

# 1 | Preparing for a new future

# Future of Education



# Table of contents

Foreword	<u>02</u>
Executive summary	<u>03</u>
<b>Trend 1:</b>	
<b>Rising demand for global problem solvers</b>	<u>05</u>
As the world faces a new set of global challenges, education systems will become a central part of the solution, helping future generations embrace global mindsets and skill sets.	
<b>Trend 2:</b>	
<b>Change in the skill sets required for work</b>	<u>22</u>
As technology advances, education will focus on equipping students with the high-demand skills they'll need to thrive in a new world of work.	
<b>Trend 3:</b>	
<b>Shift to a lifelong learning mindset</b>	<u>39</u>
As lifespans increase and societal change accelerates, the idea of lifelong learning is gaining traction, with more tools available for upskilling and advancement.	
Glossary	<u>57</u>
Our research approach	<u>58</u>
About Google for Education	<u>62</u>

# Foreword

At Google, we believe that, no matter your background, everyone deserves access to great learning experiences.

The opportunity to learn in the classroom, at home, and everywhere in between, has never been more important than it is today.

As the world evolves, driven in part by pressing global issues and the accelerated rate of technological innovation, what we learn and how we learn will evolve too. This will mean developing new mindsets and skill sets to become global problem solvers and lifelong learners; evolving how we teach and learn by making learning more personal and accessible to all; and finding more meaningful ways to evaluate learning tools and learner progress, to best support the goals of educators, students, and families.

As we march towards a radically different future, what should the role of education be and how might it look? To begin to answer this question, we collaborated with research partner Canvas8 to conduct a global study in 24 countries that synthesizes insights from 94 educational experts, two years of peer-reviewed academic literature, and a media narrative analysis across the education sector. Global nonprofit American Institutes for Research

served as an advisor and consultant to this research. The result is a three-part report on the future of education.

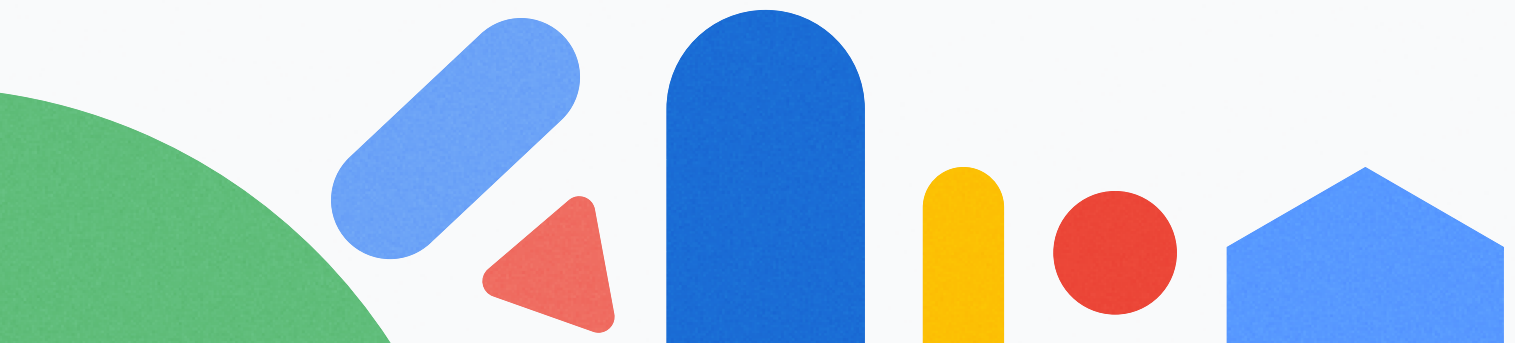
This is Part 1: Preparing for a new future.

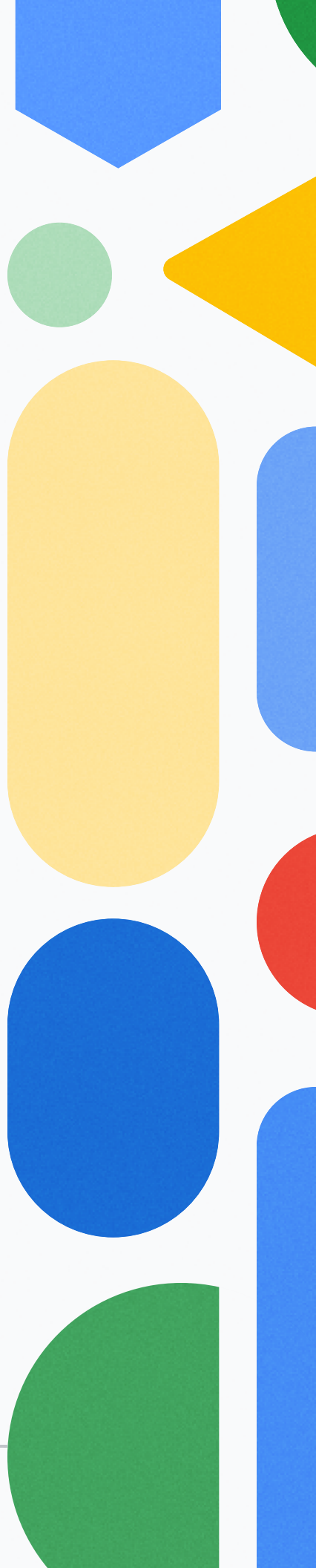
We acknowledge that, just as there is Maslow's hierarchy of needs for life, so too there exists a hierarchy of needs in education. Some educators and leaders have the luxury of building for the future, while others are forced to tackle more immediate challenges, such as student attendance or literacy. As such, the future of education will be shaped by a complex, nuanced process rather than a single wave of change. We also recognize that there is significant variation in perspectives on the role of education across and within different markets; our intention is not to present a comprehensive or uniform view of the future.

Instead, we hope that this research can help provide educators and education leaders with a common understanding of the trends informing the future of education, and spark ideas and discussion on how we can best work together to help all learners — and those who help them — succeed.

Thanks for coming with us on this journey,

**Shantanu Sinha**  
VP, Google for Education





# Executive summary

The future is shaping up to look radically different from today. As educators work to equip students with the skills and mindsets they'll need to navigate massive change and prepare for a new future, the educational experts we interviewed discussed how and why they're rethinking the role of education.

*The views and opinions expressed in this report are those of the experts and do not necessarily reflect the views or positions of any entities, institutions or organizations they represent.*



In our research, we identified three key trends driving this shift

#### TREND 2

### Change in the skill sets required for work

As technology advances, education will focus on equipping students with the high-demand skills they'll need to thrive in a new world of work.



#### TREND 1

### Rising demand for global problem solvers

As the world faces a new set of global challenges, education systems will become a central part of the solution, helping future generations embrace global mindsets and skill sets.



#### TREND 3

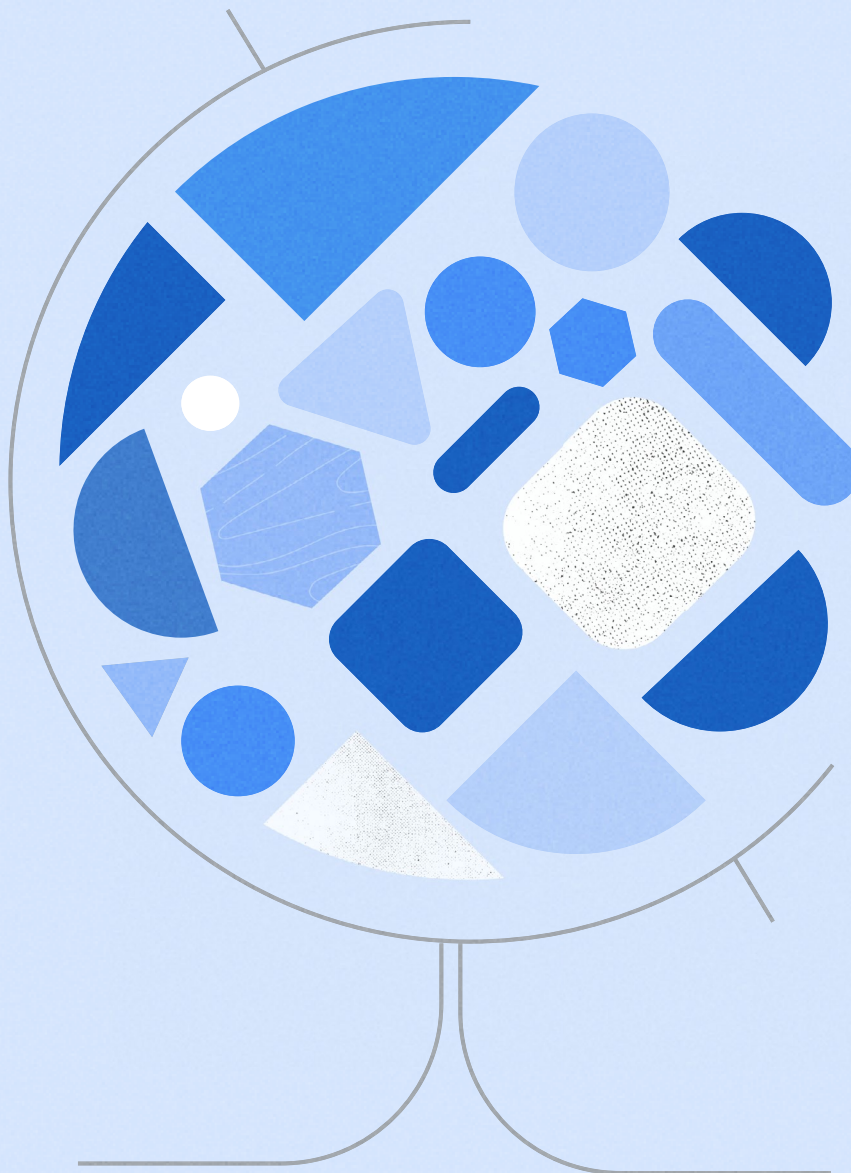
### Shift to a lifelong learning mindset

As lifespans increase and societal change accelerates, the idea of lifelong learning is gaining traction, with more tools available for upskilling and advancement.

TREND

1

# Rising demand for global problem solvers





As the world faces a new set of global challenges, education systems will become a central part of the solution, helping future generations embrace global mindsets and skill sets.



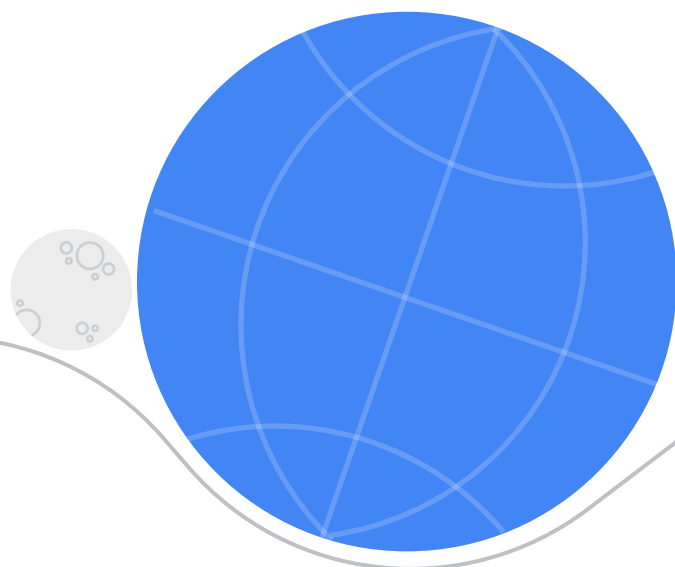
# How can educators prepare tomorrow's leaders to address global challenges?

The issues of our day, such as equitable access to education, digital literacy, sustainability, and economic volatility, are only getting more complex. In order for today's students — tomorrow's leaders — to address these challenges on a global scale, the experts we spoke to expressed a need for both global mindsets and multidisciplinary skill sets. Specifically, they highlighted the role of educators in helping students become civic-minded, collaborative problem solvers.

While the concept of collaborative problem solving is not new,<sup>1</sup> the upheaval brought about by Covid-19 has reinforced the need for collaborative problem solving at the global level. In November 2021, UNESCO published a report titled *Reimagining our futures together: A new social contract for education*, which suggests that current and future global challenges, such as the pandemic, require a new shared vision for the purpose of education, which should be organized around principles of cooperation, collaboration, and solidarity.<sup>2</sup>

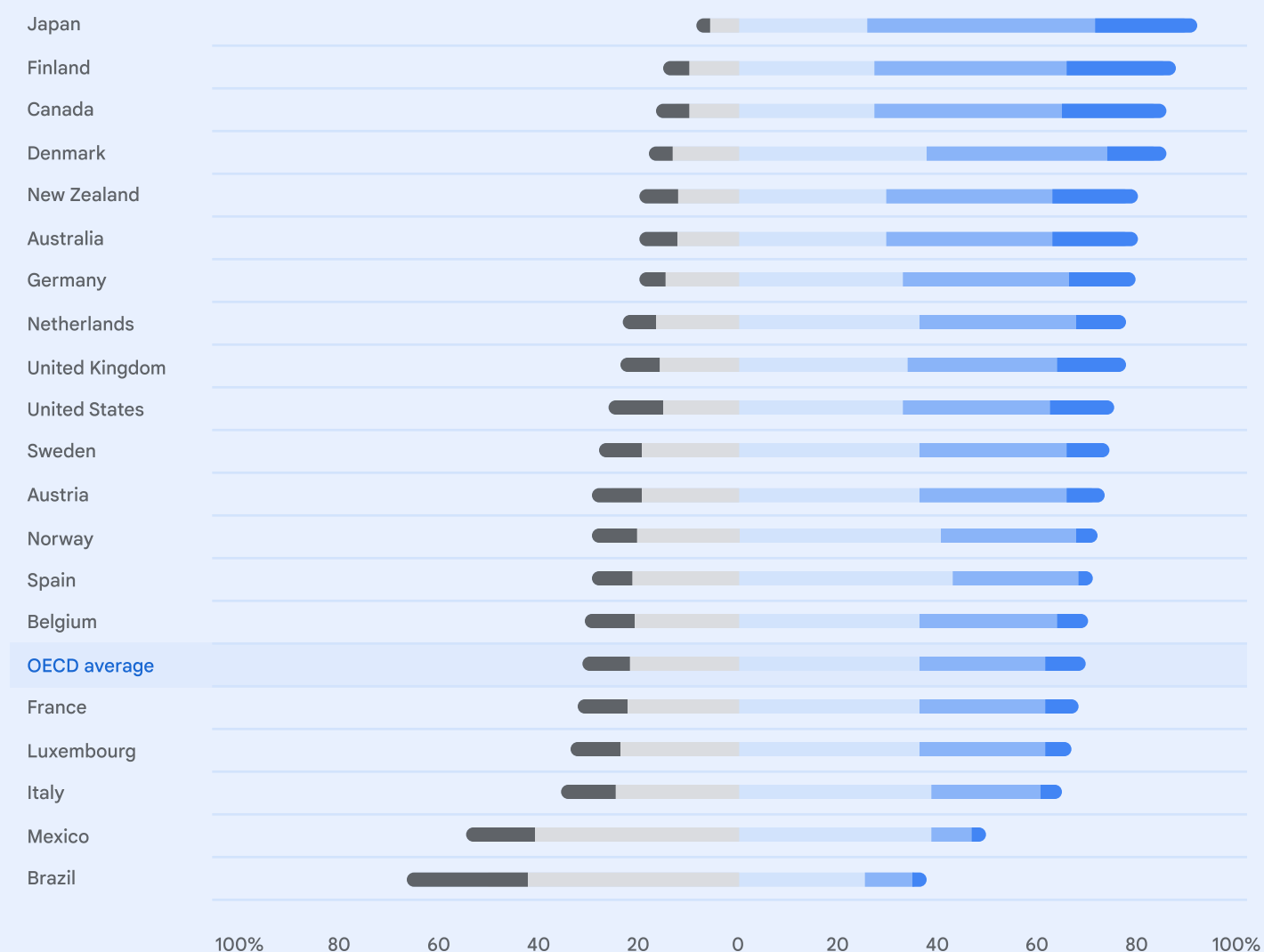
According to our experts, this need coincides with declining levels of civic engagement across the world, as measured by global voter turnout, which has been in decline since the 1960s.<sup>3</sup> This trend holds true for young people: the percentage of youth<sup>+</sup> who voted in national elections across Western developed democracies has declined since the 1970s.<sup>4</sup> Youth also exhibit reduced participation in other traditional modes of civic engagement. For example, 75% of 15-24-year-olds across 15 European countries have never signed a petition,<sup>5</sup> and 30% of US 12th graders say they have never participated in a debate.<sup>6</sup>

However, these trends do not necessarily indicate decreased interest. Evidence points to a shift in today's youth towards new forms of civic engagement such as digital activism (e.g. digital networking, self expression on social media).<sup>7</sup>



## How students perform at collaborative problem solving

Percentage of students at the different levels of collaborative problem-solving proficiency



**Level 4:** Students can successfully carry out complicated problem-solving tasks.

**Level 3:** Students can complete tasks with complex problem-solving requirements or collaboration demands.

**Level 2:** Students can contribute to a collaborative effort to solve a problem of medium difficulty.

**Level 1:** Students can complete tasks with low problem difficulty and limited collaboration complexity.

**Below Level 1:** The PISA 2015 collaborative problem-solving assessment was not designed to assess elementary-level skills.

Source: PISA, "OECD performance on collaborative problem solving skills," 2015\*

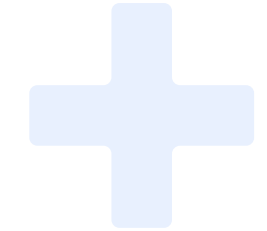
\*Latest available data.



“Children need a set of life skills and competencies to respond and adapt to the changing nature of our world.

Vishal Talreja

co-founder and trustee, Dream-A-Dream, India



Experts view schools as uniquely positioned to help students develop the mindsets and skill sets needed to more deeply engage in civic life. One organization that is helping students become more involved in their communities is nonprofit, Reap Benefit.<sup>8</sup> The award-winning organization, based in India, works with schools to help students to tackle problems in their local environment, including waste, water, sanitation and pollution. The program uses a four-step process: identify an issue; collect relevant data for deeper understanding; prototype solutions; and communicate findings and solutions to local governance. By showing students that their

actions can make a difference, Reap Benefit helps them develop a sense of agency.

Furthermore, the ability to effectively engage is underpinned by more basic needs; the ability to work with data, for example, stems from a solid foundation in math; communication on a foundation of reading literacy. While reading and math are foundational, over half of young people globally — 617 million children and adolescents — are not yet meeting minimum proficiency levels across reading and math.<sup>9</sup>

Beyond problem solving and civic engagement, the experts we spoke to also highlighted the importance of possessing the social and emotional competencies that support cross-cultural collaboration. Self-awareness, responsible decision-making, empathy, teamwork and relationship-building provide a critical foundation for the kind of work required to tackle complex global issues. Social and emotional learning (SEL) programs, which teach these competencies, have also been shown to have a significant positive impact on children in difficult circumstances.<sup>10</sup> For example, when a child experiences a traumatic event, such as a high conflict environment, this can negatively

impact their learning and wellbeing, but these impacts can be lessened by SEL interventions.<sup>11</sup>

Technology has a role to play, too. US-based SEL platform, Ripple Effects, for example, lets students learn about sensitive social and emotional topics in a private, self-paced environment.<sup>12</sup> Students can select from over 400 topics, such as ‘making friends,’ ‘anxiety,’ and ‘natural disasters,’ based on their personal needs and interests. By delivering the materials online, students can learn sensitive topics without the anxiety that face-to-face learning around these topics may create.<sup>13</sup>



While educators are still exploring the most effective ways to teach social and emotional competencies, growing ethnic, cultural and linguistic diversity in society will create a greater need to understand, empathize and collaborate across cultures.<sup>14</sup>

The issues shaping the future are increasingly global and complex and will require a multidisciplinary skill set to work towards thoughtful solutions. Education remains the most powerful institution that society has to develop the mindsets and skill sets necessary to help people work together to reach a better collective future.



“Problems in the real world are interdisciplinary in nature and young people are now expecting more problem-based kinds of multidisciplinary approaches [in their education].”

**Pasi Sahlberg**  
*professor of education, Nordics*



“

There is a need to develop human beings who are internally strong and resilient. The importance of knowledge transmission will decline in order to place a greater emphasis on fundamental and higher thinking skills, including children's socio-affective spheres.

Sylvia Schmelkes  
researcher at Universidad Iberoamericana, Mexico



Ideas in action | *Canada*

## Developing global mindsets

Belfountain Public School in Canada launched the Sustainable Future Schools pilot program in 2020, which allows students to align their course content and projects to one of the UN's 17 Sustainable Development Goals (SDGs) for the duration of the school year.

The program helps students improve their global problem-solving skills through both independent and collaborative work.<sup>15</sup> Students of the program experience improved learning outcomes, and gain the skills, knowledge and attitudes necessary to create positive changes in their communities.<sup>16</sup>





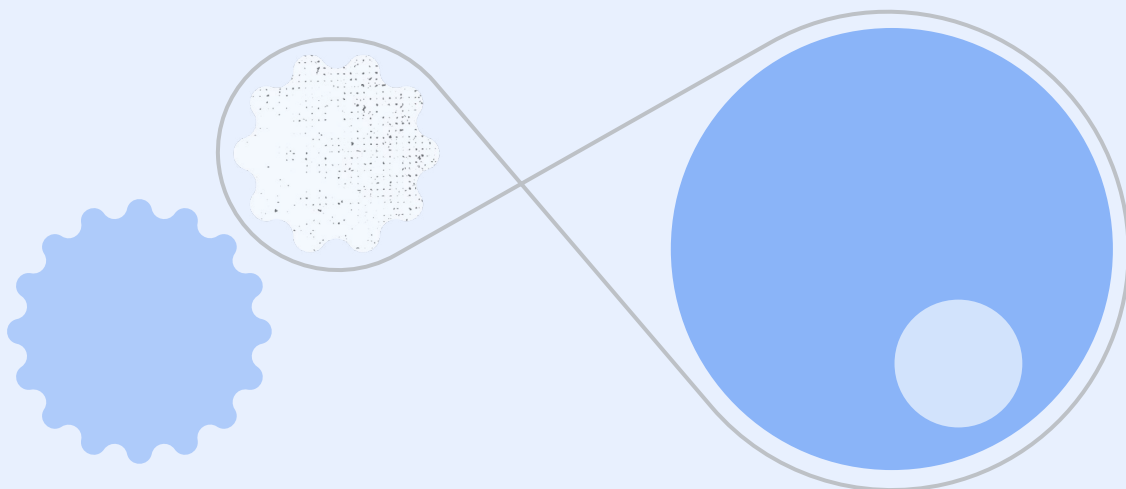


## Ideas in action | *France*

# Practicing civic engagement

The Learning Planet Institute in France has created the Les Savanturiers program, in which educators and researchers engage more than 30,000 children, from kindergarten to high school, to help solve big issues rooted in science and social challenges.<sup>17</sup>

For example, to mitigate potential issues related to rapid urbanization across the world, students explore whether urban agriculture would be enough to feed a whole city; or, to help promote biodiversity, students use biotechnology to figure out how to extend the lifespan of a bee colony.<sup>18</sup> By letting students come up with new solutions, this program has been shown to cultivate critical thinking and creative problem solving skills.<sup>19</sup>



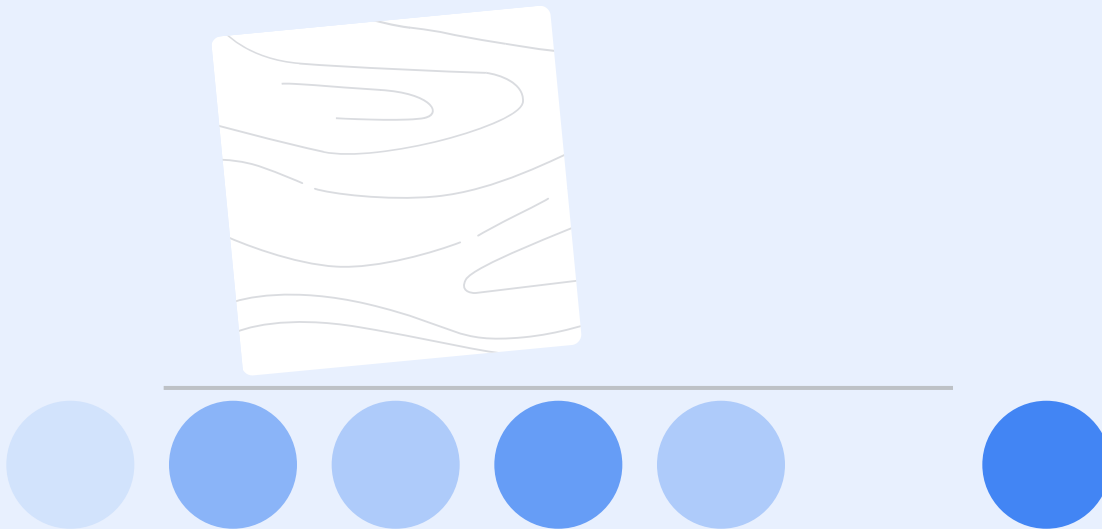


## Ideas in action | India

# ‘Whole community’ approach to learning

To effectively teach SEL qualities such as empathy, teamwork, and responsible decision-making, there is growing support among educators for a “whole community” or “whole school” approach.<sup>20</sup> In India, the Delhi government launched its Happiness Curriculum in 2018, to strengthen social and emotional learning.

The program, for students aged 3-14, brings together 200 community mentors, including parents and teachers, and includes mindfulness classes, reflective stories and other activities. The program has been found to improve relationships between students and teachers; increase participation in classrooms; increase focus among students; and encourage more positive interaction with their peers.<sup>21</sup>





Ideas in action | *Global*

## Building empathy at a global level

As digital media and video-conferencing tools have evolved, there are new opportunities to develop empathy skills by increasing students' exposure to different lived experiences around the world. In Teach for All's global Empathy Week program, students aged 5-18 learn about 65 people from a wide range of backgrounds, hearing about their experiences, lives, thoughts, feelings and perspectives through a series of short films and related lessons, including guest experts talking about empathy.<sup>22</sup> Since 2020, Empathy Week has reached schools in over 40 countries across six continents.





# The Google perspective

Rising demand for global problem solvers

The next generation of leaders will face complex challenges that are increasingly global in scope.

At Google, we want to help educators prepare their students to address these challenges, by cultivating relevant skill sets and ensuring that all students can access the knowledge they need to contribute on a global scale.





While educators see the value in teaching their students skills like collaboration, problem solving and creative thinking, they do not always have the tools available to support these instructional goals. By providing students with both a more personal learning environment and a secure way to connect with others, our Google for Education products — Chromebooks, Google Workspace and Google Classroom — help students deepen collaborative problem solving skills and find opportunities for creative expression. We also maintain an open ecosystem, partnering with companies and applications that help students go farther, faster.

At one UK-based school, staff, parents and pupils were looking for opportunities to foster collaboration, creativity and critical thinking. The existing IT infrastructure prevented them

from doing so. With Chromebooks and Google Workspace, the school was able to transform the student learning experience — increasing sharing and enabling 1:1 learning for each pupil. The school saw overall student engagement increase. The children enjoyed the collaborative approach through Google Workspace (previously called “G Suite”) where they could share ideas in a secure environment, as well as the ability to easily share work with their teacher in just a click. Furthermore, students with a passion for technology were invited to engage with their school community by becoming digital leaders, helping to teach other students how to use their Chromebooks. These students made an impact well beyond their school; digital leaders were invited to speak at the BETT educational conference and attended a Chromebook Summit.



In order to solve complex problems, we believe that it's important for students to become self-directed learners. [Google Classroom](#), our flagship edu product created to simplify teaching and learning, empowers teachers to connect with their students and create engaging lessons. For example, teachers can foster teamwork, collaboration, and individualized learning by allowing the whole class, groups, or individual students to collaborate in the same document. With [Classroom Android app features](#), we help make this learning experience as accessible as possible, by providing students and teachers with a better Classroom mobile experience, even with a limited internet connection. For students, this means the ability to easily upload their work from a mobile device; for teachers, we offer a mobile-friendly grading experience.

As students spend more of their time in the digital world, it's important that they become responsible digital citizens and stay safe online. To help them do this, we created the program [Be Internet Awesome](#), which includes a web-based game called Interland and educational curriculum. After a rigorous, [independent evaluation of our program](#), University of New Hampshire's Crimes Against Children Research Center discovered that students who went through the Be Internet Awesome program improved their comprehension in areas such as being civil online, understanding which websites are safe and responding more confidently to cyberbullying.

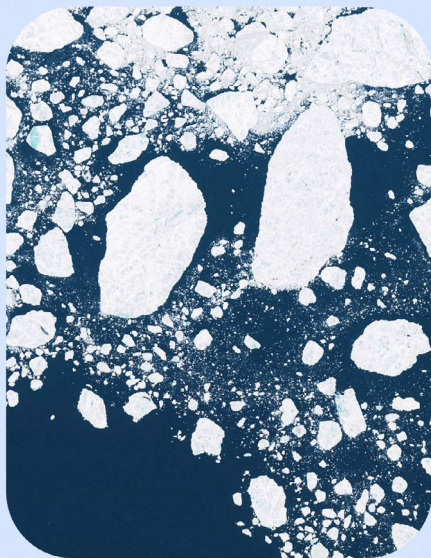
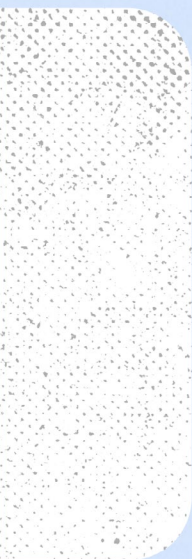


In order to solve complex problems, we believe that it's important for students to become self-directed learners.

We believe in the power of people, supported by technology, to help solve global problems. By giving students access to the right tools and the ability to safely explore and understand the world around them — and each other — we hope to foster a future rooted in collaborative problem solving and global engagement.



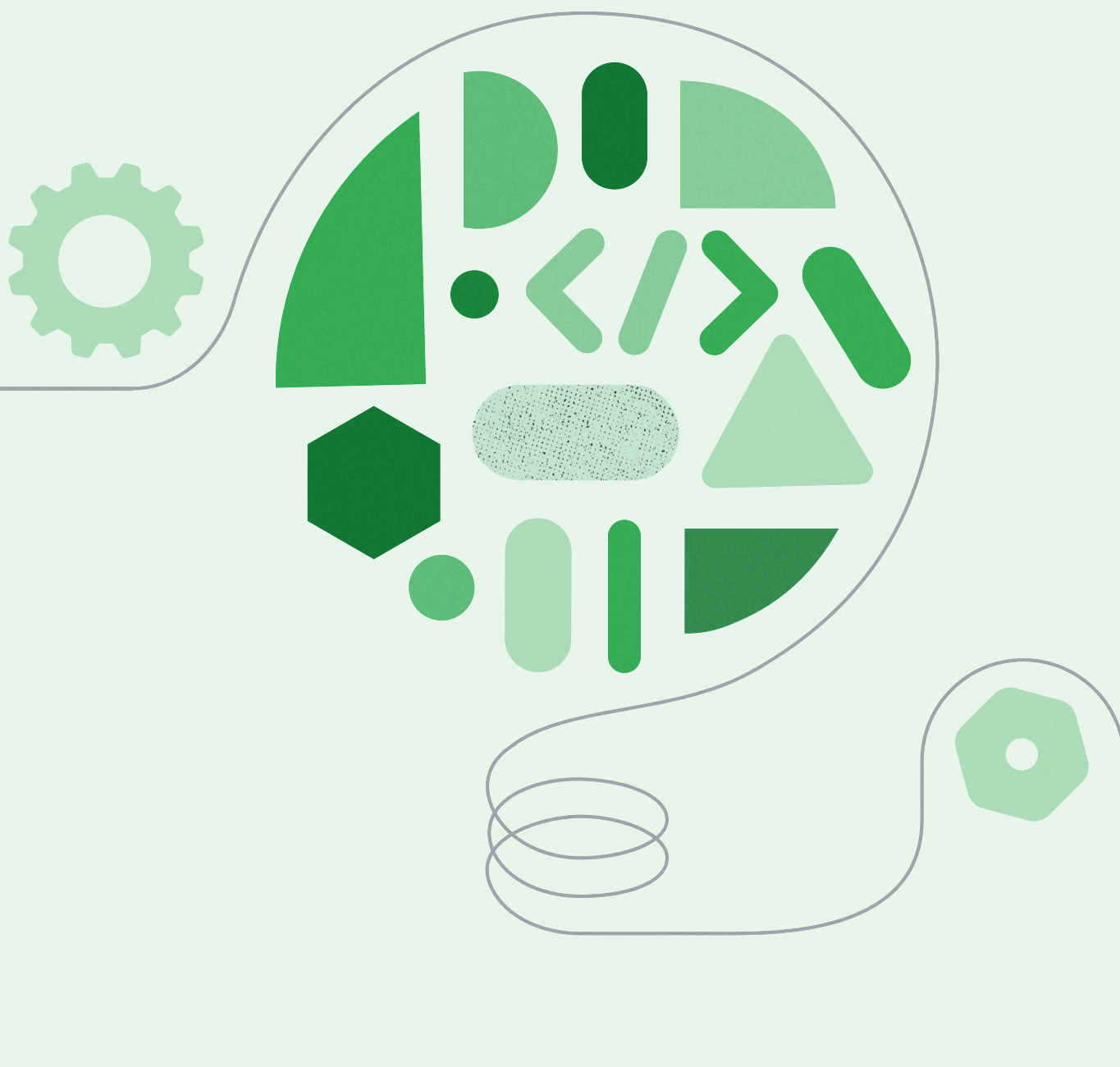




TREND

2

# Change in the skill sets required for work





As technology advances, education will focus on equipping students with the high-demand skills **they'll need to thrive in a new world of work.**

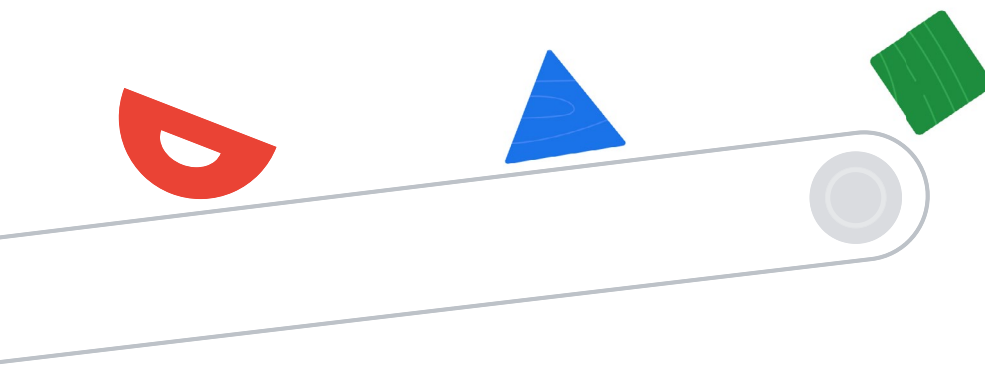




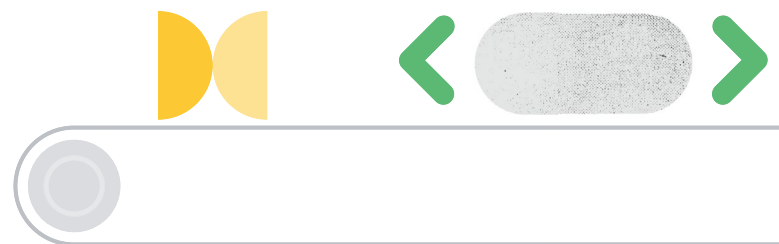
# In the age of automation, which skills will be in high demand?

Ever since formal schooling began in the early industrial era, societies have relied on schools to develop the skill sets required for the workplace.<sup>23</sup> Looking ahead, as automation and artificial intelligence (AI) increasingly transform the workplace, there will be new demand for skills that education doesn't currently offer on the scale needed. According to the World Economic Forum, by 2025, technological change may see

97 million new jobs created, while 85 million existing roles may disappear.<sup>24</sup> In addition, half of the everyday tasks currently being performed across all sectors are likely to be automated in the coming decades.<sup>25</sup> This sets up a task for education systems: to figure out which skills are going to be valuable in the future, and which are not.



Which skills are going to be valuable in the future, and which are not?



“ The idea that you educate for jobs is an idea of the past. Today, you learn to create your future, to create your job.

**Andreas Schleicher**

*director for education and skills, and special advisor on education policy to the secretary-general at the Organisation for Economic Co-operation and Development (OECD), Global*

Anticipating the in-demand skills required for jobs that don't yet exist is not an easy task. Statistical forecasting — while a useful technique to predict demand for future skills — can be slow, costly and often comes with quality challenges.<sup>26</sup> However, new solutions are starting to emerge that aggregate large data sets (such as online job postings) and, through machine learning, are able to generate quick, high quality and cost-efficient analyses on the most in-demand skills emerging.<sup>27</sup> These methods provide a near-real-time view on the trends, enabling policymakers to have a clearer, more accurate

picture of how the job market is changing and which skills are likely to be in high demand.

Such forecasts show increasing demand for analytical and innovative thinking, active learning and learning strategies, complex problem-solving, critical thinking and analysis, creativity, originality and initiative.<sup>28</sup> What is clear is that many of the skills that will matter in the future are already essential in some sectors today.

However, as demand for these skills increases, the workforce is not keeping up — a problem that's been growing for over a decade. Half of employers globally struggle to find people with the right skills.<sup>29</sup> As more work becomes automated, this skills gap is set to widen, presenting big questions about what can be done now and the role of education.



## Top 5 in-demand skills by 2025

The World Economic Forum, in its Future of Jobs report (2020), identified the following five skills as the most in-demand among employers globally, by 2025:

### 1 Analytical thinking and innovation

The capacity to solve novel, ill-defined problems in the real world.

### 2 Active learning and learning strategies

Understanding of the implications of new information for both current and future problem-solving and decision-making.

### 3 Complex problem-solving

Abilities that influence the acquisition and application of knowledge in problem-solving.

### 4 Critical thinking and analysis

Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems, as well as assessing performance of yourself, other individuals or organizations to make improvements or take corrective action.

### 5 Creativity, originality and initiative

Capacity to analyze information and use logic to address issues and problems, apply alternative thinking to develop new, original ideas and answers.

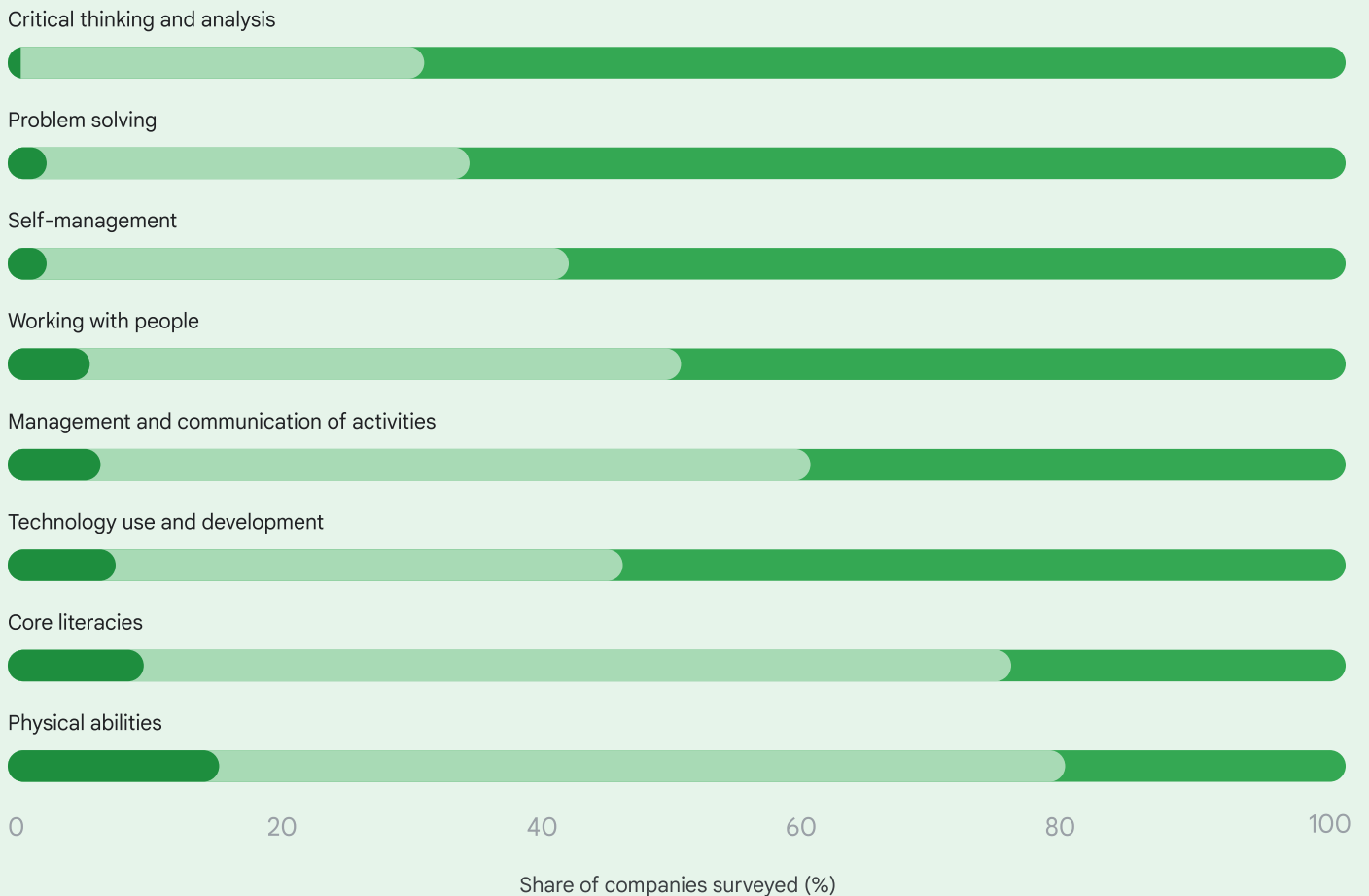


Preparing for this new economy is less about dividing up jobs between humans and machines, and more about developing a better understanding of how humans and machines can work together in productive ways. For example, artificial intelligence (AI) might be getting better at problem solving, but it will still require human intelligence to identify and define unknown problems that need solving.<sup>30</sup> This sets up a new imperative for education — to develop workplace skills that aren't easily automated, and to better prepare both teachers and students for this fluctuating future.

Knowing which skills will matter is one challenge, being able to effectively address them through education is another. The biggest barrier that teachers face globally to teaching new skills for the 21st century, is a perceived “lack of time within a strictly regulated curriculum.”<sup>31</sup> Finding easy ways to help educators efficiently identify and teach such skills will be key for progress, and will require greater collaboration between educational providers and the private sector.



## Relative importance of different skill groups



● Decreasing   ● Stable   ● Increasing

Source: World Economic Forum, "[Future of Jobs](#)," 2020

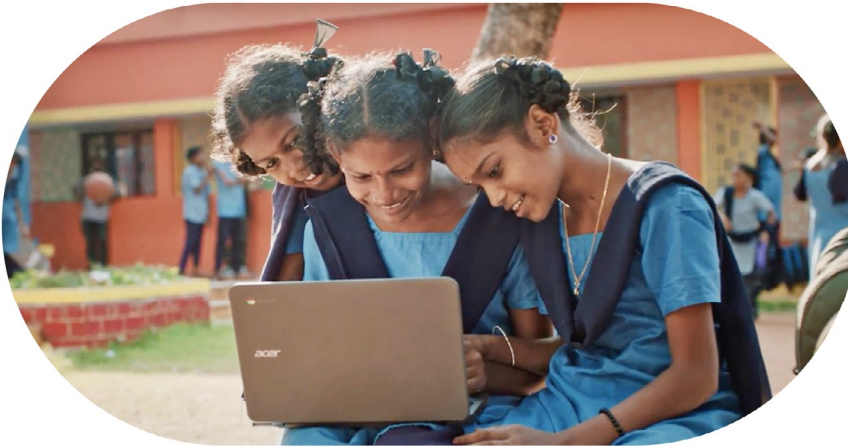
“Content can become irrelevant but skills are transferable.”

Mark Osborne  
director, Leading Learning, New Zealand



Changes in the workplace will unlock new ideas about how to approach career education too. Currently, by age 15, according to the OECD, most students have not yet spoken to a career counselor in school, visited a job fair, or done an internship.<sup>32</sup> Experts argue that exposure to this

new world of work should start earlier to give students the opportunity to shape their career pathways and aspirations over time, rather than simply focusing on their first job after formal education.<sup>33</sup>



“ More and more companies are not interested in what degree you earned. They are not asking for your transcript or test scores. The skills you need in a competitive academic environment bear no resemblance to the skills of the innovation era and more and more companies are seeing that.

**Tony Wagner**

*senior research fellow, Learning Policy Institute, and author of seven books about education, United States*

“

The education system has to enable young people to be great career navigators, to learn transferable skills that enable them to change fields and not just change jobs. And, to be alert to the changing workforce needs in ways that were probably less apparent previously.

Valerie Hannon  
*co-founder, Innovation Unit, United Kingdom*



## Ideas in action | Sweden

# Using big data to map future skills

The growing volume of data sets is helping governments and policymakers better understand gaps that education can help fill. One example of this is JobTech Development, launched in 2018 by the Swedish Public Employment Service.

The initiative uses AI to integrate previously siloed data sets (such as job adverts and forecasts for future in-demand skills) from 500 different organizations into one place.<sup>34</sup> The goal is to reduce skill mismatches by providing a highly accurate, real-time forecast of the skills Sweden's workforce needs in the future. Recognized by the European Commission for its innovation, the initiative not only helps identify skills gaps, but also helps the government identify new high-growth industries it can develop nationally.<sup>35</sup>





Ideas in action | *Global*

## Remote ‘externships’ that bridge equity, work, and education

As technology gives people the ability to work remotely, student externships — internships that run alongside academic studies — are going virtual too. Traditionally, student externships were limited to nearby businesses (and industries). Remote externships, however, expand career access to students that might not otherwise have been reached, such as those in social mobility “coldspots.”<sup>36</sup>



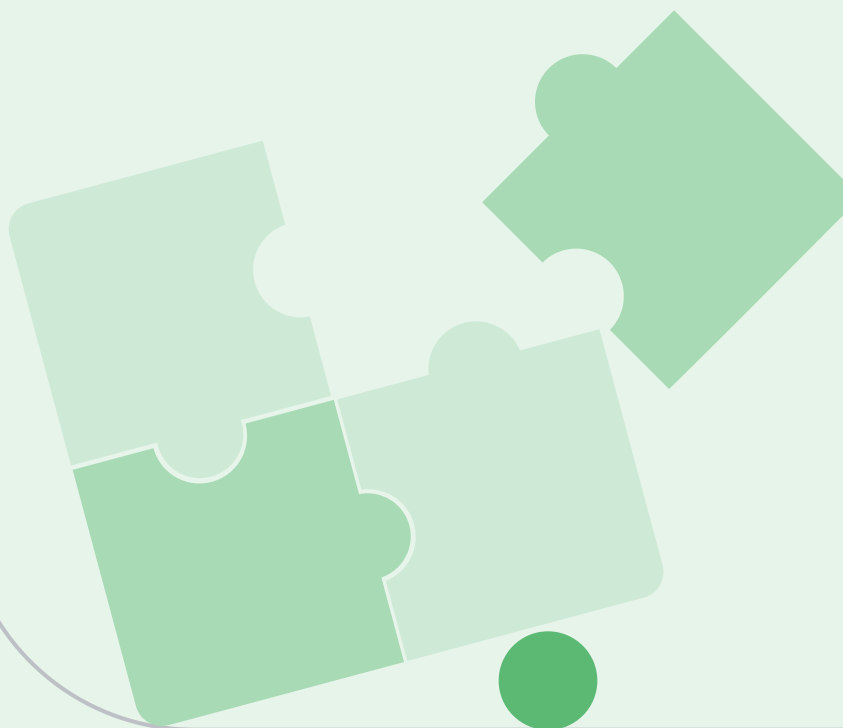


## Ideas in action | *South Korea*

# Re-evaluating and re-valuing vocational education

To help solve the skills mismatch between industry and education, in 2010, South Korea established its 'Meisters' (or 'master of crafts') vocational high school system. Each school is specialized around a fast growing industry such as new media, energy, machinery, banking, and telecommunications, and combines practical skills training at companies with theoretical lessons at school.

South Korea now has 52 designated 'Meisters' schools with an average employment rate of 90% for graduates.<sup>37</sup> Experts see these models — that modernize traditional vocation — as increasingly important to help close skills gaps.<sup>38</sup>





# The Google perspective

Change in the skill sets required for work

In the last decade, the workplace has undergone rapid transformation. Advancements in technology have enabled some sectors to go remote or work on a hybrid schedule; more work is now able to be automated; and pursuits that were once thought of as hobbies have emerged as viable careers. At Google, we're committed to helping teachers equip students with the skills they'll need to thrive in a new world of work.





CS First has reached

2M+

students and

70K+

teachers across over  
100 countries.

One area that we're focused on is helping to expand access to computer science (CS) education. CS helps build analytical and innovative thinking, problem-solving, critical thinking and creativity — skills that are crucial for thriving both today and in the future world of work. Yet lack of resources and competing educator priorities means that many students are not getting the CS education that they need. This is especially true for students in underrepresented groups and geographically remote regions.

Our [Code with Google](#) programs and products attempt to bridge this gap and help students from underrepresented groups develop the skills and confidence to become tech innovators. Through programs like [CS First](#), we offer an

introductory computer science curriculum that anyone can teach, no previous experience required. To date, CS First has reached 2M+ students and 70K+ teachers across over 100 countries. Through creating and sharing class projects, honing their storytelling skills and finding new ways to communicate their thoughts and ideas, students are empowered to showcase their creativity and problem solving abilities.

After seeing the positive impact CS First had on her own class, [one primary school teacher](#) decided to become a CS First trainer to show other teachers in her rural area of Ireland how to enrich learning with Computer Science (CS). Through an initiative from education charity Camara, she has trained more than 100 teachers.



Beyond the classroom, we connect students to CS education and career opportunities through community-based programs and philanthropy. Through these programs, students drive their own CS projects, such as designing and programming a robot or 3D printing an Android chess set ([Code Next](#)); serve in Google internships that give them a firsthand look at being a Google engineer ([Tech Exchange](#)); and gain exposure to Google engineers embedded at their college or university, to help them see what's possible after graduation ([Google in Residence](#)).

The impact is felt beyond the program. [One Code Next participant](#) found through his research that young students of color without financial resources don't have the same access to technology, computer science education and mentors who look like them. For his final project, he designed a program to expose middle school students in underrepresented communities to the field of technology through mentorship from diverse high school students who have participated in Code Next. By doing so, he helped younger students discover new pathways, grow their networks, and explore exciting future possibilities in tech.

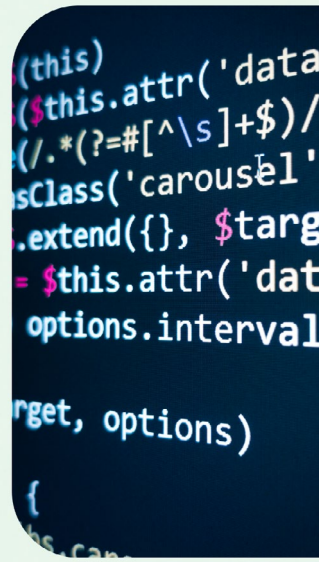
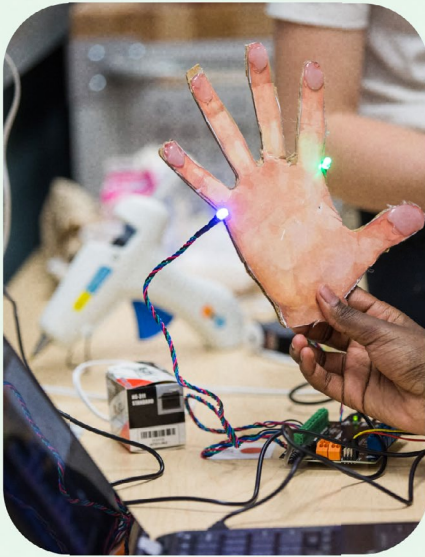
Our hope is that today's students will not just thrive in the future workplace — they will actively build it.



By helping students see what's possible when technology is deployed in creative and responsible ways, we help further innovation and imagination. Our hope is that today's students will not just thrive in the future workplace — they will actively build it.





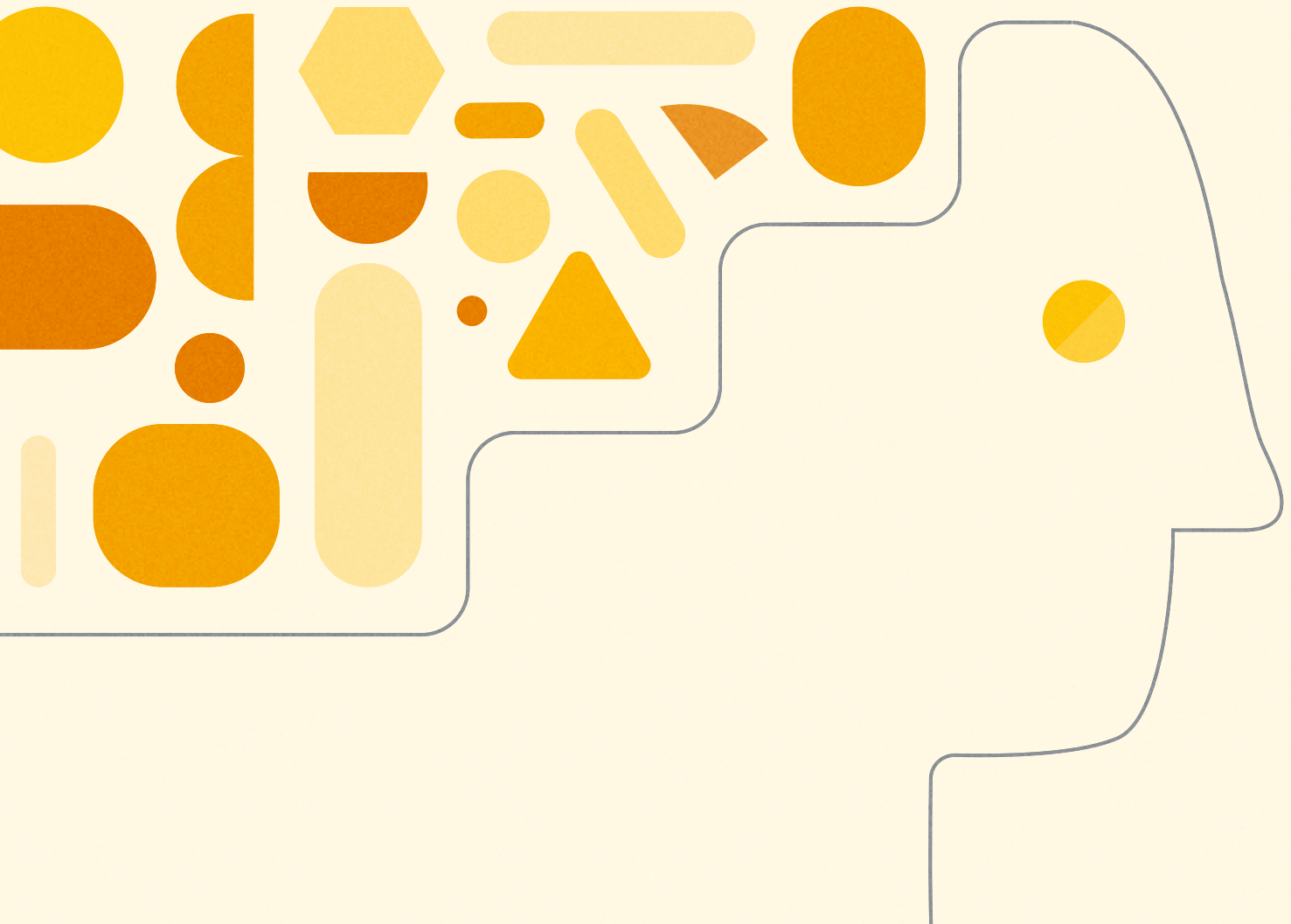




TREND

3

# Shift to a lifelong learning mindset



As lifespans increase and societal change accelerates, the idea of lifelong learning is gaining traction, **with more tools available for upskilling and advancement.**



# Why is a lifelong learning mindset important and what might it look like?

As people are living longer — in some countries as many as half of children born today will live to 100 — they are predicted to make multiple career moves over the course of their lifetime, some of which may require new skills and training.<sup>39</sup> Yet, formal education typically ends at adulthood.

For many experts we interviewed, the answer is lifelong learning: learning that takes place

across different contexts or environments beyond one's school years. The last two decades have seen firm endorsements from institutions such as the OECD, The World Bank and European Union, driven by a number of reasons: the changing nature of work requiring more frequent reskilling; a need to expand access to education for all; and the ambition to continually enrich everyday life.<sup>40</sup>



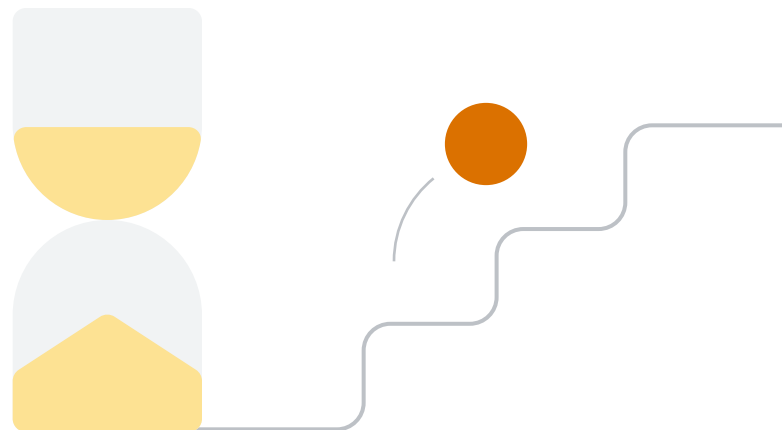
“ We learn in different ways, in different careers and in different spaces. It’s becoming more and more clear that people need to be able to access education throughout their lives. You’ve also got to develop that interest in learning and that ‘learning to learn’ ability in your students too.

**Martin Henry**  
research coordinator, Education International, Belgium

Lifelong learning is not a new concept, but it does require a shift in the collective mindset — from education as a one-off period of time, to education as an ongoing pursuit.<sup>41</sup> In addition, as lifelong learning is largely voluntary, a new learning culture must be cultivated, which instills ongoing motivation to learn.

Motivation will come from a need to remain competitive in the rapidly changing labor market through upskilling, but it will also be driven by passion and curiosity.<sup>42</sup> For education systems, this means encouraging a mindset that is ready to learn, unlearn and relearn beyond the scope of formal education.<sup>43</sup>

One example of what this could look like is The 60-year Curriculum, a concept which suggests a rethink of the fundamental design of post-secondary institutions, including the way courses are designed, how credentials are awarded and what type of learning is appropriate for different life stages.<sup>44</sup> It includes ideas such as “learning concierges,” who can provide adults with ongoing coaching and help people find opportunities to upskill, independent of any single institution or workplace.





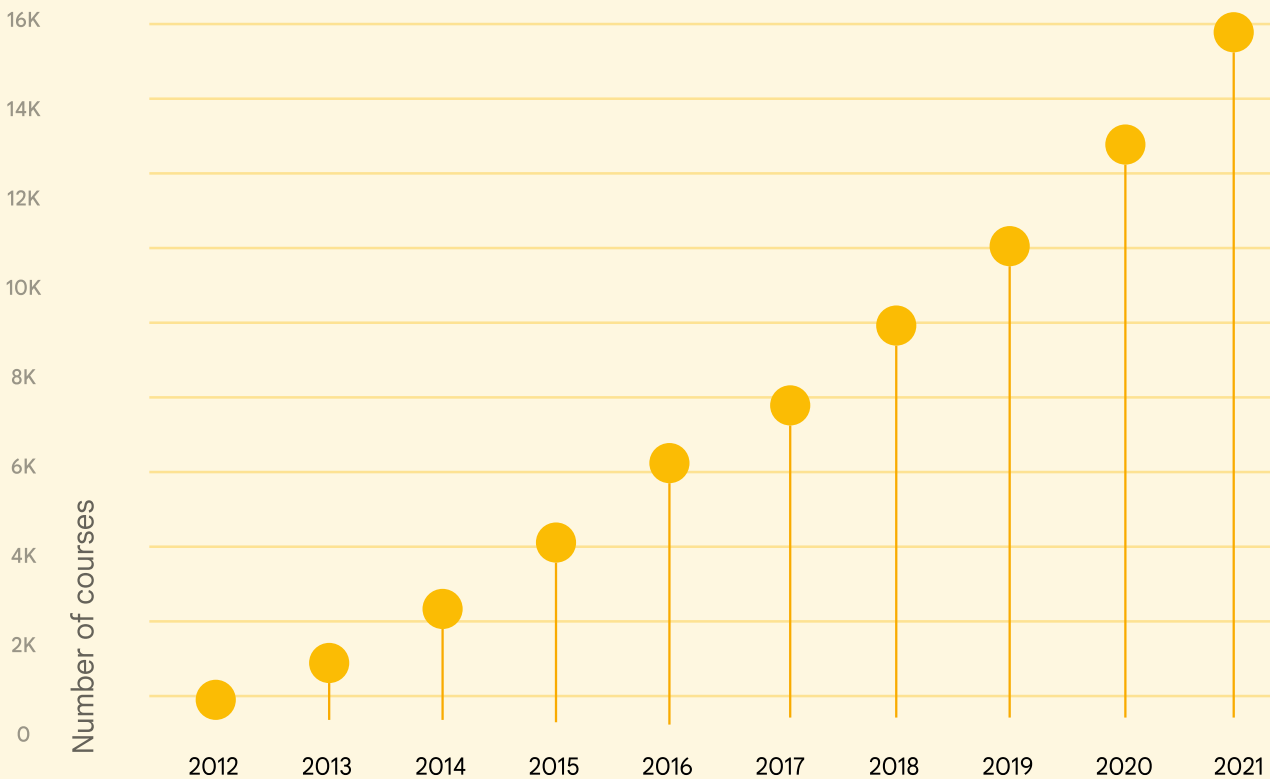
As education evolves to meet the challenges of a fast-changing and unpredictable world, lifelong learning will also be important for teachers, who will require quality professional development to keep pace with change. With half of educators and school leaders in OECD countries unable to pursue training opportunities because of busy schedules, the idea of accessible, timely, attainable lifelong learning and professional development remains an area of opportunity.<sup>45</sup>

The global e-learning industry is forecast to be worth \$1 trillion by 2028.

Innovation around lifelong learning is increasingly occurring outside traditional institutions, from short online courses via employers to MOOCs (massive open online courses), and digital certifications (e.g. new forms of 'microcredentials'), to YouTube.<sup>46</sup> In fact, 93% of users report using YouTube to gather information and knowledge.<sup>47</sup> In the future, this type of informal learning is expected to grow at a significant rate to help meet demand, with the global e-learning industry forecast to be worth \$1 trillion by 2028, up from \$315 billion in 2022, an annual growth rate of 20%.<sup>48</sup>



## Growth of MOOCs since 2012

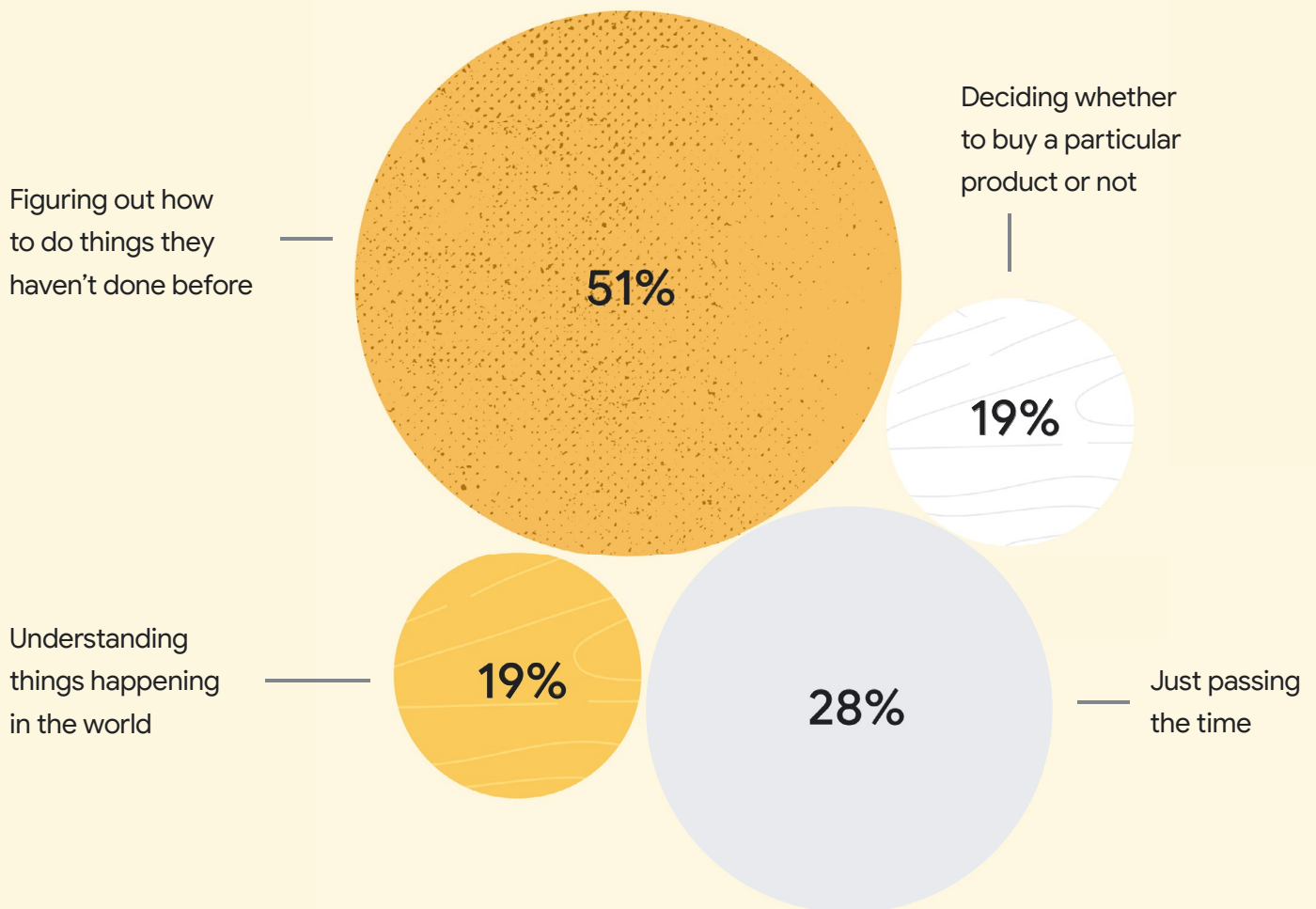


Source: Class Central, [“MOOCs in 2020”](#)

“ Professional development needs to be continuous throughout life. Every school needs to be seen as a learning community, and that includes teachers who should have a lifelong entitlement to professional developments. It is not about going away on a course and being trained in something, but having a much more personalized approach to their own learning needs as professionals — just as they do in the medical profession.

Valerie Hannon  
co-founder, Innovation Unit, United Kingdom

## YouTube as a tool for life-long learners



Over half of YouTube users say it's very important in helping them figure out how to do things they've never done before.



Source: Pew Research Center, "[Many Turn to YouTube for Children's Content, News, How-To Lessons](#)," 2018

## Which countries are in the OECD?

The Organisation for Economic Co-operation and Development (OECD) is an international organization that promotes policies to improve the economic and social well-being of people worldwide.

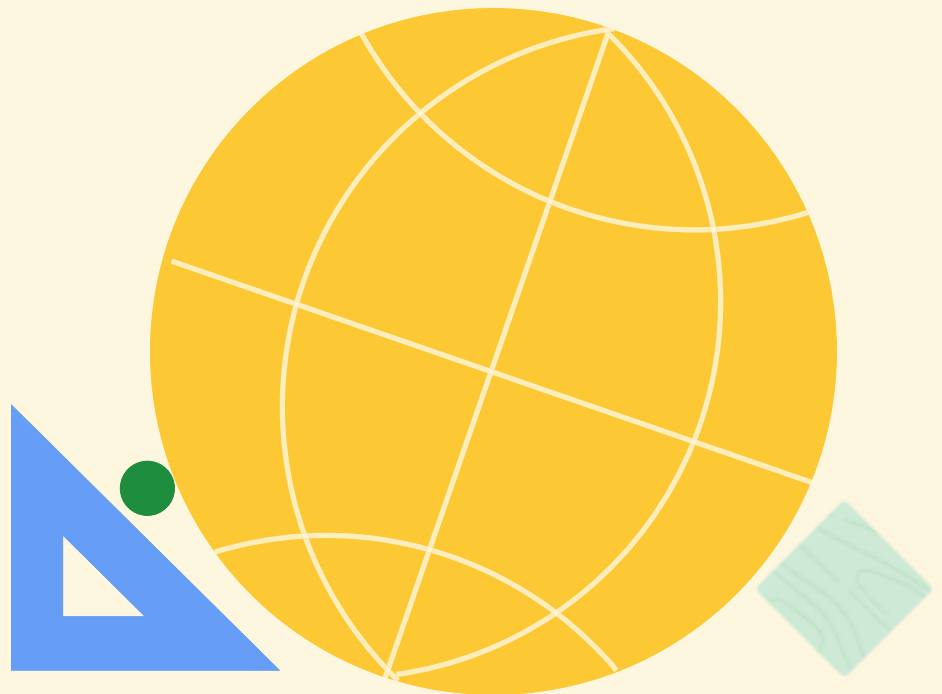
As of 2022, its 38 members are:

Austria  
Australia  
Belgium  
Canada  
Chile  
Colombia  
Costa Rica  
Czech Republic  
Denmark  
Estonia

Finland  
France  
Germany  
Greece  
Hungary  
Iceland  
Ireland  
Israel  
Italy  
Japan

Korea  
Latvia  
Lithuania  
Luxembourg  
Mexico  
The Netherlands  
New Zealand  
Norway  
Poland  
Portugal

Slovak Republic  
Slovenia  
Spain  
Sweden  
Switzerland  
Turkey  
United Kingdom  
United States





“

The knowledge world is no longer divided between specialists and generalists. A new group — let's call them 'versatilists' — has emerged. They apply depth of skill to a progressively widening scope of situations and experiences, gaining new competencies, building relationships and assuming new roles. They are capable not only of constantly adapting, but also constantly learning and growing in a fast-changing world.

**Andreas Schleicher**

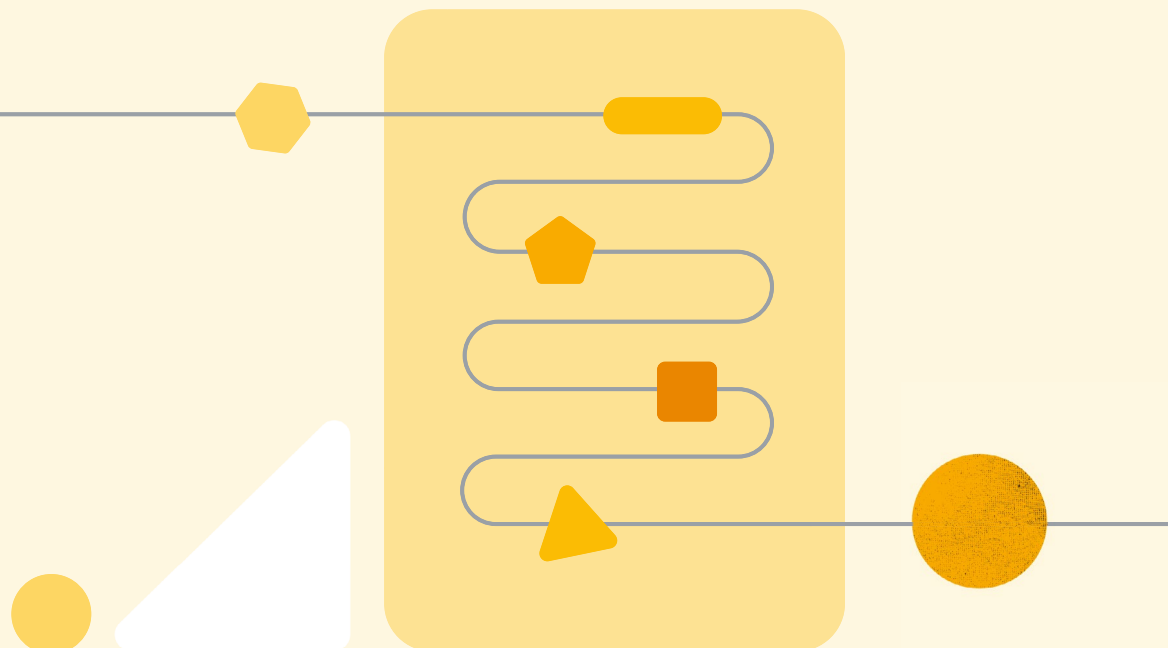
*director for education and skills, and special advisor on education policy to the secretary-general at the Organisation for Economic Co-operation and Development (OECD), Global*



Ideas in action | *United States*

## Tracking skills with digital portfolios

Microcredentials — new forms of modular and short-form learning experiences — are providing flexible ways for individuals to upskill. Given that microcredentials increasingly use digital instead of paper records, experts expect that in the future, every learner will be able to keep an accurate, easily verifiable, digital portfolio of all of their skills in one place to share with employers or other education institutions throughout their life. Exploring this possibility, The Digital Credentials Consortium, which includes representatives from leading universities around the world, is investigating how blockchain technology could be used to build such digital credential ‘portfolios’ for learners in the future.<sup>49</sup>

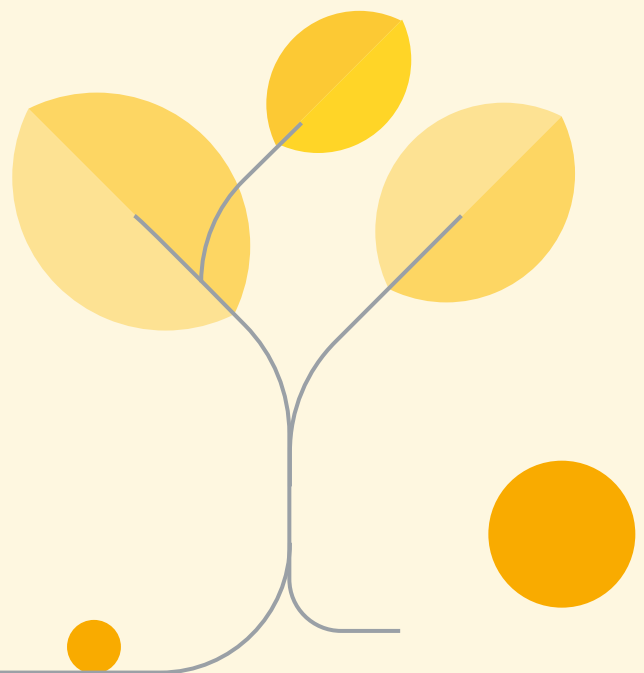




## Ideas in action | *United Kingdom*

# Expanding access to continuing education

Experts agree that continuous professional development is critical for professionals to remain effective, but resources and time are often lacking. Platforms such as Teach2030, led by the UK education charity Commonwealth Education Trust, gives teachers control over their professional development by offering bitesize, affordable and low-data professional development courses for teachers in challenging economic environments.<sup>50</sup> The courses can be accessed either individually or as part of a whole school's continuing professional development (CPD). More than 10,000 teachers from over 40 countries accessed Teach2030's courses in 2020 alone, with nearly 50% from sub-Saharan Africa.<sup>51</sup>





## Ideas in action | *United Kingdom*

# Building passion for learning

Building a passion for learning starts with learning environments that promote autonomy.<sup>52</sup> In fact, studies show that students following the Montessori educational approach, which encourages autonomy and self-determination, show higher levels of intrinsic motivation for learning and achievement in academic work than students following traditional educational approaches.<sup>53</sup> This provides new opportunities to boost motivation in the classroom — for example, schools such as Atelier 21 in the UK have adopted Montessori materials in English and math classes due to their intuitive and self-correcting properties, promoting autonomy and resourcefulness among their students.<sup>54</sup>







# The Google perspective

## Shift to a lifelong learning mindset

While formal education may have an end date, learning never stops. Given the rapid pace of technological and societal change ahead of us, this idea of ongoing, lifelong learning will become especially important. At Google, we believe that lifelong learning should be both acceptable and accessible. We also believe that lifelong learning looks different from one moment to the next: whether a person is seeking answers to a question via [Search](#), exploring learning content on [YouTube](#), upskilling for a new role or pursuing a new field of work. Our goal is to help people with their next step, wherever they are at.





As professions change over time, lifelong learning becomes especially important, as does having a supportive community. For example, as the role of educator evolves — which we'll share more about in the next installment of this research —

it's more important than ever that educators are able to access professional development opportunities and connect and share with a broader community.

It's why we developed our [Teacher Center](#), to support lifelong learning for educators with free of charge technology training and resources. With Google product tips, certification options and professional development programs, educators can gain the professional and product expertise that they need to help elevate both their classrooms and careers.

Over the years, we've been delighted to hear about the ways that teachers are deploying technology in their classrooms: inspiring their students to gather research and lead public awareness campaigns; encouraging students to create content; helping students gain greater self-awareness and hone their public speaking skills, and these are just a few examples. To help educators share these ideas and learn from each other, [Google Educator Groups \(GEGs\)](#) provide teachers with a forum to connect, collaborate, and discuss how they can best use technology for positive impact. In Chicago, GEG Leaders held a "Lesson Plan Jam" that provided local educators with an opportunity to collaboratively create easy-to-implement technology strategies for their classrooms. Google educators around the globe even founded their own virtual Global GEG, and have created such offerings as a parent series called "Google Guardians" and support webinars.



We believe in supporting lifelong learners as they embark on new career paths, regardless of previous experience. As testament to this, in 2017, we launched Grow with Google, to help all Americans access skills, career and business training. Since then, we've learned that when we work together with public-sector institutions and nonprofit partners, we can accomplish more together. Our Google Career Certificates program is one example of this. To date, seventy thousand Americans have completed these certificates, designed to put people on the fast track to jobs in high-growth fields like data analytics, IT support, project management and user experience design. People have used these certificates to do everything from changing their career path, to taking control of their future. Our \$100M Google Career Certificates Fund will enable Social Finance to help nonprofits like Merit America, and Year Up offer career support, job placement, and stipends to help drive \$1B in aggregate wage gains and provide career advancement for more than twenty thousand American workers.

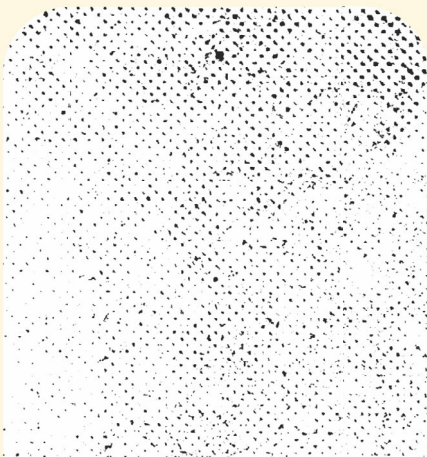
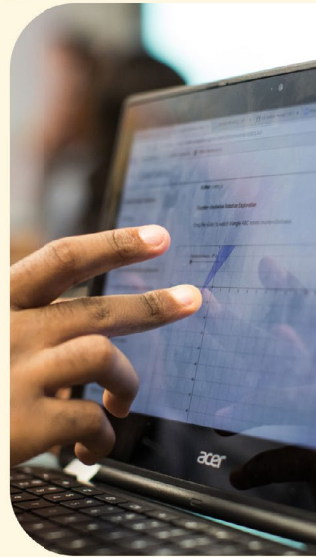
We believe  
in supporting  
lifelong learners  
as they embark  
on new career  
paths, regardless  
of previous  
experience.

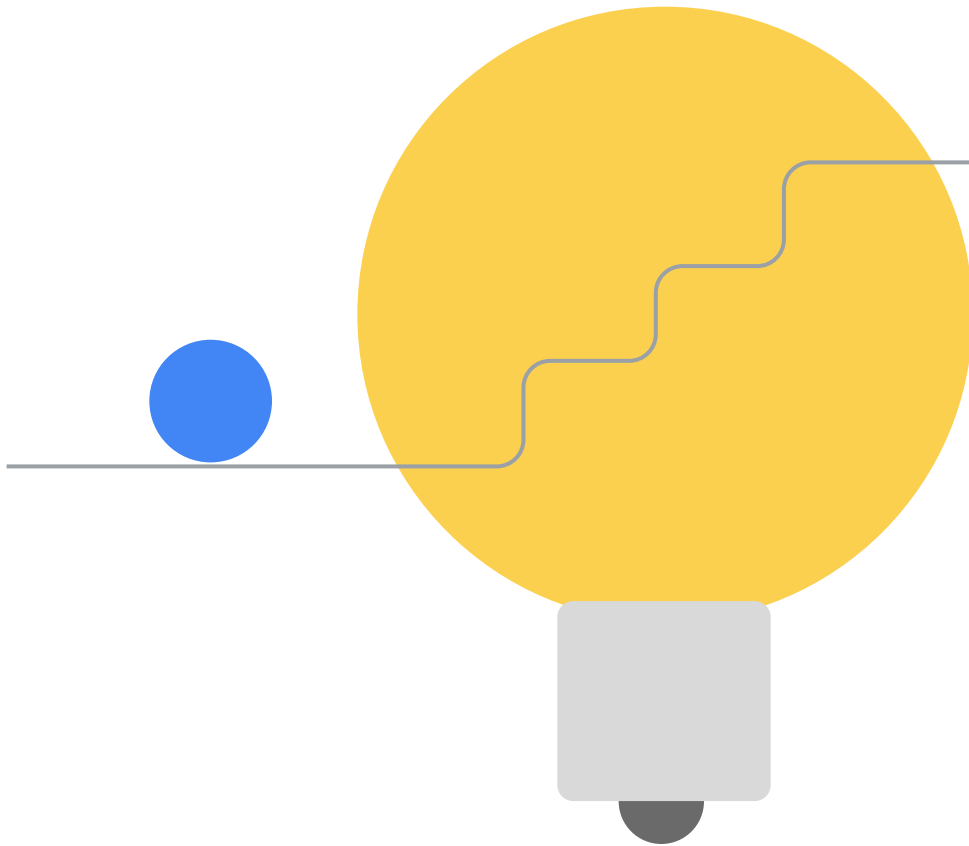




By giving students and learners of all ages access to all of the world's information, technology allows people to follow their passion, explore new interests and gain new skill sets. We hope to cultivate a society where people have the tools, resources and support that they need to pursue their personal potential — wherever they are in their learning journey.







Visit [learning.google](https://learning.google)  
to learn more about our goal to  
help everyone in the world learn  
anything in the world.

# Glossary

## Artificial intelligence

A set of technologies that enable computers to perform a variety of advanced functions.<sup>55</sup>

## Automation

The use of machines and computers that can operate without needing human control.<sup>56</sup>

## Continuing professional development (CPD)

The ongoing process of developing, maintaining and documenting professional skills.<sup>57</sup>

## Digital citizenship

The ability to engage competently and positively with digital technologies and participate actively and responsibly in communities.<sup>58</sup>

## E-learning

Learning conducted via electronic media, typically on the internet.<sup>59</sup>

## Global citizenship

An umbrella term for the actions of globally minded individuals and communities on a worldwide scale.<sup>60</sup>

## Lifelong learning

All purposeful learning activity undertaken throughout life with the aim of improving knowledge, skills and competencies within a personal, civic, social and/or work context.<sup>61</sup>

## Microcredential

A way to certify the learning outcomes of short-term learning experiences, for example a short course or training.<sup>62</sup>

## Montessori method

A system of education for children that seeks to develop natural interests and activities rather than use formal teaching methods.<sup>63</sup>

## MOOCs (massive open online courses)

A course of study made available over the internet without charge to a very large number of people.<sup>64</sup>

## The OECD (The Organisation for Economic Co-operation and Development)

An intergovernmental organization with 38 member countries focused on stimulating economic progress.<sup>65</sup>

## Reskilling

Learning a new set of skills in order to perform a different job.<sup>66</sup>

## Social and emotional competencies

An umbrella term for the specific skills and dispositions learned through social and emotional learning.<sup>67</sup>

## Social and emotional learning (SEL)

An educational method that aims to foster social and emotional competencies within school curricula.<sup>68</sup>

## The 60-year Curriculum

A perspective oriented toward continuing education and centered on six decades of employment, requiring a lifetime of learning in the context of repeated occupational change and transition.<sup>69</sup>

## Upskilling

The process of improving skills.<sup>70</sup>



# Our research approach

It is Google's goal to help learners develop the knowledge, mindsets, skill sets, and tool sets necessary to thrive in a transforming world and actively co-construct a flourishing, diverse and equitable society.

Supporting this ambition, in collaboration with our research partner Canvas8, we conducted a global study to better understand the emerging shape of tomorrow's education ecosystem.

## Methodology

### Our study took us around the world, including

- 94 in-depth expert interviews with global and country-specific thought leaders in education, including experts in policy, academic researchers covering education, district-level representatives, school principals and teachers and ed tech leaders.
- Academic literature review focusing on the last two years of peer-reviewed publications, and desk research and media narrative analysis<sup>‡</sup> across the education sector, including policy research and teacher surveys.

### Macro questions we asked

- How do we expect education to evolve over the next 5-10 years?
- What are the implications of macro trends on education and schools?
- What are the emerging education technology trends in each market?

### Our process

- Interviews were conducted with a panel of international experts to identify the forces shaping the education landscape.
- The interview transcripts were coded to create initial hypotheses which informed a discussion guide for local market interviews.
- Local market interviews were coded by local contributors to identify the most prevalent themes across markets.
- Workshops with experts and consultants helped refine the articulation and organization of the themes.
- Finally, desk research was conducted to elaborate the themes, providing additional theory and context for the readers.

Interviews were conducted between March 2022 and July 2022.

### Countries included in the study

Austria, Australia, Belgium, Brazil, Canada, Denmark, Finland, France, Germany, India, Indonesia, Italy, Ireland, Japan, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, the United Kingdom and the United States of America. The central focus was primary and secondary education (K-12), with acknowledgement to how the trends are also impacting post-secondary education.

### Research partner and advisor

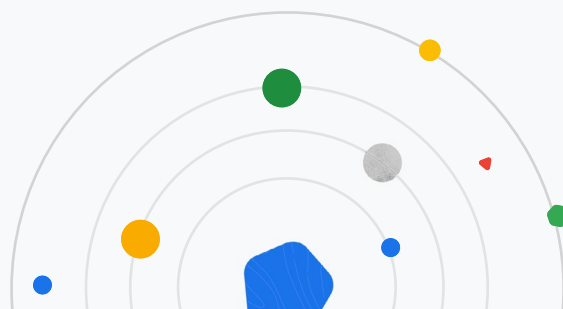
Canvas8 ([www.canvas8.com](http://www.canvas8.com)) is an award-winning strategic insights practice operating out of London, LA, New York and Singapore. Its focus is on enabling organizations to be better, by understanding changes in human culture and behavior.

Global nonprofit American Institutes for Research (AIR) ([www.air.org](http://www.air.org)) served as an advisor and consultant to this research. Founded in 1946, AIR is one of the largest behavioral and social science research and evaluation organizations in the world. Its mission is to generate and use rigorous evidence that contributes to a better, more equitable world.

## Limitations

This work is not intended to be a definitive or comprehensive view of the future of education. It aims to bring together a range of expert perspectives from around the world, and across the education ecosystem, to provide a picture of some of the key trends that will be shaping the future, especially when considering the role of technology. The views and opinions expressed in this report are those of the experts and do not necessarily reflect the views or positions of any entities, institutions or organizations they represent. This report is intended to provide a global view of trends that are relevant across 24 countries. It also acknowledges that each country is different and that there are significant variations within markets. By taking a big picture view, we aim to help educators identify common challenges, ideas and opportunities around the world.

<sup>‡</sup> Using media intelligence platform NetBase Quid ([www.netbasequid.com](http://www.netbasequid.com)), we conducted a "future of education" keyword search across global English-language media sources, covering the five-year period from December 2016 - December 2021. This surfaced important events and topics, which fed into the global analysis.





# References

- 1 PISA in Focus, "Collaborative problem solving," 2017
- 2 UNESCO, "Reimagining our futures together: A new social contract for education," 2021
- 3 Organisation for Economic Co-operation and Development (OECD) Better Life Index, "Civic engagement," 2022; The Conversation, "Global voter turnout has been in decline since the 1960s – we wanted to find out why," 2021; The OECD uses 'voter turnout' as a reliable indicator of civic engagement. A longitudinal study using data across 20 democracies between 1945-2017 found that voter turnout has been in long-term decline since the 1960s
- 4 Barrett and Pachi, "Youth Civic and Political, Engagement," 2019; 'Youth denotes the period of life that starts with early adolescence and extends through into early adulthood
- 5 Barrett and Pachi, "Youth Civic and Political, Engagement," 2019
- 6 The Brookings Institution, "The need for civic education in 21st-century schools," 2020
- 7 UNICEF, "Digital civic engagement by young people," 2020
- 8 Hundred, "Reap Benefit," 2021
- 9 UNESCO, "More Than One-Half of Children and Adolescents Are Not Learning Worldwide," 2017
- 10 Applied Developmental Science, "Implications for educational practice of the science of learning and development," 2020
- 11 Applied Developmental Science, "Implications for educational practice of the science of learning and development," 2020
- 12 Ripple Effects, "Impacts," Accessed: 2022
- 13 Heching Report, "Techniques and technologies that can level the playing field," 2019
- 14 OECD, "Future of Education and Skills 2030," 2019
- 15 Canadian Education Alliance (CEA)'s EdCan, "EdCan," Accessed: 2022
- 16 CEA's Edcan, "A Whole-School Approach to Teaching the UN Sustainable Development Goals," 2021
- 17 Learning Planet Institute, "Learning Planet Institute," Accessed: 2022; Les Savanturiers, "Education through research training," 2022
- 18 United Nations Environmental Program (UNEP), "Why bees are essential to people and planet," 2022
- 19 Nesta, "Challenge-driven universities to solve global problems," 2016
- 20 Cambridge Journal of Education, "Establishing systemic social and emotional learning approaches in schools: a framework for schoolwide implementation," 2016
- 21 Dream a Dream and The Brookings Institution, "Development of student and teacher measures of Happiness Curriculum factors," 2020
- 22 Teach for All, "Teach For All Network Teachers are Building the 'Empathy Generation' Around the World," 2020
- 23 Journal of Physics, "The Role Of Vocational Education In The Era Of Industrial Automation," 2019
- 24 World Economic Forum, "The Future of Jobs Report," 2020
- 25 The Economist, "A study finds nearly half of jobs are vulnerable to automation," 2018
- 26 OECD and International Labor Office, "Approaches to anticipating skills for the future of work," 2018
- 27 International Labor Office, Geneva, "Anticipating and matching skills and jobs," 2015
- 28 World Economic Forum, "The Future of Jobs Report," 2020
- 29 Boston Consulting Group (BCG) "Fixing the Global Skills Mismatch," 2020; ManpowerGroup "Employment outlook survey," 2022
- 30 Venture Beat, "Why AI can't solve unknown problems," 2021
- 31 The Economist, "Driving the skills agenda: Preparing students for the future," 2015

- 32 OECD, ["I am the Future of Work - Getting ready,"](#) 2022
- 33 Education and Employers, ["Drawing the Future: Exploring the career aspirations of primary school children from around the world,"](#) 2018
- 34 European Commission, ["JobTech Development,"](#) 2021
- 35 European Commission, ["JobTech Development,"](#) 2021
- 36 The Careers and Enterprise Company, ["Trends in Careers Education,"](#) 2021
- 37 Krivet, ["Meister high school system in Korea 2020,"](#) 2020
- 38 Forbes, ["Meister Of Korean School Reform: A Conversation With Lee Ju-Ho,"](#) 2014
- 39 Lynda Gratton and Andrew J. Scott, ["The 100-Year Life: Living and Working in an Age of Longevity,"](#) 2020; RSA Journal, ["Learn, unlearn, relearn,"](#) 2022
- 40 International Review of Education, ["Learning for life, for work, and for its own sake: the value \(and values\) of lifelong learning,"](#) 2017
- 41 International Journal of Early Years Education, ["Good teachers are always learning,"](#) 2021
- 42 International Review of Education, ["Learning for life, for work, and for its own sake: the value \(and values\) of lifelong learning,"](#) 2017
- 43 RSA Journal, ["Learn, unlearn, relearn,"](#) 2022
- 44 Christopher J. Dede, John Richards, ["The 60-Year Curriculum : New Models for Lifelong Learning in the Digital Economy,"](#) 2020
- 45 OECD, ["TALIS 2018 Results \(Volume I\) | Teachers and School Leaders as Lifelong Learners,"](#) 2018
- 46 World Bank Group, ["Lifelong Learning,"](#) 2018
- 47 YouTube, ["2022 YouTube Impact Report,"](#) 2022
- 48 Global Market Insights, ["E-Learning Market Trends,"](#) 2022
- 49 MIT, ["Building the digital credential infrastructure for the future,"](#) 2020
- 50 Teach2030, ["Teach2030,"](#) 2022
- 51 Hundred, ["Teach2030,"](#) 2022
- 52 Frontiers in Education, ["The Importance of Autonomous, Self-Regulated Learning in Primary Initial Teacher Training,"](#) 2019
- 53 American Journal of Education, ["Middle School Students' Motivation and Quality of Experience: A Comparison of Montessori and Traditional School Environments,"](#) 2005
- 54 Atelier 21 School, ["Our Revolutionary Approach,"](#) Accessed: 2022
- 55 Google Cloud, ["What is Artificial Intelligence \(AI\)?,"](#) Accessed: 2022
- 56 Cambridge English Dictionary, ["Automation,"](#) Accessed: 2022
- 57 The CPD Certification Service, ["What is Continuing Professional Development \(CPD\)?,"](#) Accessed: 2022
- 58 Adapted from Council of Europe's ["Digital Citizenship Education,"](#) Accessed: 2022
- 59 Oxford Reference, ["Oxford Reference,"](#) Accessed: 2022
- 60 United Nations, ["Global Citizenship,"](#) Accessed: 2022
- 61 UNESCO, ["Lifelong Learning,"](#) Accessed: 2022
- 62 European Commission, ["A European approach to micro-credentials,"](#) Accessed: 2022
- 63 Oxford Reference, ["Montessori,"](#) Accessed: 2022
- 64 Oxford Learner's Dictionary, ["MOOC,"](#) Accessed: 2022
- 65 OECD, ["About the OECD,"](#) Accessed: 2022
- 66 Cambridge English Dictionary, ["Reskilling,"](#) Accessed: 2022
- 67 Review of Research in Education, ["Advancing the Science and Practice of Social and Emotional Learning: Looking Back and Moving Forward,"](#) 2016
- 68 Review of Research in Education, ["Advancing the Science and Practice of Social and Emotional Learning: Looking Back and Moving Forward,"](#) 2016
- 69 Christopher J. Dede, John Richards. ["The 60-Year Curriculum : New Models for Lifelong Learning in the Digital Economy,"](#) 2020
- 70 Cambridge English Dictionary, ["Upskilling,"](#) Accessed: 2022





## ABOUT GOOGLE FOR EDUCATION

# Products that power education

Google for Education tools work together to transform teaching and learning so every student and educator can pursue their personal potential.



## Google Workspace for Education

Make collaboration easier, streamline instruction, and keep your learning environment secure with Google Workspace for Education. You can select from tools available without cost, or add enhanced capabilities to suit the needs of your institution.

[Learn more →](#)



## Google Classroom

Google Classroom is your all-in-one place for teaching and learning. Our easy-to-use and secure tool helps educators manage, measure, and enrich learning experiences.

[Learn more →](#)

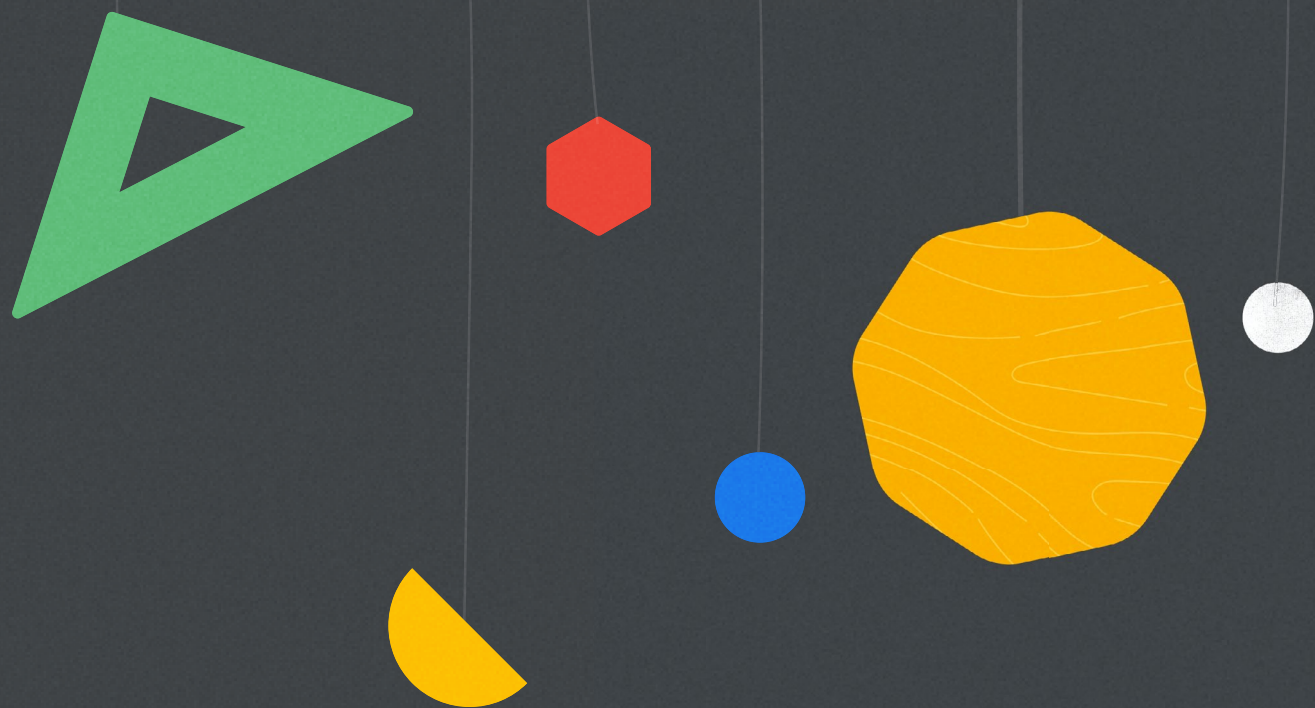


## Google Chromebooks

A range of simple yet powerful devices with built-in accessibility and security features to deepen classroom connections and keep user information safe.

[Learn more →](#)





Google for Education

Learn more at [edu.google.com](https://edu.google.com).