THE FUTURE OF EDUCATION AND SKILLS

Education 2030

THE FUTURE WE WANT

OECD

Foreword

We are facing unprecedented challenges – social, economic and environmental – driven by accelerating globalisation and a faster rate of technological developments. At the same time, those forces are providing us with myriad new opportunities for human advancement. The future is uncertain and we cannot predict it; but we need to be open and ready for it. The children entering education in 2018 will be young adults in 2030. Schools can prepare them 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. It will be a shared responsibility to seize opportunities and find solutions.

To navigate through such uncertainty, students will need to develop curiosity, imagination, resilience and self-regulation; they will need to respect and appreciate the ideas, perspectives and values of others; and they will need to cope with failure and rejection, and to move forward in the face of adversity. Their motivation will be more than getting a good job and a high income; they will also need to care about the well-being of their friends and families, their communities and the planet.

Education can equip learners with agency and a sense of purpose, and the competencies they need, to shape their own lives and contribute to the lives of others. To find out how best to do so, the Organisation for Economic Co-operation and Development (OECD) has launched *The Future of Education and Skills 2030* project. 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 and shape their world?
- **How** can instructional systems develop these knowledge, skills, attitudes and values effectively?

This position paper describes the first results from this work. The initial framework was reviewed, tested and validated in an iterative process involving a range of stakeholders from around the world. They ensured that the framework is relevant across the globe, consistent with wider policies and can be implemented. We will finalise the framework by the end of 2018. In 2019, we will change gears and begin to explore the translation of the framework into pedagogy, assessment and the design of an instructional system.

Working with policy makers, academic experts, school networks, teachers, education leaders, students and social partners, the framework provides a space in which to exchange ideas, compare proven and promising practices, discover cutting-edge research and contribute to a new ecosystem of learning. If you'd like to join us, please get in touch.

Andreas Schleicher

Director for Education and Skills

OECD

OECD Learning Framework 2030

This OECD Learning Framework 2030 offers a vision and some underpinning principles for the future of education systems. It is about orientation, not prescription. The learning framework has been co-created for the OECD Education 2030 project by government representatives and a growing community of partners, including thought leaders, experts, school networks, school leaders, teachers, students and youth groups, parents, universities, local organisations and social partners. This is work in progress and we invite you to join us in developing future-ready education for all.

Education 2030: A Shared Vision

We are committed to helping every learner develop as a whole person, fulfil his or her potential and help shape a shared future built on the well-being of individuals, communities and the planet.

Children entering school in 2018 will need to abandon the notion that resources are limitless and are there to be exploited; they will need to value common prosperity, sustainability and well-being. They will need to be responsible and empowered, placing collaboration above division, and sustainability above short-term gain.

In the face of an increasingly volatile, uncertain, complex and ambiguous world, education can make the difference as to whether people embrace the challenges they are confronted with or whether they are defeated by them. And in an era characterised by a new explosion of scientific knowledge and a growing array of complex societal problems, it is appropriate that curricula should continue to evolve, perhaps in radical ways.

Need for new solutions in a rapidly changing world

Societies are changing rapidly and profoundly.

A first challenge is **environmental**: e.g.

- Climate change and the depletion of natural resources require urgent action and adaptation.

A second challenge is **economic**: e.g.

- Scientific knowledge is creating new opportunities and solutions that can enrich our lives, while at the same time fuelling disruptive waves of change in every sector. Unprecedented innovation in science and technology, especially in bio-technology and artificial intelligence, is raising fundamental questions about what it is to be human. It is time to create new economic, social and institutional models that pursue better lives for all.
- Financial interdependence at local, national and regional levels has created global value chains and a shared economy, but also pervasive uncertainty and exposure to economic risk and crises. Data is being created, used and shared on a vast scale, holding out the promise of expansion, growth and improved efficiency while posing new problems of cyber security and privacy protection.

A third challenge is **social**: e.g.

- As the global population continues to grow, migration, urbanisation and increasing social and cultural diversity are reshaping countries and communities.
- In large parts of the world, inequalities in living standards and life chances are widening, while conflict, instability and inertia, often intertwined with populist politics, are eroding trust and confidence in government itself. At the same time, the threats of war and terrorism are escalating.

These global trends are already affecting individual lives, and may do so for decades to come. They have triggered a global debate that matters to every country, and call for global and local solutions. The OECD Education 2030 contributes to the UN 2030 Global Goals for Sustainable Development (SDGs), aiming to ensure the sustainability of people, profit, planet and peace, through partnership.

Need for broader education goals: Individual and collective well-being

Unless steered with a purpose, the rapid advance of science and technology may widen inequities, exacerbate social fragmentation and accelerate resource depletion.

In the 21st century, that purpose has been increasingly defined in terms of well-being. But well-being involves more than access to material resources, such as income and wealth, jobs and earnings, and housing. It is also related to the

quality of life, including health, civic engagement, social connections, education, security, life satisfaction and the environment. Equitable access to all of these underpins the concept of inclusive growth.

Education has a vital role to play in developing the knowledge, skills, attitudes and values that enable people to contribute to and benefit from an inclusive and sustainable future. Learning to form clear and purposeful goals, work with others with different perspectives, find untapped opportunities and identify multiple solutions to big problems will be essential in the coming years. Education needs to aim to do more than prepare young people for the world of work; it needs to equip students with the skills they need to become active, responsible and engaged citizens.

## Learner agency: Navigating through a complex and uncertain world

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.

To help enable agency, educators must not only recognise learners' individuality, but also acknowledge the wider set of relationships – with their teachers, peers, families and communities – that influence their learning. A concept underlying the learning framework is "co-agency" – the interactive, mutually supportive relationships that help learners to progress towards their valued goals. In this context, everyone should be considered a learner, not only students but also teachers, school managers, parents and communities.

Two factors, in particular, help learners enable agency. The first is a personalised learning environment that supports and motivates each student to nurture his or her passions, make connections between different learning experiences and opportunities, and design their own learning projects and processes in collaboration with others. The second is building a solid foundation: literacy and numeracy remain crucial. In the era of digital transformation and with the advent of big data, digital literacy and data literacy are becoming increasingly essential, as are physical health and mental well-being.

OECD Education 2030 stakeholders have co-developed a "learning compass" that shows how young people can navigate their lives and their world (Figure 1).

Figure 1. The OECD Learning Framework 2030: Work-in-progress
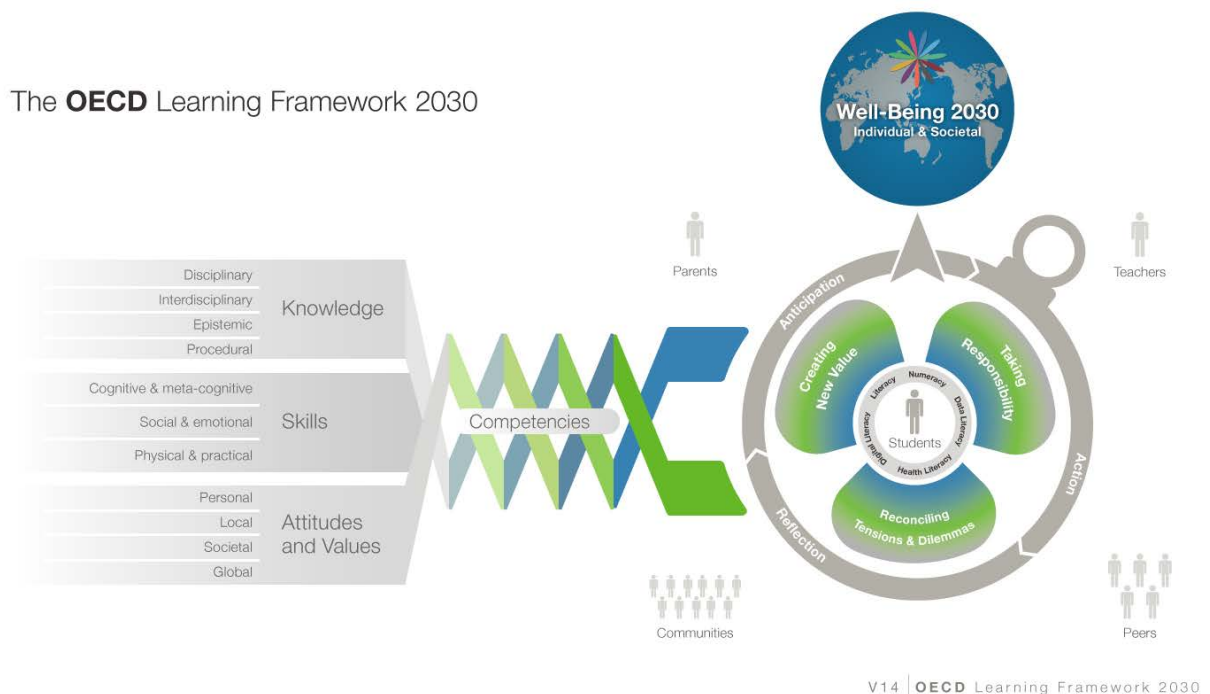
Need for a broad set of knowledge, skills, attitudes and values in action

Students who are best prepared for the future are change agents. They can have a positive impact on their surroundings, influence the future, understand others' intentions, actions and feelings, and anticipate the short and long-term consequences of what they do.

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. Future-ready students will need both broad and specialised knowledge. Disciplinary knowledge will continue to be important, as the raw material from which new knowledge is developed, together with the capacity to think across the boundaries of disciplines and "connect the dots". Epistemic knowledge, or knowledge about the disciplines, such as knowing how to think like a mathematician, historian or scientist, will also be significant, enabling students to extend their disciplinary knowledge. Procedural knowledge is acquired by understanding how something is done or made – the series of steps or actions taken to accomplish a goal. Some procedural knowledge is domain-specific, some transferable across domains. It typically develops through practical problem-solving, such as through design thinking and systems thinking.

Students will need to apply their knowledge in unknown and evolving circumstances. For this, they will need a broad range of skills, including cognitive and meta-cognitive skills (e.g. critical thinking, creative thinking, learning to learn and self-regulation); social and emotional skills (e.g. empathy, self-efficacy and collaboration); and practical and physical skills (e.g. using new information and communication technology devices).

The use of this broader range of knowledge and skills will be mediated by attitudes and values (e.g. motivation, trust, respect for diversity and virtue). The attitudes and values can be observed at personal, local, societal and global levels. While human life is enriched by the diversity of values and attitudes arising from different cultural perspectives and personality traits, there are some human values (e.g. respect for life and human dignity, and respect for the environment, to name two) that cannot be compromised.

Competencies to transform our society and shape our future

If students are to play an active part in all dimensions of life, they will need to navigate through uncertainty, across a wide variety of contexts: in time (past, present, future), in social space (family, community, region, nation and world) and in digital space. They will also need to engage with the natural world, to appreciate its fragility, complexity and value.

Building on the *OECD Key Competencies* (the DeSeCo project: Definition and Selection of Competencies), the OECD Education 2030 project has identified three further categories of competencies, the "Transformative Competencies", that together address the growing need for young people to be innovative, responsible and aware:

- Creating new value
- Reconciling tensions and dilemmas
- Taking responsibility

Creating new value

New sources of growth are urgently needed to achieve stronger, more inclusive and more sustainable development. Innovation can offer vital solutions, at affordable cost, to economic, social and cultural dilemmas. Innovative economies are more productive, more resilient, more adaptable and better able to support higher living standards.

To prepare for 2030, people should be able to think creatively, develop new products and services, new jobs, new processes and methods, new ways of thinking and living, new enterprises, new sectors, new business models and new social models. Increasingly, innovation springs not from individuals thinking and working alone, but through co-operation and collaboration with others to draw on existing knowledge to create new knowledge. The constructs that underpin the competency include adaptability, creativity, curiosity and open-mindedness.

Reconciling tensions and dilemmas

In a world characterised by inequities, the imperative to reconcile diverse perspectives and interests, in local settings with sometimes global implications, will require young people to become adept at handling tensions, dilemmas and trade-offs, for example, balancing equity and freedom, autonomy and community, innovation and continuity, and efficiency and the democratic process. Striking a balance between competing demands will rarely lead to an either/or choice or even a single solution. Individuals will need to think in a more integrated way that avoids premature conclusions and recognises interconnections. In a world of interdependency and conflict, people will successfully secure their own well-being and that of their families and their communities only by developing the capacity to understand the needs and desires of others.

To be prepared for the future, individuals have to learn to think and act in a more integrated way, taking into account the interconnections and inter-relations between contradictory or incompatible ideas, logics and positions, from both short- and long-term perspectives. In other words, they have to learn to be systems thinkers.

Taking responsibility

The third transformative competency is a prerequisite of the other two. Dealing with novelty, change, diversity and ambiguity assumes that individuals can think for themselves and work with others. Equally, creativity and problem-solving require the capacity to consider the future consequences of one's actions, to evaluate risk and reward, and to accept accountability for the products of one's work. This suggests a sense of responsibility, and moral and intellectual maturity, with which a person can reflect upon and evaluate his or her actions in light of his or her experiences, and personal and societal goals, what they have been taught and told, and what is right or wrong. Acting ethically implies 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? Central to this competency is the concept of self-regulation, which involves self-control, self-efficacy, responsibility, problem solving and adaptability. Advances in developmental neuroscience show that a second burst of brain plasticity takes place during adolescence, and that the brain regions and systems that are especially plastic are those implicated in the development of self-regulation. Adolescence can now be seen as a time not just of vulnerability but of opportunity for developing a sense of responsibility.

Design principles for moving toward an eco-systemic change

These transformative competencies are complex; each competency is intricately inter-related with the others. They are developmental in nature, and thus learnable.

The ability to develop competencies is itself something to be learned using a sequenced process of reflection, anticipation and action. Reflective practice is the ability to take a critical stance when deciding, choosing and acting, by stepping back from what is known or assumed and looking at a situation from other, different perspectives. Anticipation mobilises cognitive skills, such as analytical or critical thinking, to foresee what may be needed in the future or how actions taken today might have consequences for the future. Both reflection and anticipation are precursors to responsible actions.

The OECD Learning Framework 2030 therefore encapsulates a complex concept: the mobilisation of knowledge, skills, attitudes and values through a process of reflection, anticipation and action, in order to develop the inter-related competencies needed to engage with the world.

To ensure that the new learning framework is actionable, the OECD Education 2030 stakeholders have worked together to translate the transformative competencies and other key concepts into a set of specific constructs (e.g. creativity, critical thinking, responsibility, resilience, collaboration) so that teachers and school leaders can better incorporate them into curricula. The constructs are currently under review (Annex 2).

They have also built a knowledge base for curriculum redesign. Curriculum change assumes that education is an eco-system with many stakeholders. Students, teachers, school leaders, parents, national and local policy makers, academic experts, unions, and social and business partners have worked as one to develop this project. In its work across different countries, OECD Education 2030 has identified five common challenges.

1. Confronted with the needs and requests of parents, universities and employers, schools are dealing with curriculum overload. As a result, students often lack sufficient time to master key disciplinary concepts or, in the interests of a balanced life, to nurture friendships, to sleep and to exercise. It is time to shift the focus of our students from "more hours for learning" to "quality learning time".
2. Curricula reforms suffer from time lags between recognition, decision making, implementation and impact. The gap between the intent of the curriculum and learning outcome is generally too wide.
3. Content must be of high quality if students are to engage in learning and acquire deeper understanding.
4. Curricula should ensure equity while innovating; all students, not just a select few, must benefit from social, economic and technological changes.
5. Careful planning and alignment is critically important for effective implementation of reforms.

In response to these challenges, working group members and partners are co-creating "design principles" for changes in curricula and education systems that will be relevant in different countries over time.

Concept, content and topic design:

- **Student agency.** The curriculum should be designed around students to motivate them and recognise their prior knowledge, skills, attitudes and values.
- **Rigour.** Topics should be challenging and enable deep thinking and reflection.
- **Focus.** A relatively small number of topics should be introduced in each grade to ensure the depth and quality of students' learning. Topics may overlap in order to reinforce key concepts.

- **Coherence.** Topics should be sequenced to reflect the logic of the academic discipline or disciplines on which they draw, enabling progression from basic to more advanced concepts through stages and age levels.
- **Alignment.** The curriculum should be well-aligned with teaching and assessment practices. While the technologies to assess many of the desired outcomes do not yet exist, different assessment practices might be needed for different purposes. New assessment methods should be developed that value student outcomes and actions that cannot always be measured.
- **Transferability.** Higher priority should be given to knowledge, skills, attitudes and values that can be learned in one context and transferred to others.
- **Choice.** Students should be offered a diverse range of topic and project options, and the opportunity to suggest their own topics and projects, with the support to make well-informed choices.

Process design:

- **Teacher agency.** Teachers should be empowered to use their professional knowledge, skills and expertise to deliver the curriculum effectively.

- **Authenticity.** Learners should be able to link their learning experiences to the real world and have a sense of purpose in their learning. This requires interdisciplinary and collaborative learning alongside mastery of discipline-based knowledge.

- **Inter-relation.** Learners should be given opportunities to discover how a topic or concept can link and connect to other topics or concepts within and across disciplines, and with real life outside of school.

- **Flexibility.** The concept of "curriculum" should be developed from "predetermined and static" to "adaptable and dynamic". Schools and teachers should be able to update and align the curriculum to reflect evolving societal requirements as well as individual learning needs.
- **Engagement**. Teachers, students and other relevant stakeholders should be involved early in the development of the curriculum, to ensure their ownership for implementation.

Next steps

This paper summarises a global effort for education change. You are invited to add your voice and your support to its visions and ideas by joining the Working Group of the OECD Education 2030 project.

The group is collecting ideas and examples of good practice for making the learning framework actionable. They call on:

- National, regional and local governments to share their policy design and curriculum design experiences related to the learning framework
- Students, teachers, school leaders, and parents to share practices and experiences as concrete examples of using the OECD Learning Compass 2030
- Experts and researchers to help strengthen the links between evidence-based policy and practice, especially on the constructs of the framework
- Local communities, professional associations and industries, including representatives of teachers' unions and the business sector, to share practices of supporting student learning and creating appropriate learning environments
- International communities and organisations to contribute to the OECD Education 2030 dialogue in support of the UN Sustainable Development Goal 4.7 and other relevant initiatives.

Annex 1: Contributors

Chair of Education 2030

Jørn Skovsgaard (Senior Adviser, Ministry of Education, Denmark)

Advisory group

João Costa (Secretary of State for Education, Portugal)

Suzanne Dillon (Assistant Chief Inspector, Department of Education and Skills, Ireland)

Moonhee Kim (Minister, Permanent Delegation of the Republic of Korea to the OECD, Korea)

Kan Hiroshi Suzuki (Special Advisor to the Minister of Education, Sports, Culture, Science and Technology, Japan)

Education 2030 National Coordinators and Contact Persons for Policy Questionnaire on Curriculum (PQC)

Australia: Hilary Dixon (ACARA) and Robert Randall (ACARA)

Argentina: Mercedes Miguel (Ministerio de Educatión Nacional)

Canada, Ontario: Shirley Kendrick (Ontario Ministry of Education) and Cathy Montreuil (Ontario Ministry of Education)

Chile: Alejandra Arratia Martínez (Ministry of Education) and Ana Labra Welden (Ministry of Education)

China: Yan Wang (National Institute of Education Sciences)

Costa Rica: Rosa Carranza (Ministerio de Educación Pública) and Alicia Vargas (Ministerio de Educación Pública)

Czech Republic: Hana Novotna (Czech School Inspectorate)

Denmark: Christian Rasmussen (Ministry of Education) and Pernille Skou Bronner Andersen (Ministry of Education)

Estonia: Pille Liblik (Ministry of Education and Research)

Finland: Aki Tornberg (Ministry of Education and Culture) and Erja Vitikka (Finnish National Board of Education)

Hong Kong, China: Joe NG (The Government of the Hong Kong Special Administrative Region Education Bureau)

Ireland: Linda Neary (Department of Education and Skills)

Japan: Takanori Bando (MEXT), Saori Oda (National Institute for Educational Policy Research) and Shun Shirai (MEXT)

Kazakhstan: Azhar Kabdulinova (Nazarbayev Intellectual Schools AEO) and Dina Shaikhina (Nazarbayev Intellectual Schools AEO)

Korea: Mee-Kyeong Lee (Korea Institute for Curriculum and Evaluation) and Eun Young Kim (Korean Educational Development Institute)

Mexico: Elisa Bonilla Rius (Secretaría de Educación Pública)

Netherlands: Jeanne van Loon (Dutch Ministry of Education, Culture and Science)

New Zealand: Pauline Cleaver (Ministry of Education) and Gracielli Ghizzi-Hall (Ministry of Education)

Norway: Elisabeth Buk-Berge (Ministry of Education and Research) and Bente Heian (Norwegian Directorate for Education and Training)

Poland: Danuta Pusek (Ministry of National Education)

Portugal: Eulália Alexandre (Ministry of Education)

Russia: Maria Dobryakova (National Research University Higher School of Economics), Tatiana Meshkova (National Research University Higher School of Economics) and Elena Sabelnikova (National Research University Higher School of Economics)

Singapore: Low Ee Ling (National Institute of Education)

South Africa: Suren Govender (Department of Basic Education) and Hleki Mabunda (Department of Basic Education)

Sweden: Johan Börjesson (Swedish National Agency for Education)

Turkey: Alpaslan Durmus (Head of Board of Education, MoNE), Mustafa Hilmi Çolakoglu (Deputy Undersecretary, MoNE), Hasan Kavgaci (Member of Board of Education, MoNE), Toper Akbaba (Head of Curriculum Department Board of Education, MoNE), Özlem Kalkan (Teacher-Expert, MoNE), Şadiye İnci (Teacher-Expert, MoNE) and Ayhan İncirci (Teacher-Expert, MoNE)

United Kingdom, Scotland: Jonathan Wright (Education Analysis)

United Kingdom, Wales: Rhiannon Davies (Education and Public Services Group)

Vietnam: Luong Viet Thai (Vietnam Institute of Education Sciences)

Education 2030 Curriculum Experts

Hungary: Valeria Csepe (Eszterházy Károly University) and Nora Katona (Eszterházy Károly University)

India: Monal Jayaram Poduval (Piramal Foundation for Education Leadership), Lopa Gandhi (Gandhi Fellowship), Shrestha Ganguly (Piramal Foundation for Education Leadership) and Shobhana Panikar (Kaivalya Education Foundation)

United Kingdom, Northern Ireland: Carmel Gallagher (International Bureau for Education)

United States: William Schmidt (Michigan State University)

Contributors from OECD countries and jurisdictions

Australia: Danielle Cavanagh (ACARA), Patrick Donaldson (Permanent Delegation of Australia to the OECD), Hilary Dixon (ACARA), Mark McAndrew (ACARA) and Robert Randall (ACARA)

Belgium: Dominique Denis (Ministère de la Fédération Wallonie-Bruxelles) and Marie-Anne Persoons (Flemish Department of Education and Training)

Canada: Council of Ministers of Education Canada - CMEC: Marie Macauley; **Ontario**: Richard Franz (Ontario Ministry of Education), Angela Hinton (Ontario Ministry of Education), Cathy Montreuil (Ontario Ministry of Education), Safa Zaki (Ontario Ministry of Education), Lori Stryker (Ontario Ministry of Education) and Cresencia Fong (Ontario Ministry of Education); **Quebec**: Julie-Madeleine Roy (Ministère de l'Éducation et de l'Enseignement supérieur); **Manitoba**: Carolee Buckler (Manitoba Education and Advanced Learning) and Dallas Morrow (Manitoba Department of Education and Training).

Chile: Eliana Chamizo Álvarez (Ministry of Education) and Ana Labra Welden (Ministry of Education)

Denmark: Rasmus Biering-Sorensen (Danish Ministry of Education), Jens Rasmussen (Aarhus University) and Pernille Skou Bronner Andersen (Danish Ministry of Education)

Estonia: Heli Aru-Chabilan (Ministry of Education and Research), Eve Kikas (Tallinn University), Maie Kitsing (Ministry of Education and Research), Pille Liblik (Ministry of Education and Research) and Katrin Rein (Permanent Representation of Estonia to the OECD and UNESCO)

Finland: Aleksi Kalenius (Permanent Delegation of Finland to the OECD) and Anneli Rautiainen (Finnish National Agency for Education)

France: Claudio Cimelli (Ministère de l'Education Nationale), Mireille Lamouroux (Ministère de l'Education Nationale), Pascale Montrol-Amouroux (Ministère de l'Education Nationale) and Daniel Schlosser (Permanent Delegation of France to the OECD)

Germany: Jutta Illichmann (Bundesministerium für Bildung und Forschung) and Elfriede Ohrnberger (Bayerisches Staatsministerium für Bildung und Kultus, Wissenschaft und Kunst)

Hungary: Andras Hlacs (Permanent Delegation of Hungary to the OECD), László Limbacher (Ministry of Human Capacities) and Emese Pupek (Ministry of Human Capacities)

Iceland: Ásgerdur Kjartansdóttir (Ministry of Education, Science and Culture) and Ásta Magnusdottir (Ministry of Education, Science and Culture)

Ireland: Suzanne Dillon (Department of Education and Skills), Breda Naughton (Department of Education and Skills) and Linda Neary (Department of Education and Skills)

Israel: Sivan Kfir Katz (Permanent Delegation of Israel to the OECD)

Italy: Donatella Solda Kutzmann (Ministry of Education)

Japan: Kazuo Akiyama (MEXT), Hajime Furusaka (MEXT), Masafumi Ishikawa (MEXT), Takashi Kiryu (Permanent Delegation of Japan to the OECD), Yamaguchi Masakazu (MEXT), Hideaki Matsugi (MEXT), Takashi Murao (Perma-

nent Delegation of Japan to the OECD), Hajime Shirouzu (The University of Tokyo), Kan Hiroshi Suzuki (MEXT), Hiroki Toyooka (MEXT), Taijiro Tsuruoka (MEXT), Aya Saito (MEXT) and Shun Shirai (MEXT)

Korea: Moonhee Kim (Permanent Delegation of the Republic of Korea to the OECD), Mee-Kyeong Lee (Korea Institute for Curriculum and Evaluation), Keun Ho Lee (Korea Institute for Curriculum and Evaluation), Kee-Joon Yoon (Korea Institute for Curriculum and Evaluation), Hee-Hyun Byun (Korea Institute for Curriculum and Evaluation), Eun Young Kim (Korean Educational Development Institute) and Su-Jin Choi (Korean Educational Development Institute)

Luxembourg: Michel Lanners (Ministère de l'Éducation nationale, de l'Enfance et de la Jeunesse)

Mexico: Carla Musi (Permanent Delegation of Mexico to the OECD) and Carlos Tena (Permanent Delegation of Mexico to the OECD)

Netherlands: Marjolijn de Boer (Ministry of Education Culture and Science), Willem Rosier (SLO) and Jeanne van Loon (Dutch Ministry of Education, Culture and Science)

New Zealand: Pauline Cleaver (Ministry of Education)

Norway: Elisabeth Buk-Berge (Ministry of Education and Research) and Bente Heian (Norwegian Directorate for Education and Training)

Poland: Rafal Lew-Starowicz (Ministry of National Education) and Danuta Pusek (Ministry of National Education)

Portugal: Eulália Alexandre (Ministry of Education), João Costa (Ministry of Education) and Luisa Ucha-Silva (Ministry of Education)

Spain: Carmen Tovar Sanchez (Ministry of Education, Culture and Sport), Jaime Vaquero (Ministry of Education, Culture and Sport) and María Saladich (Délégations Permanentes de l'Espagne auprès de l'OCDE, l'UNESCO et le Conseil de l'Europe)

Sweden: Johan Börjesson (Swedish National Agency for Education) and Ann-Christin Hartman (Swedish National Agency for Education)

Turkey: Mustafa Hilmi Colakoglu (Deputy Undersecretary, MONE), Toper Akbaba (Head of Curriculum Department Board of Education, MONE), Banu Özdemir (Teacher-Expert, MONE), Özlem Kalkan (Teacher-Expert, MONE) and Şadiye Inci (Teacher-Expert, MONE)

United Kingdom, Scotland: Joan Mackay (Education Scotland), Judith Tracey (Scottish Government), Kit Wyeth (Scottish Government) and Jonathan Wright (Scottish Government); **Wales:** Steve Davies (Education and Public Service Group) and Kevin Mark Palmer (Education Achievement Service for South East Wales)

United States: Mary Coleman (U.S. Department of Education)

Contributors from partner countries and economies

Argentina: Inés Cruzalegui (Ministerio de Educatión Nacional) and Mercedes Miguel (Ministerio de Educatión Nacional)

China: Yangnan Wang (Ministry of Education) and Haixia Xu (Ministry of Education)

Costa Rica: Alicia Vargas (Ministerio de Educación Pública)

Hong Kong, China: Chi-kong Chau (The Government of the Hong Kong Special Administrative Region Education Bureau), Joe NG (The Government of the Hong Kong Special Administrative Region Education Bureau), Ashley Pak-wai Leung (The Government of the Hong Kong Special Administrative Region Education Bureau) and Vincent Siu-chuen Chan (The Government of the Hong Kong Special Administrative Region Education Bureau)

Indonesia: Taufik Hanafi (Ministry of Education and Culture

Kazakhstan: Zhanar Abdildina (Nazarbayev Intellectual Schools AEO), Yeldos Nurlanov (JSC Information-Analytical Center) and Aizhan Ramazanova (Nazarbayev Intellectual Schools AEO)

Latvia: Guntars Ctalaks (National Education Centre), Jelena Muhina (Ministry of Education and Science) and Zane Olina (Competency Based Curriculum Project, National Centre for Education)

Lebanon: Rana Abdallah (CERD)

Lithuania: Šarūnė Nagrockaitė (Vilnius University) and Irena Raudiene (Ministry of Education and Science)

Russia: Kirill Bykov (Ambassade de Russie en France), Maria Dobryakova (National Research University Higher School of Economics), Isak Froumin (National Research University Higher School of Economics), Anastasia Sviridova (Far Eastern Federal University) and Shivleta Tagirova (Ministry of Education and Science - MEC)

Singapore: Oon Seng Tan (National Institute of Education)

Slovenia: Ksenija Bregar-Golobic (Ministry of Education, Science and Sport)

United Arab Emirates: Tareq Mana S. Al Otaiba (Abu Dhabi Crown Prince Court)

Viet Nam: Tran Cong Phong (Vietnam Institute of Educational Sciences - VNIES), Do Duc Lan (Vietnam Institute of Educational Sciences - VNIES), Anh Nguyen Ngoc (Vietnam Institute of Educational Sciences - VNIES) and Luong Viet Thai (Vietnam Institute of Educational Sciences - VNIES)

Observers

European Union: Francesca Crippa and Ivana Vrhovski

UNESCO ESD: Alexander Leicht

UNESCO IBE: Carmel Gallagher and Mmantsetsa Marope

Group leaders of the thematic working groups

Future we want: Yuhyun Park (DQ Institute, Singapore)

Learner Agency: Luisa Ucha (Ministry of Education, Portugal), Angga Dwi Martha (Indonesia) and Suzanne Dillon (Department of Education and Skills, Ireland)

Construct Analysis: Kimberly Schonert-Reichl (University of British Columbia, Canada), Darla Deardorff (Duke University, United States), Katariina Salmela-Aro (University of Helsinki, Finland) and Raphaela Schlicht-Schmälzle (Michigan State University, United States)

Transformative Competencies & Action-Anticipation-Reflection Cycle: Polly Akhurst (Sky School, United Kingdom) and Richard Franz (Ontario Ministry of Education, Canada)

Foundational skills & Literacies for 2030: Maria Dobryakova (National Research University Higher School of Economics National Research, Russia) and Isak Frumin (National Research University Higher School of Economics, Russia)

Knowledge and Skills for 2030: Roderick Allen (School District 79 - Cowichan Valley, Canada) and Mary-Elizabeth Wilson (GEMS Education, United States)

Attitudes and Values for 2030: Connie Chung (United States)

Visuals/Communication: Juan-Carlos López Tavera (Knotion, Mexico)

Glossary: Raphaela Schlicht-Schmälzle (Michigan State University, United States)

(Co-)Authors of papers contributing to the Education 2030 project

Tadahiko Abiko (Kanagawa University, Japan)

Alejandro Adler (University of Pennsylvania, United States)

Guillermo José Aguirre-Esponda (Grupo Aguirre – Innovalia, Mexico)

Rod Allen (School District 79 - Cowichan Valley, Canada)

Kazuto Ataka (Yahoo Japan Corporation, Japan)

Julia Atkin (Learning by Design, Australia)

Richard Bailey (Richard Bailey Education and Sport Ltd, United Kingdom)

Anja Balanskat (European Schoolnet, Belgium)

Tom Bentley (RMIT University, Australia)

Thor Berger (Lund University, Sweden)

Stephen Billett (Griffith University, Australia)

Peter Bishop (Teach the Future, United States)

Marjolijn de Boer (Ministry of Education Culture and Science, Netherlands)

M. Anne Britt (Northern Illinois University, United States)

Jeroen Bron (Institute for Curriculum Development, Netherlands)

Kathryn Bullard (Harvard University, United States)

Marius R. Busemeyer (University of Konstanz, Germany)

Connie Chung (United States)

Anita Collins (University of Canberra, Australia)

Joao Costa (Ministry of Education, Portugal)

John Dunn (Kings College, United Kingdom)

Charles Fadel (Centre of Curriculum Redesign, United States)

Lianghuo Fan (University of Southampton, United Kingdom)

Franziska Felder (University of Birmingham, United Kingdom)

Andra Fernate (Latvian Academy of Sport Education, Latvia)

Carl Benedikt Frey (University of Oxford, United Kingdom)

Emma Garcia (Economic Policy Institute and Georgetown University, United States)

A.C. Grayling (New College of the Humanities, United Kingdom)

Jen Groff (MIT Media Lab, United States)

Irmeli Halinen (Metodix Oy, Finland)

Ross Hall (Ashoka, United Kingdom)

Valerie Hannon (Innovation Unit, United Kingdom)

Helen Haste (Harvard Graduate School of Education, United States)

Kit-Tai Hau (Chinese University of Hong Kong, Hong Kong, China)

Martin Henry (Education International – EI, Belgium)

Hideyuki Horii (Innovative Schools Network/University of Tokyo, Japan)

Muir Houstan (University of Glasgow, United Kingdom)

Rachael Jacobs (Western Sydney University, Australia)

Hyung-Mi Joo (Korea Institute for Curriculum and Evaluation, Korea)

Aleksi Kalenius (Ministry of Education and Culture, Finland)

Kévin Kok Heang (Ingénieur Arts et Métiers, France)

Daniel Kunin (Stanford University, United States)

Phil Lambert (Phil Lambert Consulting, Australia)

Charles Leadbeater (United Kingdom)

Anke Li (The Pennsylvania State University, United States)

Laura Lippman (United States)

Zbigniew Marciniak (Ministry of Science and Higher Education, Poland)

Peeter Mehisto (United Kingdom)

Chiara Monticone (OECD, France)

Martin Mulder (Wageningen University, Netherlands)

Johan Muller (University of Cape Town, South Africa)

Takashi Murao (Permanent Delegation of Japan to OECD, Japan)

Kaoru Nasuno (The University of Tokyo, Japan)

Nienke Nieveen (Technische Universiteit Eindhoven, Netherlands)

Tim Oates (Cambridge Assessment, United Kingdom)

Karine Oganisjana (Riga Technical University, Latvia)

Renato Opertti (UNESCO IBE)

Karmijn van de Oudewetering (University of Amsterdam, Netherlands)

Yuhyun Park (DQ Institute, Singapore)

Medjy Pierre-Louis (Harvard University, United States)

Saemah Rahman (Universiti Kebangsaan Malaysia, Malaysia)

Katherine Ross (Chilean Civil Service, Chile)

Jean-François Rouet (Université de Portiers, France)

Calin Rus (Intercultural Institute, Romania)

Dominique S. Rychen (Former Project Director of DeSeCo, Switzerland)

Katariina Salmela-Aro (University of Helsinki, Finland)

Raphaela Schlicht-Schmalzle (Michigan State University, United States)

William Schmidt (Michigan State University, United States)

Kimberly A. Schonert-Reichl (University of British Columbia, Canada)

Martin Seligman (University of Pennsylvania, United States)

Henk Sligte (Kohnstamm Instituut, Netherlands)

Julie Soderman (Michigan State University, United States)

Laurence Steinberg (Temple University, United States)

Namji Steinemann (East-West Center, United States)

Kan Hiroshi Suzuki (MEXT, Japan)

Vishal Talreja (Dream a Dream, India)

Philip Tomporowki (The University of Georgia, United States)

Joke Voogt (University of Amsterdam, Netherlands)

Nancy Walt (British Columbia Ministry of Education, Canada)

Conrad Wolfram (computerbasedmath, United Kingdom)

Michael Young (UCL Institute of Education, United Kingdom)

Further contributors

Kiyomi Akita (Innovative Schools Network/The University of Tokyo, Japan)

Ilayda Bilgin (Innovative Schools Network/MEF High School Istanbul, Turkey)

Darryl Buchanan (Association of Independent Schools of NSW, Australia)

Jeppe Bundsgaard (Aarhus University, Denmark)

Nick Chambers (Education and Employers, United Kingdom)

Sharon Cheers (Association of Independent Schools of NSW, Australia)

Bei Cheng (National Institute of Education Sciences, China)

Aldo M. Costa (Universidade da Beira Interior, Portugal)

Claudia Costin (CEIPE - Fundação Getulio Vargas, Brazil)

Allan Michel Jales Coutinho (CEIPE-Fundação Getulio Vargas, Brazil)

Proserpina Dhlamini-Fisher (UWC International, United Kingdom)

Graham Donaldson (University of Glasgow, United Kingdom)

Jane Drake (International Baccalaureate Organization, Netherlands)

Celina Faerch (Student, UWC Robert Bosch College, Germany)

Michael Fullan (New Pedagogies for Deep Learning, Canada)

Eduardo Garcia (Knotion, Mexico)

Howard Earl Gardner (Harvard Graduate School of Education, United States)

Fiona Gatty (University of Oxford, United Kingdom)

Jenny Gillett (International Baccalaureate Organization, Netherlands)

Ger Graus (KidZania, United Kingdom)

Tomasz Greczyło (Institute of Experimental Physics, Poland)

Randa Grob (Porticus, Switzerland)

Anna Gromada (Kalecki Foundation, Poland)

Gábor Halász (Eötvös Loránd University, Hungary)

Robert Harrison (International Baccalaureate Organization, Netherlands)

Kristy Howells (Canterbury Christ Church University, United Kingdom)

Archana Iyer (Teach for all, India)

Yumi Jeung (Future Class Network, Korea)

Lord Jim Knight (Tes, United Kingdom)

Børge Frank Koch (UC SYD, Denmark)

Wendy Kopp (Teach for All, United States)

Petyr Koubek (National Institute for Education, Czech Republic)

Linda Lam (Student, Hong Kong, China)

Clive Ka-lun Lee (Yidan Prize Foundation, Hong Kong, China)

King Hei Lee (Rotaract of Chu Hai College, Hong Kong, China)

Jonathan Lee (Student, UWC Maastricht, Netherlands)

Marianne Lindheim (The Norwegian Association of Local and Regional Authorities, Norway)

Ou Lydia Liu (Educational Testing Service, United States)

Fangli Liu (National Institute of Education Sciences, China)

Daniel Lovelock (UWC International, United Kingdom)

George Lueddeke (One Health Commission, United States)

Anthony Mackay (Centre for Strategic Education, Australia)

Astrid Mogstad Hoivik (Nettwork Nordmore, Norway)

Alan Ricardo Salceda Monge (Student, Unilider, Mexico)

David Montemurro (University of Toronto, Canada)

Ralph Müller-Eiselt (Bertelsmann Stiftung, Germany)

Armanzhan Muratbayev (Student, Kazakhstan)

Christine Niewöhner (Siemens Stiftung, Germany)

Essie North (Big Change, United Kingdom)

Marion Nouvellon (Student, UWC Maastricht, Netherlands)

Yorihisa Ohneda (Saitama Prefecture, Japan)

Ryan S. Olson (Institute for Advanced Studies in Culture, United States)

Kevin Ruth (ECIS, United Kingdom)

Ingrid Schoon (University College London, United Kingdom)

Nobert Seel (University of Freiburg, Germany)

Keisha Siriboe (The University of Hong Kong, Hong Kong, China)

Luana Sores (Student, UWC Maastricht, Netherlands)

Nenad Stamatovic (UWC Robert Bosch College, Germany)

Tanya Surawski (UWC Maastricht, Netherlands)

Deborah Sutch (International Baccalaurate Organization, Netherlands)

Kentaro Tsukamoto (Tokyo Gakugei University, Japan)

Hannah Tümpel (UWC International, United Kingdom)

Tao Wang (Institute of Curriculum and Instruction, East China Normal University, China)

Ilknur West (Innovative Schools Network /MEF High School Istanbul, Turkey)

Will Williams (Will Williams Meditation, United Kingdom)

Stanton Wortham (Boston College, United States)

Gökhan Yücel (The Istanbul Center for Digital Affairs, Turkey)

Annika Zettl (Student, UWC Robert Bosch College, Germany)

Tracy Zilm (ACARA, Australia)

Kara Zumbrink (Education Y, Germany)

OECD Secretariat

Andreas Schleicher, Director for Education and Skills

Yuri Belfali, Head of Division

Miho Taguma, Project Manager, Senior Analyst

Lars Barteit, Analyst

Esther Carvalhaes, Analyst

Eva Feron, Analyst

Florence Gabriel, Analyst

Kevin Gillespie, Assistant

Tanya Ghosh, Intern

Yubai Wu, Intern

OECD Experts

Michael Stevenson (Senior Adviser PISA, United Kingdom)

Meow Hwee Lim (Consultant, Singapore)

Annex 2: List of constructs currently reviewed

The following constructs are currently under review based on the following guiding principles:

- **Clear definition**: Does the construct have a commonly used and understood definition?
- **Relevant for 2030**: Does the construct, alone or in combination with others, equip people for future challenges?
- **Interdependent**: Can we say how the construct develops in conjunction with others?
- **Impactful**: Is the construct proven to have a bearing on future life outcomes?
- **Malleable**: Can the construct be developed through the processes of learning?
- **Measurable**: Can the construct be given a comparative numerical value on a scale, or a non-numerical account?

The list is not exhaustive but constructs are selected that are closely related to the key concepts underpinning the framework.

- Adaptability/ Flexibility/ Adjustment/ Agility
- Compassion
- Conflict resolution
- Creativity/ Creative thinking/ Inventive thinking
- Critical-thinking skills
- Curiosity
- Empathy
- Engagement/Communication skills/Collaboration skills
- Equality/ Equity
- Global mind-set
- Goal orientation and completion (e.g. grit, persistence)
- Gratitude
- Growth mind-set
- Hope
- Human dignity
- Identity/Spiritual identity
- Integrity
- Justice
- Manual skills for information and communication technology (related to learning strategies)
- Manual skills related to the arts and crafts, music, physical education skills needed for the future
- Meta-learning skills (including learning to learn skills)
- Mindfulness
- Motivation (e.g. to learn, to contribute to society)
- Open mind-set (to others, new ideas, new experiences)
- Perspective-taking and cognitive flexibility
- Pro-activeness
- Problem solving skills
- Purposefulness
- Reflective thinking/Evaluating/Monitoring
- Resilience/Stress resistance
- Respect (for self, others, including cultural diversity)
- Responsibility (including locus of control)
- Risk management
- Self-awareness/Self-regulation/Self-control
- Self-efficacy/Positive self-orientation
- Trust (in self, others, institutions)

Annex 3: References

Abadzi, H. (2015), "Training the 21st-century Worker: Policy Advice from the Dark Network of Implicit Memory", *IBE Working Papers on Curriculum Issues*, Vol. 16, http://unesdoc.unesco.org/images/0023/002355/235521e.pdf (accessed on 18 December 2017).

ACARA (2013), *General Capabilities in the Australian Curriculum*, Australian Curriculum, Assessment and Reporting Authority, http://k10outline.scsa.wa.edu.au/__data/assets/pdf_file/0015/5217/Personal-and-social-capability.pdf.

Atkinson, A. and F. Messy (2012), "Measuring Financial Literacy: Results of the OECD / International Network on Financial Education (INFE) Pilot Study"*, OECD Working Papers on Finance, Insurance and Private Pensions*, No. 15, OECD Publishing, Paris, http://dx.doi.org/10.1787/5k9csfs90fr4-en.

Barrick, M., M. Mount and T. Judge (2001), "Personality and Performance at the Beginning of the New Millennium: What Do We Know and Where Do We Go Next?", *International Journal of Selection and Assessment*, Vol. 9/1&2, pp. 9-30, http://dx.doi.org/10.1111/1468-2389.00160.

Bassi, M. et al. (2012), *Desconectados. Habilidades, educación y empleo en América Latina.*, Banco Interamericano de Desarrollo, Washington, http://www.redetis.iipe.unesco.org/publicaciones/desconectados-habilidades-educacion-y-empleo-en-america-latina-washington-banco-interamericano-de-desarrollo-bid/#.Wjee0m8rKUk (accessed on 18 December 2017).

Biggs, J. (1987), *Student approaches to learning and studying*, Australian Council for Educational Research.

Canto-Sperber, M. and Jean-Pierre Dupuy (2001), "Competencies for the Good Life and the Good Society", in Rychen, D. and L. Salganik (eds.), *Defining and selecting key competencies*, Hogrefe & Huber, http://www.voced.edu.au/content/ngv:18652 (accessed on 07 December 2017).

Carneiro, P., C. Crawford and A. Goodman (2007), "The Impact of Early Cognitive and Non-Cognitive Skills on Later Outcomes"*, CEE Discussion Papers*, Centre for the Economics of Education, LSE, https://EconPapers.repec.org/RePEc:cep:ceedps:0092.

Council of Europe (2016), *Competencies for Democratic Culture: Living Together as Equals in Culturally Diverse Democratic Societies*, Council of Europe Publishing, Strasbourg, http://www.coe.int/t/dg4/education/Source/competences/CDC_en.pdf.

Cunha, F., J. Heckman and S. Schennach (2010), "Estimating the Technology of Cognitive and Noncognitive Skill Formation"*, Discussion Paper Series*, No. 4702, IZA, Bonn, http://ftp.iza.org/dp4702.pdf (accessed on 18 December 2017).

Davis and Coupez (2009), *European NGO Confederation for Relief and Development and Development Education Exchange in Europe Project*.

Eccles, J. and J. Gootman (2002), *Community Programs to Promote Youth Development*, National Academies Press, Washington, D.C., http://dx.doi.org/10.17226/10022.

Eccles, J. and J. Gootman (eds.) (2002), *Community programs to promote youth development.*, National Academy Press, Washington, DC.

Education Scotland (2008), *Curriculum for Excellence*, The Scottish Government, Edinburgh, http://www.gov.scot/resource/doc/226155/0061245.pdf (accessed on 18 December 2017).

European Centre for the Development of Vocational Training (Cedefop) (2014), *A Terminology of European Education and Training*, Publications office of the European Union, Luxembourg, http://dx.doi.org/10.2801/15877.

Foray, D. and J. Raffo (2012), "Business-Driven Innovation: Is it Making a Difference in Education?: An Analysis of Educational Patents"*, OECD Education Working Papers*, No. 84, OECD Publishing, Paris, http://dx.doi.org/10.1787/5k91dl7pc835-en.

Francis, L. and W. Kay (1995), *Teenage Religion and Values*, Gracewing Fowler Wright, Leominster.

Furlong, M. et al. (2003), "Multiple Contexts of School Engagement: Moving Toward a Unifying Framework for Educational Research and Practice", *The California School Psychologist*, Vol. 8/1, pp. 99-113, http://dx.doi.org/10.1007/BF03340899.

G20 (2012), *G20 Leaders Declaration*, http://www.bmjv.de/SharedDocs/Downloads/EN/G20/G20%20Leaders'%20Declaration%20(Los%20Cabos%20Summit).pdf?__blob=publicationFile&v=2 (accessed on 18 December 2017).

Goodman, A. et al. (2015), *Social and emotional skills in childhood and their long-term effects on adult life*, Institute of Education, UCL, http://www.eif.org.uk/wp-content/uploads/2015/03/EIF-Strand-1-Report-FINAL1.pdf (accessed on 18 December 2017).

Greenberg, P. (1992), "Ideas that work with Young Children", *Young Children* July, pp. 10-17.

Gregory, A. and A. Sadeh (2012), "Sleep, emotional and behavioral difficulties in children and adolescents", *Sleep Medicine Reviews*, Vol. 16/2, pp. 129-136, http://dx.doi.org/10.1016/j.smrv.2011.03.007.

Gutman, L. and I. Schoon (2003), *The Impact of Non-cognitive skills on outcomes for young people:Literature Review*, Institute of Education, University of London.

Halstead, M. and M. Taylor (2000), *The Development of Values, Attitudes and Personal Qualities– A Review of Recent Research*, National Foundation for Educational Research, Berkshire, https://www.nfer.ac.uk/publications/91009/91009.pdf (accessed on 18 December 2017).

Hannon, V. and Peterson A (2017), *Thrive: Schools Reinvented for the real challenges we face*, Innovation Unit Press, London, http://www.innovationunit.org/wp-content/uploads/2017/04/Thrive_Preface.pdf (accessed on 15 December 2017).

Harris, K., R. Berkowitz King and P. Gordon-Larsen (2005), "Healthy Habits among Adolescents: Sleep, exercise, diet, and body image", in Moore, K. and L. Lippman (eds.), *What do children need to flourish?: Conceptualizing and measuring indicators of positive development*, Springer Science + Business Media, New York.

Haste, H. (2001), "Ambiguity, Autonomy, and Agency: Psychological Challenges to New Competence", in Rychen, D. and L. Salganik (eds.), *Defining and selecting key competencies*, Hogrefe & Huber, http://www.voced.edu.au/content/ngv:18652 (accessed on 07 December 2017).

Hawkins, J., S. Oesterle and K. Hill (2004), *Successful Young Adult Development*, The Bill & Melinda Gates Foundation , Washington, https://docs.gatesfoundation.org/documents/successfuldevelopment.pdf (accessed on 18 December 2017).

Heckman, J., J. Stixrud and S. Urzua (2006), "The Effects of Cognitive and Noncognitive Abilities on Labor Market Outcomes and Social Behavior", No. 12006, National Bureau of Economic Research, Cambridge, MA, http://dx.doi.org/10.3386/w12006.

James, M. et al. (eds.) (2011), *The Framework for the National Curriculum: A Report by the Expert Panel for the National Curriculum Review*, Department for Education, UK, https://www.researchgate.net/publication/258423191_The_Framework_for_the_National_Curriculum_A_Report_by_the_Expert_Panel_for_the_National_Curriculum_Review (accessed on 18 December 2017).

Kautz, T. et al. (2014), "Fostering and Measuring Skills: Improving Cognitive and Non-Cognitive Skills to Promote Lifetime Success", No. 110, OECD, https://www.oecd.org/edu/ceri/Fostering-and-Measuring-Skills-Improving-Cognitive-and-Non-Cognitive-Skills-to-Promote-Lifetime-Success.pdf (accessed on 15 December 2017).

Kegan, R. (2001), "Competencies as working epistemologies: Ways we want adults to know", in Rychen, D. and L. Salganik (eds.), *Defining and selecting key competencies*, Hogrefe & Huber, http://www.voced.edu.au/content/ngv:18652 (accessed on 07 December 2017).

Lai, E. (2011), *Motivation: A Literature Review*, Pearson, http://www.pearsonassessments.com/research. (accessed on 15 December 2017).

Lai, E. (2011), *Metacognition: A Literature Review Research Report*, Pearson,

https://images.pearsonassessments.com/images/tmrs/Metacognition_Literature_Review_Final.pdf (accessed on 15 December 2017).

Lickona, T. et al. (2005), *Smart and good high schools: Integrating excellence and ethics for success in school, work, and beyond*, Center for the 4th and 5th R's (Respect and Responsibility), Cortland, NY, https://www2.cortland.edu/centers/character/high-schools/SnGReport.pdf (accessed on 15 December 2017).

Lippman, L. et al. (2008), *A Developmental Perspective on College and Workplace Readiness*, Bill and Melinda Gates Foundation, Washington, DC, https://www.childtrends.org/wp-content/uploads/2013/04/Child_Trends-2008_09_15_FR_ReadinessReport.pdf (accessed on 15 December 2017).

Lippman, L. et al. (2014), "Positive and protective factors in adolescent well-being", in Ben-Arieh, A. et al. (eds.), *Handbook of Child Well-Being: Theories, Methods and Policies in Global Perspective*, Springer Reference.

Lippman, L. et al. (2015), *Key Soft Skills that Foster Youth Workforce Success; Toward a Consensus Across Fields*, Child Trends Publishing, Washington, DC, https://www.childtrends.org/wp-content/uploads/2015/06/2015-24WFCSoftSkills1.pdf (accessed on 15 December 2017).

Li, Y. et al. (2008), "Out-of-School Time Activity Participation, School Engagement and Positive Youth Development: Findings from the 4-H Study of Positive Youth Development", *Journal of Youth Development*, Vol. 3/3, pp. 22-Jul, http://dx.doi.org/10.5195/JYD.2008.284.

Marks, G. (2014), *Education, social background and cognitive ability*, Routledge, https://www.routledge.com/Education-Social-Background-and-Cognitive-Ability-The-decline-of-the/Marks/p/book/9780415842464 (accessed on 18 December 2017).

Mevarech, Z. and B. Kramarski (2014), *Critical Maths for Innovative Societies: The Role of Metacognitive Pedagogies*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264223561-en.

Oates, T. (2002), "Contributions to the Second DeSeCo Symposium Definition and Selection of Key Competencies", *Contributions to the Second DeSeCo Symposium*, http://www.oecd.org/edu/skills-beyond-school/41529505.pdf#page=174 (accessed on 07 December 2017).

Oates, T. (2003), "Key Skills/Key Competencies: Avoiding the Pitfalls of Current Initiatives", in Swiss Federal Statistical Office (SFSO) and A. Education Statistics Services Institute (ESSI) (eds.), *Contributions to the Second DeSeCo Symposium Definition and Selection of Key Competencies*, Swiss Federal Statistical Office (SFSO), Neuchâte, http://www.oecd.org/education/skills-beyond-school/41529505.pdf (accessed on 12 February 2018).

OECD/EU (2017), *Boosting Social Enterprise Development: Good Practice Compendium*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264268500-en.

OECD (2003), "The Definition and Selection of Key Competencies Executive Summary", https://www.oecd.org/pisa/35070367.pdf (accessed on 15 December 2017).

OECD (2005), "The Definition and Selection of key Competencies", http://www.oecd.org/pisa/35070367.pdf (accessed on 07 December 2017).

OECD (2005), *Recommendation on Principles and Good Practices for Financial Education*, http://www.oecd.org/finance/financial-education/35108560.pdf (accessed on 15 December 2017).

OECD (2012), "OECD/INFE High-Level Principles on National Strategies for Financial Education", http://www.oecd.org/daf/fin/financial-education/OECD_INFE_High_Level_Principles_National_Strategies_Financial_Education_APEC.pdf (accessed on 15 December 2017).

OECD (2013), "Interconnected Economies Benefiting from Global Value Chains", https://www.oecd.org/sti/ind/interconnected-economies-GVCs-synthesis.pdf (accessed on 07 December 2017).

OECD (2013), *OECD Skills Outlook 2013 First Results from the survey of Adult Skills*,

https://www.oecd.org/skills/piaac/Skills%20volume%201%20(eng)--full%20v12--eBook%20(04%2011%202013).pdf (accessed on 15 December 2017).

OECD (2013), *PISA 2012 Assessment and Analytical Framework: Mathematics, Reading, Science, Problem Solving and Financial Literacy*, PISA, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264190511-en.

OECD (2014), "PISA 2012 Results: Students and Money Financial literacy SkillS For the 21St centUry (VolUme Vi)", *PISA 2012 Results*, Vol. VI, http://www.oecd.org/pisa/keyfindings/PISA-2012-results-volume-vi.pdf (accessed on 15 December 2017).

OECD (2015), "Research Protocol for OECD Project on Assessing Progression in Creative and Critical Thinking Skills in Education", *OECD Publishing*, http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=EDU/CERI/CD(2015)12&docLanguage=En (accessed on 14 December 2017).

OECD (2015), *Skills for Social Progress: The Power of Social and Emotional Skills*, OECD Skills Studies, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264226159-en.

OECD (2015), *Universal Basic Skills: What Countries Stand to Gain*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264234833-en.

OECD (2017), *PISA 2015 Results (Volume III): Students' Well-Being*, PISA, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264273856-en.

OECD (2017), "PISA 2015 Collaborative Problem-Solving Framework", https://www.oecd.org/pisa/pisaproducts/Draft%20PISA%202015%20Collaborative%20Problem%20Solving%20Framework%20.pdf (accessed on 14 December 2017).

Playfoot, J. and R. Hall (2009), *Effective Education for Employment: A global perspective A report commissioned by Edexcel and prepared by White Loop Effective Education for Employment: A global perspective*, Edexcel, White Loop, http://www.eee-edexcel.com/xstandard/docs/effective_education_for_employment_web_version.pdf (accessed on 15 December 2017).

Proctor, R., T. Reeve and D. Weeks (1990), "A Triphasic Approach to the Acquisition of Response-Selection Skill", *Psychology of Learning and Motivation*, Vol. 26, pp. 207-240, http://dx.doi.org/10.1016/S0079-7421(08)60055-9.

Rasberry, C. et al. (2011), "The association between school-based physical activity, including physical education, and academic performance: A systematic review of the literature", *Preventive Medicine*, Vol. 52, pp. S10-S20, http://dx.doi.org/10.1016/j.ypmed.2011.01.027.

Rychen, D. (ed.) (1979), *Understanding human values : Individual and Societal*, Free Press.

Rychen, D. and L. Salganik (2001), "The knowledge economy: A business perspective", in Rychen, D. and L. Salganik (eds.), *Defining and selecting key competencies*, Hogrefe & Huber, http://www.voced.edu.au/content/ngv:18652 (accessed on 07 December 2017).

Rychen, D. and L. Salganik (2001), *Defining and selecting key competencies*, Hogrefe & Huber, http://www.voced.edu.au/content/ngv:18652 (accessed on 14 December 2017).

Rychen, D. and L. Salganik (eds.) (2003), *Key Competencies for a Successful Life and Well-Functioning Society*, Hogrefe & Huber, Gottingen, Germany, https://books.google.fr/books?hl=fr&lr=&id=CUhfAgAAQBAJ&oi=fnd&pg=PR5&dq=Rychen,+D.+S.,+%26+Salganik,+L.+H.+(Eds.).+(2003).+Key+competencies+for+a+successful+life+and+a+well-+functioning+society.+G%C3%B6ttingen,+Germany:+Hogrefe+%26+Huber&ots=fbJYfbS8hZ&s (accessed on 15 December 2017).

Schneider, W. (2008), "The Development of Metacognitive Knowledge in Children and Adolescents: Major Trends and Implications for Education", *Mind, Brain, and Education*, Vol. 2/3, pp. 114-121, http://dx.doi.org/10.1111/j.1751-228X.2008.00041.x.

Schoon, I. et al. (2015), "The Impact of early life skills on later outcomes(Final report)", in OECD (ed.),

Second scoping group meeting on early learning assessment, OECD Publishing, Paris.

Schulz, W. et al. (2008), *International Civic and Citizenship Education Study Assessment Framework*, http://pub.iea.nl/fileadmin/user_upload/Publications/Electronic_versions/ICCS_2009_Framework.pdf (accessed on 15 December 2017).

Schwartz, S.H. and Bohner, G. (2001), "The Construction of Attitudes", in Tesser, A. and N. Schwarz (eds.), *Intrapersonal Processes(Blackwell Handbook of Social Psychology)*, Blackwell, Oxford, UK.

Schwartz, S. and W. Bilsky (1987), "Toward a universal psychological structure of human values", *Journal of Personality and Social Psychology*, pp. 550-562, http://dx.doi.org/10.1037/0022-3514.53.3.550.

Schwartz, S. (2012), "An Overview of the Schwartz Theory of Basic Values", *Online Readings in Psychology and Culture*, Vol. 2/1, http://dx.doi.org/10.9707/2307-0919.1116.

Shapiro, J. (2002), "How Do Physicians Teach Empathy in the Primary Care Setting?", *Journal of The Association of American Medical Colleges*, Vol. 77/4, http://journals.lww.com/academicmedicine/Abstract/2002/04000/How_Do_Physicians_Teach_Empathy_in_the_Primary.12.aspx (accessed on 15 December 2017), pp. 323-328.

Soland, J., L. Hamilton and B. Stecher (2013), "Measuring 21st Century Competencies: Guidance for Educators", *Global Cities Education Network Report*, https://www.rand.org/pubs/external_publications/EP50463.html (accessed on 15 December 2017), p. 68.

Tomporowski, P. et al. (2008), "Exercise and Children's Intelligence, Cognition, and Academic Achievement.", *Educational Psychology Review*, Vol. 20/2, pp. 111-131, http://dx.doi.org/10.1007/s10648-007-9057-0.

UN General Assembly (2000), *United Nations Millennium Declaration*, United Nationa, http://www.un.org/millennium/declaration/ares552e.htm (accessed on 15 December 2017).

UNESCO-IBE (2013), *Glossary of Curriculum Terminology*, http://www.ibe.unesco.org/fileadmin/user_upload/Publications/IBE_GlossaryCurriculumTerminology2013_eng.pdf (accessed on 15 December 2017).

United Nations (1945), *Charter of the United Nations*, http://www.un.org/en/charter-united-nations/ (accessed on 15 December 2017).

United Nations (1948), *Universal Declaration of Human Rights*, http://www.ohchr.org/EN/UDHR/Documents/UDHR_Translations/eng.pdf (accessed on 15 December 2017).

Willingham, D. (2006), *How Knowledge Helps*, American Educator, https://www.aft.org/periodical/american-educator/spring-2006/how-knowledge-helps (accessed on 18 December 2017).

Young, M. et al. (2016), "Preliminary reflections and research on Knowledge, Skills, Attitudes and values necessary for 2030".

THE FUTURE OF EDUCATION AND SKILLS
Education 2030

Schools are facing increasing demands to prepare students for rapid economic, environmental and social changes, for jobs that have not yet been created, for technologies that have not yet been invented, and to solve social problems that have not yet been anticipated. Education can equip learners with the agency, the competencies and the sense of purpose to shape their own lives and contribute to the lives of others. Children entering school in 2018 will be young adults in 2030. So, change is imminent.

The aim of OECD's Education 2030: The Future of Education and Skills project is to support countries to find answers to two far-reaching questions: "What knowledge, skills, attitudes and values will today's students need to shape and thrive their world in 2030?" and "How can instructional systems develop these knowledge, skills, attitudes and values effectively?"

This OECD Education 2030 position paper considers the challenges that young people will face; suggests the importance of the concept of learner agency; proposes an overarching learning framework with transformative competencies; reviews the nature of the knowledge, skills, attitudes and values that young people will need; and ends with possible curriculum design principles. It encapsulates the key messages of the project so far.

Do you want to take part in OECD Education 2030?

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

To find out more about the project, please visit our website at: oe.cd/education2030

Write to us

Directorate for Education and Skills-OECD

2 rue André Pascal - 75775 Paris Cedex 16-France

OECD

BETTER POLICIES FOR BETTER LIVES