taking action by mapping the current system with the aim of finding leverage points for making change (Meadows, 2008[24]).

Creating new value means not only developing new innovations, but also ensuring that those innovations are beneficial to the well-being of others and of society more generally. Creating new value also encompasses the ability to develop new thinking, and to approach challenges in different ways – an ability that is cultivated through the AAR cycle and its emphasis on continually improving thinking.

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Frequently Asked Questions

What is the aim of the OECD Future of Education and Skills 2030 project?

The OECD Future of Education and Skills 2030 project was launched to help countries reflect on and explore the long-term challenges facing education. As part of this process, the project identifies the competencies (knowledge, skills, attitudes and values) today's students need to thrive in and shape their world towards a better future in 2030 and beyond. The project will also consider the profiles of teachers, the types of learning environments and the institutional arrangements that can help students develop these competencies.

In addition, the project aims to help make the process of curriculum design and development both evidence-based and systematic. The project aims neither at nor involves the prescription of national curricula but rather seeks to establish a common language and shared space within which countries can individually and collectively explore issues that affect the design of education systems.

How can the OECD Future of Education and Skills 2030 project contribute to the future of societies?

We cannot predict the future; but we need to be open and ready for it. The project aspires to help shape our societies towards a more sustainable and creative future by highlighting the role of education.

The goals of education are much wider than just preparing young people for the world of work. Schools need to prepare students for jobs that have not yet been created, for technologies that have not yet been invented, to solve problems that have not yet been anticipated. Education can equip young people with agency and a sense of purpose, as well as the competencies they need to fulfil their own potential, contribute to the lives of others, and help make a better future.

The project assists countries in preparing students, teachers and schools for the future by education goals, curricula, teaching models, assessments, teacher professional development and learning environments.

The project is aligned with, for example, goal 4.7 of the United Nations Sustainable Development Goal for Education. For example, the project's knowledge base on how countries embed "Global Citizenship" and "Education for Sustainable Development into existing subjects provides the basis on which countries can reflect on their own curriculum design and learn from each other.

What is the timeline of the OECD Future of Education and Skills 2030 project?

The **first phase of the project (2015-19)** explores "what" questions, such as: what kind of competencies (knowledge, skills, attitudes and values) do today's students need to thrive in and shape the future for better lives and well-being? The **second phase of the project (2019 and beyond)** explores "how" questions, such as: how can the design of learning environments foster these competencies, and how can curricula be effectively implemented?

What are the areas of work in Phase I (2015-19) of the OECD Future of Education and Skills 2030 project?

To respond to the interest and needs expressed by the participating countries, Phase I of the project (201 5-19) focused on two strands of activities:

- Concept-making with common language/taxonomy: i.e. developing a future-oriented conceptual learning framework that supports a common understanding of the knowledge, skills, attitudes and values that are important for students to learn
- International comparative analysis on curriculum redesign: i.e. conducting an international curriculum analysis that can guide evidence-based debates and facilitate international peer-learning and self-reflection on curriculum redesign for the future.

Our Learning Framework defines a clear vision and goals for education systems, and a common language to be used by countries, local authorities, schools, teachers, students and other stakeholders. A shared language can facilitate comparisons across a wide range of education systems.

Our international curriculum analysis will build a knowledge base that will allow countries to make the curriculum-design process more systematic. It supports international peer learning and evidence-based debates among the project's stakeholders.

- The **Policy Questionnaire on Curriculum Redesign** exercise gives countries the opportunity to learn from peers about good practices and the challenges of curriculum redesign, policy initiatives and strategies. It also provides an opportunity for self-reflection so that countries can position their own curriculum (e.g. visions, education goals and expected student outcomes) in comparison with those of other countries. It also maps trends across multiple country contexts.
- The **Curriculum Content Mapping** is a document-analysis exercise in which countries explore the extent to which and how competencies are included in their current curriculum. By mapping seven learning areas of the curriculum against a list of 28 competencies that stem from the OECD 2030 Learning Framework, countries explore how knowledge can be taught together with skills (e.g. critical thinking, creative thinking, co-operation/collaboration), and attitudes and values (e.g. respect, empathy). This can help countries better understand how particular skills, attitudes and values are more or less relevant to certain learning areas/subjects. CCM also helps identify how emerging demands for interdisciplinary competencies (e.g. global competency, digital literacy) can be accommodated in existing learning areas. This can help countries avoid overloading their curricula.
- The **Mathematics Curriculum Documents Analysis** project investigates the extent to which countries have incorporated 21st-century skills in their current mathematics curriculum. Participating countries identify one or more mathematics experts to take part in a week-long workshop on coding relevant and desired mathematics curriculum documents, including curriculum guides and textbook materials, making use of the 21st-Century Mathematics Framework developed for MCDA in conjunction with PISA 2021. Benefits for participating countries include: learning the extent to which the PISA 2021 concept of mathematics literacy is represented in a country's current mathematics curriculum; comparing individual mathematics curricula to contemporary international benchmarks;

informing ongoing reform efforts towards a 21st-century vision of mathematics education; and creating a mathematics curriculum profile to provide a relevant interpretive context for a country's PISA 2021 mathematics literacy performance.

- The **stock-taking exercise on physical and health education** marks the first time that the OECD has focused on "physical and health education curriculum" as part of its policy analysis. It takes stock of research evidence on the effects of physical education/health education on student academic outcomes and well-being. It also aims to describe the state of physical education/health education policies, curricula, practices and perspectives in various countries.

What is a competency?

A competency is a holistic concept that includes knowledge, skills, attitudes and values. In other words, the OECD Future of Education and Skills 2030 project defines a competency as more than "skills". Skills are a prerequisite for exercising a competency. To be ready and competent for 2030, students need to be able to use their knowledge, skills, attitudes and values to act in coherent and responsible ways that can change the future for the better.

Competency and disciplinary knowledge are neither competing nor mutually exclusive concepts. Students need core knowledge as a fundamental building block of understanding; they can also exhibit competencies based on knowledge, and use their growing competency to update and apply their knowledge, and deepen their understanding. Thus, the concept of competency implies more than just the acquisition of knowledge and skills; it involves the mobilisation of knowledge, skills, attitudes and values to meet the complex demands of situations of uncertainty.

What is the OECD 2030 Learning Framework?

The OECD 2030 Learning Framework offers a vision and a set of underpinning principles for the future of education systems. OECD Future of Education and Skills 2030 stakeholders have co-developed a "learning compass" as a metaphor for the framework. The OECD Learning Compass 2030 aims to help students orient themselves and navigate through uncertainty towards well-being for themselves, their community and the planet (see concept note on the Learning Compass).

How can the OECD Learning Compass 2030 help orient students towards well-being?

Students who are best prepared for the future are change agents. They can have a positive impact on their surroundings and on their own well-being, influence the future, understand others' intentions, actions and feelings, and anticipate the short- and long-term consequences of what they do. Future-ready students need to exercise agency in their own education and throughout life. Agency implies a sense of responsibility to participate in the world and, in so doing, to influence people, events and circumstances for the better. Agency requires the ability to frame a guiding purpose and identify actions to achieve a goal.

Each individual student should "hold" his or her own learning compass. Where the student stands – his or her prior knowledge, learning experiences and dispositions, family background – will differ from person to person; therefore the student's learning path and the speed with which he or she moves towards well-being will differ from those of his/her peers. Yet, even though there may be many visions of the future we want, the well-being of society is a shared "destination".

Are the OECD Future of Education and Skills 2030 project and its IWG members developing a global prescriptive curriculum?

No, the project does not prescribe; rather, it provides an opportunity to look forward and broaden ways of thinking about what competencies young people need to thrive in and shape the future for the better. The OECD 2030 Learning Framework is globally informed and locally contextualised. The project chose to use the word "learning" as opposed to "curriculum" for the framework to embrace all forms of learning, including formal, non-formal and informal activities. The framework acknowledges that competencies are developed both in and outside of school.

Will the OECD 2030 Learning Framework be used as an assessment framework?

No, the intention of the OECD 2030 Learning Framework is not to develop an assessment framework. Its intention is to value student outcomes that are not currently measured by test instruments, such as exercising agency, taking responsibility and showing empathy. The project's working group members are aiming to expand the notion of "what gets measured gets treasured" to "what does not get measured also gets treasured".

What are the main differences between the OECD 2030 Learning Framework and the PISA assessment and analytical framework?

There are three differences. First, the former focuses on "learning" while the latter focuses on "assessment". In other words, the former aims to answer questions such as "what kind of competencies do students need in order to be able to shape a better future?", while the latter aims to clarify the knowledge and skills that can be measured through PISA. The assessed competencies are decided by the PISA Governing Board members based on PISA's priorities of what should be measured and experts' input on what can be measured.

Second, the scope covered by the learning framework is much broader than the scope of the PISA framework. While the OECD 2030 Learning Framework takes a holistic view of what students need to learn, the PISA assessment and analytical framework focuses on specific knowledge and skills that are important, and can be reliably and soundly assessed. The OECD 2030 Learning Framework provides a map for where students should head towards; PISA provides information on how near or far today's students are from some of those goals in specific domains.

Third, the relationship or positioning of the frameworks relative to "curriculum" is different. The OECD 2030 Learning Framework aims to help countries reflect on their own curriculum by comparing it with those of other countries, using the framework as common language. While PISA is not a curriculum-based assessment, it is based on expectations about what students should be learning, and thus takes into account what students have the opportunity to learn through the curriculum.

Is there a connection between the OECD 2030 Learning Framework and the PISA global competence framework?

The OECD 2030 Learning Framework and the PISA global competence framework are connected but not identical; more important, they do not serve the same purpose. The OECD 2030 Learning Framework provides a vision and a set of underpinning principles for the future of education systems. It focuses on well-being for 2030 at the individual and societal levels, and provides a holistic vision of learning. It is designed to show what knowledge, skills, attitudes and values students need to shape the future, and allows policy

makers to take stock of how these competencies could be embedded in existing curricula rather than by creating new subject areas.

The PISA global competence framework is an assessment framework that clarifies the rationale for focusing on the domain, defines the domain and provides direction on how the domain is assessed. For PISA 2018, global competence is defined as a multidimensional capacity that encompasses the ability to examine global and intercultural issues; understand and appreciate different perspectives and viewpoints; interact successfully and respectfully with others; and take action towards sustainability and collective well-being. These dimensions overlap with those constructs included in the OECD 2030 Learning Framework, such as perspective taking, openness, and taking responsibility, but the OECD 2030 Learning Framework has a broader outlook.

What are the areas of work in Phase II (2019 and beyond) of the OECD Future of Education and Skills 2030 project?

With broad agreement reached on the question of what knowledge, skills, attitudes and values today's students need to learn in order to thrive in and shape a better future, Phase II will explore how redesigned curricula can be best delivered to ensure that all students, regardless of their backgrounds, have the chance to acquire the desired competencies and achieve the broader goals of education. Thus the focus will shift to the "how" question, i.e. how education systems can effectively deliver the redesigned curriculum, and translate it into learning.

Drawing on the working methods established in Phase I, Phase II will also involve two activities:

- Concept-making with common language/taxonomy: the focus of conceptualisation will shift from "learning for 2030" to "teaching for 2030"
- Curriculum analysis: the focus will shift from "curriculum design" to "curriculum implementation".

What stakeholders are involved in the OECD Future of Education and Skills 2030 project?

Our stakeholders include system leaders and action leaders who are policy makers, academics, school leaders, teachers and students from school networks, teachers, school, and social partners (e.g. private foundations, private companies and community services) who have a genuine interest in supporting system change for better a future. To this end, consultations are conducted with a wide range of project stakeholders to ensure that they participate in the co-creation of concept making, which requires expertise beyond research evidence.

How can I get involved/contribute to the OECD Future of Education and Skills 2030 Project?

OECD Future of Education and Skills 2030 welcomes stakeholders to contribute to the project. If you are interested, please contact: education2030@oecd.org.

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