For over 60 years the Organisation for Economic Cooperation and Development (OECD) has supported countries in improving and transforming their education systems. The OECD has assumed a leadership role in the field of international collaboration in education through the wealth and quality of its comparative data, its assessment programmes and surveys, and its analytical and policy work. The OECD operates with and alongside many other organisations in this space. Each organisation focuses on its comparative strengths and advantages. For the OECD, these include its multilateral frameworks for comparative data collection and analysis, for peer learning and peer review, and for convening dialogue among policy actors and a wide range of stakeholders. But the most significant comparative strength of the OECD lies in its capacity to develop innovative and forward-looking ideas and approaches that inform the international debate, inspire policy processes, and shape the future of education.

To remain relevant, the OECD’s work on education needs to engage with emerging issues, operate at the frontiers of knowledge, and anticipate a range of possible futures and plausible opportunities that are shaping the future of learning. This requires taking a bold look at the future of the knowledge, skills, attitudes, and values that will matter most, and the kind of learning environments and educational opportunities that can best enable these throughout the lifecycle.

This is a good moment to face this as education systems move forward from the disruption generated by the COVID-19 pandemic that gave urgency and visibility to the work in education. It led to digitalisation in education taking a major leap by forcing education systems, teachers, and learners to use digital tools in education delivery and accelerated the use of learning analytics to monitor learning. It brought questions on equity and inclusion in education and through education to the forefront of the debate on the role of education. And it has further highlighted the growing importance of lifelong and life-wide learning by accelerating labour market disruption.

Against this backdrop, this paper discusses areas where the OECD could contribute to responding to the current policy challenges through education in the years to come. The premise of this paper is that education and skills will be key to achieving the OECD’s strategic objectives presented in the OECD Secretary General’s Strategic Orientations of optimising the strength and quality of the ongoing recovery; leadership on climate action to help secure global net-zero by 2050; seizing the opportunities of the digital transformation; helping to ensure well-functioning global markets and; advancing OECD standards, through membership and partnerships and a sound approach to development.

The paper is structured in three parts. The first part highlights some key changes in the environment in which education is delivered. The second part summarises the key foci of OECD’s work: learners, educators, educational institutions and systems. The final part makes possible propositions for the OECD’s future work in education and skills.

The first edition of this paper was published in 2021. This revised edition takes account of the latest OECD strategic orientations and priorities and the upcoming Programme of Work and Budget biennium.
Education has seen massive expansion over the years with unprecedented growth in participation and attainment levels. Education systems have developed into major engines of economic growth and prosperity, nation and community building, and social progress. Education shapes the world we live in by developing the knowledge, skills, attitudes, and values on which societies rely, forging social cohesion and preparing people to become and remain competent workers and active citizens. As such, education systems foster democracy and the transformation to innovation-oriented knowledge societies.

At the same time, there is a – real or perceived – disconnect between the growth imperative and the limited resources of our planet; between the financial economy and the real economy; between the wealthy and the poor; between the concept of our gross domestic product and the well-being of people; between technology and social needs; and between governance and political representation. Education is not responsible for all this but the role that people’s knowledge, skills, attitudes, and values can play should not be underestimated. Our economies are shifting towards regional hubs of production, linked together by global chains of information and goods, but always concentrated where comparative advantage can be built and renewed. This makes the distribution of knowledge and wealth crucial, and that is intimately tied to the distribution of education opportunity.
Learning for an uncertain future

The future comes with surprises. To educators and education policy makers, this brings challenges. How can they educate learners for jobs that have not yet been created, to use technologies that have not yet been invented, or to solve social problems we cannot yet imagine?

Whether they come in the form of gradually evolving trends or abrupt systemic shocks, changes reshape the world and the preoccupations and belief systems of the people and communities. As a result, they also redefine expectations towards education and affect the ways in which learning is organised. Education is no longer just about teaching learners something but about helping them develop a reliable compass and the tools to confidently navigate through a complex, volatile, and uncertain world. Success in education today is about identity, agency (i.e. the capacity to set a goal, reflect and act responsibly to effect change), values, building curiosity, and mobilising cognitive, social, and emotional resources to contribute actively to society.

Education is at a crossroads, with humanity now facing mega-challenges like climate change, impact of Artificial Intelligence (AI) and innovative technologies, mass migration and global taxation. The disruption created by the COVID-19 pandemic and the war in Ukraine has accelerated change and the urgency of it even more. It is important to find ways to sustain innovation in education and re-affirm that investment in education is an investment in the future of prosperity and the well-being of society.

In this context, lifelong learning has become an expectation for all. It will enable individuals, communities, organisations, and societies to translate opportunities into an active sense of agency that is necessary to ensure a good life. The shift from qualification-oriented attainment up front to a new distribution of learning and skills development over the lifespan is a new reality. This will create important public policy challenges, requiring the development of new partnerships to support learning with innovative arrangements on both the supply and demand side.

Education for a new social contract

Education’s unique potential to reduce inequalities and build strong foundations for inclusive and democratic societies is widely recognised. However, in several OECD countries, upward social mobility has become more difficult to achieve, and the fear of downward social mobility is becoming more common in the middle classes. Large parts of the population seem to have lost faith in the “social contract” of the 20th-century welfare state of which public education is a key component. In this context, trust in school systems falters and young people from vulnerable backgrounds may no longer invest their time and energy into schooling. Beyond education, people who have lost trust in the “social contract” are at risk of becoming defiant towards the “system”, embracing populism and turning away from democracy.

Education is still the main institutional framework that keeps societies together. By instilling a common canon of knowledge, shared behaviours and collective social values, education develops shared identities and a sense of belonging that facilitates citizens’ active engagement in democratic processes. Education’s role in safeguarding democracy, however, goes further than that. Literature has identified several dimensions of civic engagement that education can foster, e.g. by providing knowledge about political processes and other forms of civic engagement, and promoting trust in society and tolerance towards different cultures and viewpoints. In recent years, the need to build resilience to systemic risks posed by the spread of mis- and disinformation has emerged as a top priority for democratic societies. This highlights the important role of media and digital literacy efforts through education.

It should also be acknowledged that education can amplify inequality when educational opportunities are not fairly distributed within societies. Evidence shows that education contributes to the transmission of advantages and privileges from one generation to the other. This is to be kept in mind when personalised learning rises in importance because it disrupts the “one-size-fits-all” approach of schooling that was dominant until now. Another dimension contributing to the status quo of inequities that needs re-assessing is school selection driven by the residential area or social background of families.

Digital transformation

To keep pace and anticipate the impact of technological change requires vision, boldness and courage from leaders and policy makers, as well as capacity on the ground. AI, cloud computing, big data, the Internet of Things, virtual reality, and other forms of digitalisation are fundamentally reshaping the world. The future looks increasing digital with enhanced connectivity, disruptive digital business models, mostly automated physical production, increasingly virtual work, and digitised global trade. All this will transform businesses and markets, the nature of work and the demand for skills, as well as the ways in which people participate in physical or virtual communities and engage in personal relationships.
Digitalisation affects security and privacy as well as health and well-being, particularly among children. This transformation has led to an abundance of information, facilitated the ability for information to be spread instantaneously and globally, and has upended traditional sources of news. In particular, the spread of mis- and disinformation poses a fundamental threat to the free and fact-based exchange of information that underpins democracy. This development further highlights the need to equip people with media and digital literacy skills, and advance critical thinking skills and ethical judgment for them to be able to navigate these spaces and understand their meaning. This is a priority for OECD in combatting mis- and dis-information.

Increased use of digital tools in education is one of the legacies of COVID-19 school closures, but there is a consensus that much more can be done in this regard. Digital technologies can create new learning opportunities for those who are not able to enrol in formal education and enable reaching new populations. These include older people, youth who are not in employment, education, or training (NEETs), and people with special needs. Technology can also enable educators and learners to access knowledge in multiple formats, and in ways that bridge time and space and at a lower cost.

One distinguishing feature of digital technologies is that besides serving individual learners and educators, they can build an ecosystem of learning predicated on collaboration. Technology can build communities of learners that make learning more collaborative, thereby enhancing goal orientation, motivation, persistence, and the development of effective learning strategies. Similarly, technology can build communities in which educators share and enrich educational resources and practices and collaborate on professional growth and the institutionalisation of professional practice. It can also help system leaders and governments develop and share best practice around curriculum design, policy, and pedagogy.

Reimagining the purposes of education

Digitalisation will open hitherto unknown possibilities. Digital technologies will not merely impact our jobs, communities and lives but reproduce human capabilities. Smart machines and bio- and neurotech will also empower people with enhanced cognitive and sensory capabilities. This raises questions about whether biological and computer engineering will render some forms of human activity redundant and decouple intelligence from consciousness. Digital technologies invite people to think of the ways to best integrate and collaborate with them and reinforce the most “human” parts. This has profound consequences for the purpose of education.

Knowledge about education is turning into the most valuable resource for education itself. Indeed, the growth in science and research is also enhancing the transformative capacity of education systems. New knowledge about education is created at a very rapid pace, renewing the knowledge base on which education thrives. A new “science of learning” is emerging, composed of building blocks from cognitive psychology, neuroscience, brain research and social psychology. This offers major opportunities for education systems to re-think their purpose, design, and delivery.

Diversifying landscapes of education and skills

Learning as a fundamental human activity is not bound by space and time. Institutionalised settings remain important in providing spaces and opportunities for learning, but the value proposition of traditional educational institutions is under increasing scrutiny and there are questions as to whether they deliver education that is aligned with real world needs. When the demand for lifelong learning opportunities continues to rise, technology makes it easier to access both learning throughout life as well as ways to recognise such learning outside the formal education systems.

At the same time, there is an increasing recognition of diverse actors in society offering learning opportunities. Families and personal social relations – which are themselves under constant transformation – constitute important learning settings with which schools must negotiate and collaborate. Social institutions such as health and welfare systems, politics, religion, traditional and social media, and many other aspects of modern society will play an ever more important role in socialising people and providing spaces for learning. Employers play a crucial role in lifelong learning by providing continuous professional training and informal learning at the workplace as well as in engaging in social dialogue about the purpose, relevance, and substance of education. Moreover, employer engagement is at the heart of effective career guidance for young people, amplifying labour market signalling and enabling progression towards attractive employment.

The blurring of the clear line between acquiring knowledge and skills (in educational institutions) and applying them (in society and workplaces) is an opportunity to make learning more relevant, authentic, and engaging. For formal education in educational institutions, such as schools and universities, increased collaboration with other actors in society offers an important avenue for re-inventing themselves, which has potential for significant benefits to learners.
The systemic challenges of the 21st century – from climate change and biodiversity loss to pandemics and military conflicts or technology governance – require intense collaboration between countries. While education systems are closely tied to national history, language and culture, international collaboration is a vital component of the governance architecture in education. This collaboration complements jurisdictions with lawful and legitimate power over education with a space for comparing, collaborating, and learning from others’ experiences.

As formulated in the strategic mission of the OECD’s work in education and skills, the fundamental rationale for intergovernmental collaboration in education within OECD is to support jurisdictions in their efforts to achieve high quality lifelong learning for all, which contributes to personal development, sustainable economic growth, and social cohesion. In the OECD work this is explicated through four foci:

- Learners have the opportunity and agency to learn in formal, non-formal and informal environments.
- Learners are supported by capable and professional educators.
- Educational institutions provide learning opportunities in high-quality, equitable, cost-effective, and innovation-friendly ways, both in partnership with and as complements of other organisations and learning environments.
- Education systems deliver on economic and social outcomes for the benefit of societies and can adapt themselves to new challenges.

These are briefly elaborated in following.
Opportunity and agency

The goal of education is to empower learners, both individually and collectively. As societies continue to change, education systems need to provide opportunities for learners to develop the knowledge, skills, attitudes, and values that enable them to realise their potential throughout their lives – from early childhood to old age. Learners need to develop a sense of responsibility to actively participate in building societies, and the ability to define purpose and take actions to achieve goals, including realising their own learning. Learners will need to ability to design their own learning trajectories. As such, developing agency over one’s life and learning is itself an educational outcome that will equip learners to thrive in a changing world. This puts the development of broader transversal skills, as well as attitudes, values, entrepreneurship, critical thinking, and metacognitive skills, at the same level as traditional disciplinary knowledge.

However, learners will need guidance and support to exercise agency. They will need to be confident that learning environments will recognise their prior learning enabling them to reconnect with institutional and informal learning seamlessly. In view of the pressures to foster equity and inclusion in education, they also need new, innovative support given their diverse social, cultural, and ethnic backgrounds.

Professional educators

Autonomous, self-directed, technology-supported learning will become more prevalent in the future. Nevertheless, learning is a social experience that happens through interactions. Therefore, education systems need to better recognise, enable, and articulate the roles and functions of educators, whether they are teachers, trainers, coaches or other professionals in workplaces, or tutors and peers.

In formal education teachers are professionals who design and engineer learning environments and learning processes, and support learning through a variety of professional interventions. They need deep knowledge and understanding of the content that they teach and how learning happens. But they also face increasing demands to use and interpret ever more sources of data and keep ahead of the curve on rapidly developing teaching and facilitation tools and techniques as well as supporting learners in their well-being. Developing teaching as a profession is an important public policy objective. This includes recruiting and retaining effective teachers; providing them with initial education and continuing professional development; offering induction and mentoring when entering the profession; establishing attractive career structures with appropriate financial compensation; regulating working conditions; and safeguarding the attractiveness and reputation of, and the social trust in, the teaching profession.

Educational institutions

Together with many other actors and stakeholders, public authorities are responsible for ensuring high-quality and equitable learning environments in a cost-effective and innovation-friendly way. Maintaining and improving the institutional framework in education is an important task for public policy, although that does not necessarily mean that public authorities provide or own educational institutions.

Yet educational institutions are in the midst of major changes and under pressure to change their modus operandi. The OECD scenario work on future schools illustrates that the development of educational institutions could take many alternative paths. Regardless of the path, there is a new urgency and need for new approaches to building partnerships between educational institutions and employers as well as civil society organisations.

Education systems

These partnerships can facilitate the combining of formal, informal, and non-formal learning into functioning lifelong learning and skills development ecosystems. All forms of learning and diverse providers will have their role to play, and functioning frameworks and structures for recognition and credentialling are needed. These ecosystems would promote a diversity of learning pathways in education and skills systems.

Furthermore, addressing challenges such as updating physical infrastructure and cost-efficiency will necessitate redesigning education efficiently through smart combinations of school-based learning and alternative learning spaces and delivery modes.
This section discusses some mid- and long-term opportunities for international collaboration in education that OECD might address in response to the changing environment described above. These take into account the strategic foci discussed above and go beyond the short-term priority themes identified by the Chairs of the Level 1 EDU bodies – equity, lifelong learning, and digitalisation – but also span these themes. While the perspective in this section is largely that of education and skills, it is important to bear in mind that many of the proposals made would entail collaboration across the OECD with diverse Directorates.

First, the paper discusses three concepts that constitute the space in which new avenues for international collaboration can be developed. Next, three conditions for future-oriented work in education are considered. Successful innovative and future-oriented international work in education hinge on progress made in these three conditions. Finally, two central imperatives for policy development are presented.

The following graph depicts the interrelationships among the eight components.
Three concepts to guide reflection on the future of education and learning

1. **Strengthen societal benefits of education**

   The OECD’s work in education is fuelled by the idea that education is a worthwhile investment that pays dividends over time, both to individuals and societies. This implies both economic and social outcomes, which both need critical reassessment.

   Analyses of economic and social returns to education in both employability and earnings remain a key area of work. The economic benefits of tertiary graduates, for example, are measured as relative benefits but remain significant mainly because the benefits for the comparison category of upper secondary graduates are decreasing in absolute terms. In several OECD countries, the saturation of graduate employment, substituting effects and qualification mismatch signal a fundamental change in the relationship between credentials and economic outcomes. In some systems, vocational and technical education already provides greater employment benefits for individuals, communities, regions, and countries than a tertiary-level education.

   Massive educational expansion, increasing inputs of qualifications and skills in the workforce and the economy, and technological progress can be expected to have a stimulating effect on productivity. In most OECD countries, however, productivity growth is low and, in some cases, stalling. Skills shortages and mismatches or, on the other hand, over-qualification can offer a partial explanation for stalling productivity growth. Finding the right argument on the economic outcomes and benefits of education is especially important to avoid public trust and investment in education eroding. In this context, vocational education and training (VET) programmes and assessment of the skills they provide, constitute a specific...
area with exciting potential for further development of OECD’s large-scale survey work.

Further investment in career guidance and its effectiveness in facilitating transition to labour force, career progression and productivity offers an interesting avenue for OECD work. The OECD’s first-of-its-kind analysis of longitudinal datasets has already shown that effective career guidance relates to better employment outcomes for youth. Similarly, there is evidence indicating students who accumulate social capital through networking prior to graduation by taking part in entrepreneurship education, for instance, access the labour market in a more effective way.

In recent years the OECD has put the social outcomes of education and learning on the map, marking one of its significant achievements in education. The positive association of educational attainment with health, political participation, volunteering, interpersonal trust, and other social outcomes has been amply demonstrated and is widely accepted. The data collection, analysis, and policy advice on the social outcomes and benefits of education as well as its contradictory effects on the unequal distribution of these outcomes remain a strategically critical area of work.

However, social outcomes that have been included in the OECD’s analysis so far give only a partial picture. For example, environmentally sustainable behaviour, digital citizenship skills, and health and various other desirable outcomes of education – to which the United Nations (UN) Sustainable Development Goal Target 4.7 refers – are high on the policy agenda but have so far attracted little empirical research. In many countries, other purposes of education such as democratic participation, identity development and openness towards other cultures and traditions are important as well. Yet, in this regard, there is no conceptual framework to map and classify the desired outcomes of education. This would allow for the development of an empirical research strategy.

Possible propositions

- Revise the analytical framework on the economic returns to education.
- Improve the understanding of the role of educational attainment and skills development in productivity growth.
- Test the feasibility of a system-level assessment for monitoring overall performance levels in (parts of) the formal VET system, changes in those levels, and related or contributing factors.
- Strengthen the data collection and the analytical work on education’s social outcomes relevant to some of the OECD’s strategic or horizontal themes, such as addressing climate change, supporting democracy and civic engagement, building resilience to mis- and disinformation, and improving health.
- Explore new areas of education’s societal outcomes such as the role of education in collective behavioural change, building collective knowledge, capacity, and responsibility.

2. **Approach learning in an integrated and balanced way**

The success of the Programme for International Student Assessment (PISA) and its adult counterpart, the Survey of Adult Skills (a product of the Programme for the International Assessment of Adult Competencies, PIAAC), is due to their analytical and assessment frameworks, which put real-world competency in applying and using cognitive skills front and centre. Work on adult learning across the life course has further reinforced the idea that learning should be relevant to work, social participation, and real life. Competency-based education has proven to be an important correction to an educational paradigm previously dominated by the reproduction of subject-matter knowledge.

At the same time, neuroscientific research on learning also demonstrates that competencies are built on solid background knowledge. Smart memorisation and retrieval practice are shown to be highly effective in fostering the proficiency in subject areas. Finding the right balance between knowledge of the disciplines and knowledge and thinking skills about the disciplines will remain an important challenge for education, as it is for PISA and PIAAC. There is much to gain from sharing experiences with curriculum design and implementation internationally.

In recent years, the OECD has expanded and strengthened its assessments of learning outcomes by including other essential domains of learning beyond proficiency in core academic domains. The results of OECD’s Survey on Social and Emotional Skills (SSES) provide the first international comparative data on social and emotional learning. Thanks in part to the OECD’s pioneering work on this topic, the idea that social and emotional learning is as important as the development of cognitive domains is gaining traction. The move to include
social and emotional learning alongside disciplinary content in OECD’s education work was an important one and will continue to be a strategic area of work for the near and mid-term future.

Even more than cognitive skills, the development of social skills happens through the interplay between various sites and spaces of learning. Experiences in after-school leisure activities, sports, community life, part-time working, volunteering, etc. interact with what families and schools “teach.” Further, the renewed attention paid to mental well-being in many systems requires understanding how skills such as resilience, perseverance, entrepreneurship, achievement motivation and self-control can be fostered through education in various contexts. How the different settings and actors can collaborate and contribute to developing these skills is another promising area of work.

Yet knowledge, skills and character do not constitute the full universe of human learning. Ethical development through the integration of values and moral norms is an essential dimension of learning as well. Even though some countries have given values significant space in curriculum design, this is still largely uncharted territory in our understanding of human learning – and how formal and informal learning environments influence it. Values have a cognitive component. Caring about climate change for example and developing the sense of urgency to take personal action requires a good understanding of environmental science. How cognitive and non-cognitive building blocks crystallise in the development of strong and durable ethical values and norms requires further analysis.

The digital transformation and AI will force further redefining the skills needed for human learning and development. Currently, there is also a lack of AI skills among the workforce, which is a major challenge for the adoption of AI in society. The question is how education will respond to this demand. The OECD can monitor, assess, and anticipate this development, and put forward a vision of how human learning will remain important for securing future growth, prosperity, social progress, and the overall quality of life. At the same time, AI will also fundamentally change the ways, the channels, and the processes through which we learn. How far can AI go in giving cognitive support to learners? The OECD should harness the power of AI, big data and learning analytics to provide more tailored and individual learning at scale.

### Possible propositions

- Continue to broaden the assessment of learning outcomes to domains of social and emotional learning and discern lessons on how to improve those outcomes.
- Explore the possibilities of the assessment of value development and ethical learning and discern lessons on how to improve those outcomes.
- Ensure that the assessment of learning outcomes lead to recommendations for educational policy and practice and curriculum development that are framed in a holistic and balanced view on learning.
- Assess and anticipate the capabilities of computers, robots, and AI against human skills, and establish implications for curriculum design and development.
- Serve as a pathfinder for full exploitation of AI, big data and learning analytics in enhancing the quality of and access to learning for all.

### 3. Make lifelong learning the guiding concept

The concept of lifelong learning is not new and has been part of the policy discourse for more than half a century. But it has led to few implications for policy and practice. This needs to change.

From a lifelong learning perspective, the distinction between job-related learning and people’s motivation to learn because of social, cultural, or personal considerations is blurring. Implementing lifelong learning will require more than expanding opportunities for adult learning. It will push systems to fundamentally re-think the timing and sequencing of learning over the life course accompanied by more sophisticated support arrangements. This includes the earliest stages of learning, which frame learner engagement in subsequent stages. Neuroscience and work on early childhood education have convincingly demonstrated that early investments have many positive effects later in life, and that limiting learning opportunities can cause irreversible damage.

Laying the foundation for lifelong learning requires front-loaded educational biographies to evolve into more complex and more diversified learning trajectories throughout life with learning integrated into work and other contexts. Beyond the fundamental changes to how education is organised, other areas in society require changes as well. Now, employment policies, compensation systems and social security arrangements
still rely on the standard learning biography. The idea that credentials hold for a lifetime will need to give way to new approaches to demonstrate individuals’ relevant knowledge, skills, attitudes, and values. Similarly, more work is needed in understanding how employers themselves contribute to lifelong learning provision and what kind of policy frameworks would best encourage their contribution.

Qualifications and credentials are an important feature of modern education systems. Today, close to 40% of workers in OECD countries already work in a field other than their field of study. There are significant signs that employers are starting to devalue qualifications that reflect on past attainment in favour of direct assessments of the knowledge, skills, attitudes, and values they see as important and that workers can currently demonstrate. The fragmentation of standard educational trajectories, the spread of modularisation, the increase in part-time learning and dual learning experiences, and the emergence of new forms of assessment and certification (micro-credentials, nanodegrees, digital badges, etc.) are signs of this change.

Assessing learning outcomes (through PISA, PIAAC, SSES and International Early Learning and Child Well-being Study, IELS) is a major component of the OECD’s work in education and an important generator of data, comparative indicators, analysis, and policy advice. Fundamental changes to educational systems may also call for a re-think of design and planning of these assessments because they should be based on a comprehensive and integrated understanding of the learning biography.

All countries are increasingly confronted with these challenges and questions. To overcome them, they will need to redesign their education systems around the concept of lifelong learning by introducing more flexibility in educational structure and provision, new assessment, and credentialing arrangements, and by tearing down barriers between the worlds of working and learning. The similarity and complexity of these challenges provide a space for multilateral collaboration, exchange of policy experiences and international monitoring of policy outcomes.

Possible propositions

- Improve understanding of the changing nature of learning biographies and their diversity in various economic, social, and cultural contexts.
- Prioritise education work on the critically sensitive stages of the learning biography, such as early learning.
- Develop a well thought out view on the timing of OECD assessments of learning outcomes over the life course.
- Provide opportunities for peer learning and policy advice on improving the flexibility of education systems regarding access, learning progress and certification as well as defining roles for various stakeholders that contribute to lifelong learning.

Three conditions for future-oriented work in education

4. Improve the understanding of human learning

Mobilising the best available research knowledge and evidence on learning and translating it into policy-relevant insights and formats is important to improving and innovating education. However, many education systems currently lack incentives for educators to contribute to the creation, use and sharing of knowledge about their professional practice. This has important consequences for the quality and efficiency of learning experiences, and for the productivity of educational investments.

Recent technical advances in non-invasive brain research and new developments in neuroscience have opened a new field of empirical research into the process of learning, one that is removed from the traditional spheres of education science. A new science of learning is emerging, based on the interdisciplinary integration of research in neuroscience, cognitive psychology and many related scientific disciplines. Important findings are emerging from this field, and many are attempting to translate these into educational policy and practice. Yet there is still much to do in improving our understanding of human learning as well as our institutional approaches to learning in classrooms and schools.

One of the important domains of scientific research into human learning is that of the interplay between cognitive development, achievement motivation, growth mindset and well-being. In past years, student well-being has become an important dimension of education. Well-being is now seen as shaping the social and emotional conditions for learning to be effective and sustainable.
Considerable attention has gone into issues such as the major impact of fostering learner agency through a positive school climate, the supportive behaviours of teachers, importance of student and career counselling and the negative impact of bullying in its many different forms, etc. PISA work has also focused on achievement motivation, life satisfaction or the role of growth mindset, topics which also relate to the motivational and well-being conditions for learning.

Going forward, the research on learning can be expected to inspire new design principles of effective and supportive learning environments. Future learning environments will focus on developing learner agency and will redefine the roles of teachers and educators. Curriculum redesign will also benefit from new insights into human learning, including insights into the building blocks and sensitive periods of cognitive development. There is a clear role for international collaboration to leverage this emerging knowledge and to explore ways it can be translated into better policies and practices.

**Possible propositions**

- Support the translation of scientific progress in the understanding of human learning into educational policy and practice, more specifically regarding education and system design principles, teachers’ professional knowledge, pedagogy, and curriculum development.
- Strengthen the assessment of teachers' professional knowledge and seek to understand how this professional knowledge is used to inform policy making in education.
- Continue to integrate the social and emotional conditions for effective teaching and learning in the frameworks for assessing students' learning outcomes.
- Consolidate a focus on well-being of students and teachers as an integral part of the educational experience and its effectiveness.

**5. Go beyond formal education**

Formal education in professionalised institutional settings is and will remain the most prevalent space for human learning at least for the near future. However, most initial learning happens in families and communities. Meaningful experiences outside formal settings reinforce and complement what students learn at school. Longitudinal studies commonly find that students who work part-time or who volunteer at age 15 can expect significantly better employment outcomes 10 years later. Entrepreneurship skills are an example of skillset that is often best learnt in an informal setting.

Educational institutions themselves provide many opportunities for informal learning. Not all learning that takes place in them is by definition “formal”. An example of this is the impact of the supportive attitudes and caring behaviour of teachers on the development of a person’s interpersonal trust and empathy. Sports, extra-curricular activities, what happens at playgrounds, and so on have profound impact on children’s learning and well-being.

Making sense of non-formal and informal learning is a vast but largely uncharted territory. There is little knowledge about where and the ways through which people learn, and even less about how to make improving informal learning subject to public policy. However, there are some promising advances in this sphere. It is known that the quality of work and workplaces has a positive impact on learning and skills development at work. Collaborative cultures and working conditions that reward collaboration allow people to learn from one another. Interacting with physical environments, moving around, navigating complex environments, and travelling to other destinations all influence cognitive and non-cognitive development. There is also significant research on the impact of media, digital devices, and social media in the private sphere on learning. Insights from behavioural economics on nudging specific behaviours can provide interesting ideas as well. Providing policy advice on fostering desirable informal learning is a promising domain of future work.
Possible propositions

• Improve the understanding of the contributions of diverse channels and environments of learning in assessing students’ learning outcomes.
• Improve the understanding of educational institutions as sites that provide formal as well as informal opportunities to learn in order to develop policy advice on how to better shape schools as positive learning environments.
• Enable education systems to reinforce connections between formal schooling and non-formal and informal channels of learning in the community, civic organisations, and the media, for example, through recognition and credentialling.

6. Widen the concept of equity and inclusion in education

Equity and inclusion in education and learning are at the top of the policy agenda, which is why they are the theme of the Education Policy Committee’s 2022 Ministerial meeting. Equitable education systems are those in which all individuals can reach their full potential educationally and within society regardless of their personal, family, and social circumstances, and irrespective of factors such as gender, ethnic origin, immigrant status, and special education needs. Inclusive education systems are those that strengthen capacity to reach out to all students by responding to the diversity of their needs and ultimately ensuring individuals’ self-worth and sense of belonging to communities.

Persistent evidence shows learners’ background continues to affect educational trajectories, success, and failure. Diverse groups of students often face challenges in mainstream education systems that lower their achievement and hinder their potential, and they frequently report lower levels of social and emotional well-being in relation to their school experience. For example, gender roles and stereotypes continue to play a particularly important role in influencing the educational and occupational choices of girls and boys, whereby girls still shy away from Science, Technology, Engineering and Mathematics (STEM) programmes. Moreover, PISA 2018 results show that the impact of social background on success in education varies greatly across countries but remains substantial in too many. Similarly, PISA highlights that immigrant students tend to underperform compared to their native peers: students with an immigrant background are at least three times as likely as students without an immigrant background to score below the minimum level of proficiency in reading.

These inequalities have high costs not only for individuals and their post-educational outcomes but also for societies. Indeed, lower academic outcomes for diverse student groups can lead societies to face a loss in productivity of its labour force, lower revenues from income taxes, and higher expenditure through social welfare and protection systems.

So far, the OECD’s work on equity in education has examined the impact of gender, socio-economic background, immigrant status, parental education, parental occupation, and cultural capital, or geographic location on educational achievement and learning outcomes. The data sources available largely focus on equity and inclusion in primary and especially secondary school. This means there is great potential to widen the scope of the work at other education levels (e.g. VET and higher education) and explore the feasibility of including other kinds of backgrounds and personal characteristics (e.g. gender identity, sexual orientation, special education needs and giftedness) and their intersections in the analysis. Doing so would allow for more comprehensive understanding of the ways in which learners’ backgrounds, personal characteristics and/or the profile of their school may impact on their experiences, outcomes and opportunities in (general) secondary education and beyond.

According to PISA results, there is no country-level trade-off between excellence and equity, and some countries have seen important progress in both raising performance and levelling the playing field. But in other countries, underperformance and inequality have been persistent despite considerable policy action. Finding out the reasons for this and examining which measures have worked in different economic, cultural, and social contexts is therefore needed.
Two imperatives for policy development in education

7. Improving cost-efficiency in education

The budgetary challenges that countries face today will not go away. Public expenses in education and other domains are fuelled by increasing levels of public debt, which tax future generations will carry. Demographic shifts will push governments to spend more on health, ageing and welfare. Challenges related to climate change will require higher levels of public spending as well.

Pressures to increase value-for-money and cost-efficiency in education are likely to mount, and education systems need to find ways to respond. Most OECD countries have increased their educational expenditure significantly over the past 20 years without, in most cases, any perceivable improvement in commonly measured outcomes. Whereas other public policy domains have increased productivity mostly through the targeted use of technology, the technology-driven increase in educational productivity has yet to materialise. The experiments in using technology during the pandemic should feed into reflections on how to change this.

The cocktail of inflating costs, flat productivity, stalling or decreasing quality, questionable economic returns on investment, and external pressures for cost-efficiency risks create a significant challenge for education systems. It is another area where the causal nature of relationships between inputs, processes and outcomes is difficult to discern but where cross-country differences in educational productivity can yield important insights for public policy. Improving cost-efficiency is a critical area of policy-relevant work. Multilateral collaboration can provide the space for analysis, peer learning and policy dialogue.

If lifelong learning is adopted as a genuinely guiding principle for the education systems, funding arrangements will have to be reconsidered to ensure that individuals, the business sector, and governments at all levels share the costs and benefits of learning equitably. This may offer a new area for re-thinking how education systems are funded.

Possible propositions

• Continue the work with countries to explore ways of increasing cost-efficiency in education.
• Develop policy alternatives for improving value-for-money in education.
• Stimulate reflection among countries on the reallocation of public funding mechanisms to support an equitable distribution over the life-course.
8. **Focus on innovation of education**

When education systems come under increased pressure, they sometimes provide less space for experimentation and innovation and go back to what worked in the past. The reasons for that are many, including uncertainty about who will benefit from reforms and to what extent. This extends to questions about costs and who is responsible for them, and there is also fear of the potential loss of advantages. Even small reforms can involve massive reallocations of resources and touch the lives of millions.

Nevertheless, the case for innovation in education is clear. The number of education systems that set guidelines or standards at the national level and give freedom to educational institutions or local authorities to shape their own responses is increasing. This provides opportunities for greater innovativeness in education in improving outcomes, cost-efficiency, and equity. In this context, it is important to be rigorous about innovation and focus on innovation for learning informed by learning science.

A powerful knowledge system informed by scientific research, and driven by data and analysis, is essential to developing the evidence base for policy, and guiding innovation and experimentation. At the same time, for innovation and experimentation to be valuable, systems need to develop the capacity to learn from them, whether they be successes or failures. This is a space where international collaboration can bring in value-added.

Successful innovations depend on a collaborative effort from all actors and stakeholders both inside and outside the system, united by a convincing narrative and sense of purpose. But there is need for a more sophisticated understanding of the ways in which innovation arises in education. This seems an important space for multilateral collaboration.

Finally, one key area of strength is the Centre for Educational Research and Innovation (CERI) work on scanning global mega-trends in society that have potential implications for education. It brings these to policy makers’ attention and challenges them to think how to address them. Building on this work together with research to bolster innovation in education, the OECD continues to support governments in re-imagining the future of education.

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**Possible propositions**

- Provide countries with a view on innovation in education as a collaborative intentional process of improvement towards more effectiveness, efficiency, quality, and equity.
- Stimulate countries to generate experimentation spaces in education from which countries can learn, both from successes and failures.
- Support countries in assessing the effects of education reforms to understand what works and what doesn’t, and facilitate peer-learning on findings.
- Support countries to fundamentally re-think and innovate education systems, e.g. through foresight and scenario building.