

Advocacy brief

October 2023

Teachers and technology

The *Global Education Monitoring Report* and Education International have developed an advocacy brief for teachers based on the 2023 GEM Report, *Technology in education: A tool on whose terms?* This advocacy brief has two objectives. On one hand, it aims to highlight some of the main findings of the 2023 GEM Report for teachers; on the other, it aims to provide recommendations for teachers and education support personnel to ensure that the use of technology in education keeps learners and teachers at the centre. In partnering with Education International, the *Global Education Monitoring Report* hopes to ensure that the decisions on the use of technology in education are on the terms of the 32 million teachers and education support personnel from around the world and that technology does not supplant but rather complements human interaction in education.

Technology in education should put learners and teachers at the centre.

In considering the adoption of digital technology, education systems should always ensure that learners' best interests are placed at the centre of a framework based on rights. The focus should be on learning outcomes, not digital inputs. To help improve learning, digital technology should not replace but instead complement face-to-face interaction with teachers.

The 2023 *Global Education Monitoring Report* tries to avoid an overly technology-centred view or the claim that technology is neutral. It also offers a reminder that, as much technology was not designed for education, its suitability and value need to be proven in relation to a human-centred vision of education. This report's basic premise is that technology should serve people and that technology in education should put learners and teachers at the centre.

Current discussions around education technology centre around technology, not education. It has been generally assumed that whatever efficiency advantage education technology offers in the short term will continue in the long term, yet not all change constitutes progress. It need not be advanced to be effective and just because something can be done does not mean it should be done. Too much attention on technology in education usually comes at a high cost.

“ For education international and our 32 million teachers and education support personnel, Ed #TechOnOur terms means teachers are the prime decision makers in what technology is used and how. Equity and human rights must be at the center. Not corporate profit making.
Susan Hopgood, President, Education International ”

Resources spent on technology, rather than on classrooms, teachers and textbooks for all children in low- and lower-middle-income countries lacking access to these resources, are likely to lead to the world being further away from achieving the global education goal, SDG 4.

Change needs to happen on learners' terms to avoid repeating a scenario like the one observed during the COVID-19 pandemic, when an explosion of distance learning left hundreds of millions behind, partly because teachers, like students, had no access to connected devices. Technology created for other uses cannot necessarily be expected to be appropriate in all education settings for all learners. Nor can regulations drawn up outside the education sector necessarily be expected to cover all of education's needs. What this report calls for in this debate is a clear vision – as the world considers what is best for children's learning, especially in the case of the most marginalized.

Any potential that technology has will not be realized unless teachers are prepared to use it

Technology-based practices and resources are changing the teaching profession.

- Currently, technology appears in multiple forms in education. It is an input, a means of delivery, a skill and a planning tool, and provides a social and cultural context, all of which raise questions and issues.
- The COVID disruption increased the working hours and learning needs of teachers who worked remotely, as well as the expectations on them, but training responses have been uneven.
- Teachers not only impart knowledge and instruction, but also socialize students and act as motivational role models, which technology alone cannot do. They also encourage critical thinking and autonomy in students. Teacher development in and through technology should recognize and enable teachers to act as creators, designers and facilitators, particularly in relation to the appropriate choice of technology to respond to the diversity of learners' needs and contexts.
- The fact that technology has the potential to support education systems does not necessarily mean that teaching processes and practices have been substantially transformed. Altering pedagogical practices in fundamental ways exerts pressure on teachers, staff, students, parents and caregivers who may be unprepared to deal with them or may disagree with the consequences.

Various barriers prevent teachers from making the most of what technology has to offer.

Access

- Many teachers face a lack of access to digital devices to teach with. More than half of teachers reported in the T4 survey that inadequate online access had hampered schools' ability to provide quality education. Two in five teachers said they needed to bring their own digital devices to school to compensate for the lack of classroom resources.

- Technology increases access to materials and resources mostly for those who already have them. Even among those who have the infrastructure to access digital educational content, those most likely to do so continue to be the most privileged groups, reflecting existing education and skills inequalities. Users from rich countries are considerably overrepresented in the use of open access resources online.

Training

- Some teachers are hesitant or lack confidence in using technology. Lower secondary school teachers who took part in the 2018 Teaching and Learning International Survey reported that ICT was their second highest training priority. Even after training, only 43% felt prepared to use technology for teaching.
- Age is believed to negatively affect teachers' technology skills but research with teachers in 17 countries showed that resistance to technology was related more to preparation than to age. While novice and younger teachers generally know how to use technology, they often have difficulties in integrating it thoughtfully into their teaching practice.
- Along with age, gender is also sometimes believed to have an impact on ICT skills, as there is the stereotype that female teachers may be less comfortable using technology. However, gender differences are generally neither significant nor consistent across different contexts, at least in upper-middle and high-income countries.
- When schools and teachers are provided with equipment, teachers must be supported to use them effectively, schools often purchase expensive software licences but do not invest in teacher training programmes.
- Specialized devices using assistive technology require specialized training, which is often lacking.
- Training must be continuously evaluated and responsive to teacher needs. Analysis of countries' policies, plans, strategies and laws on teacher education, as reflected in the Profiles Enhancing Education Reviews (PEER) profiles, shows that key areas are sometimes overlooked: for example, only 21% of countries mention online safety as part of training in these documents.
- Training must be sustainable, a difficult task given the rapid changes that make programmes obsolete.



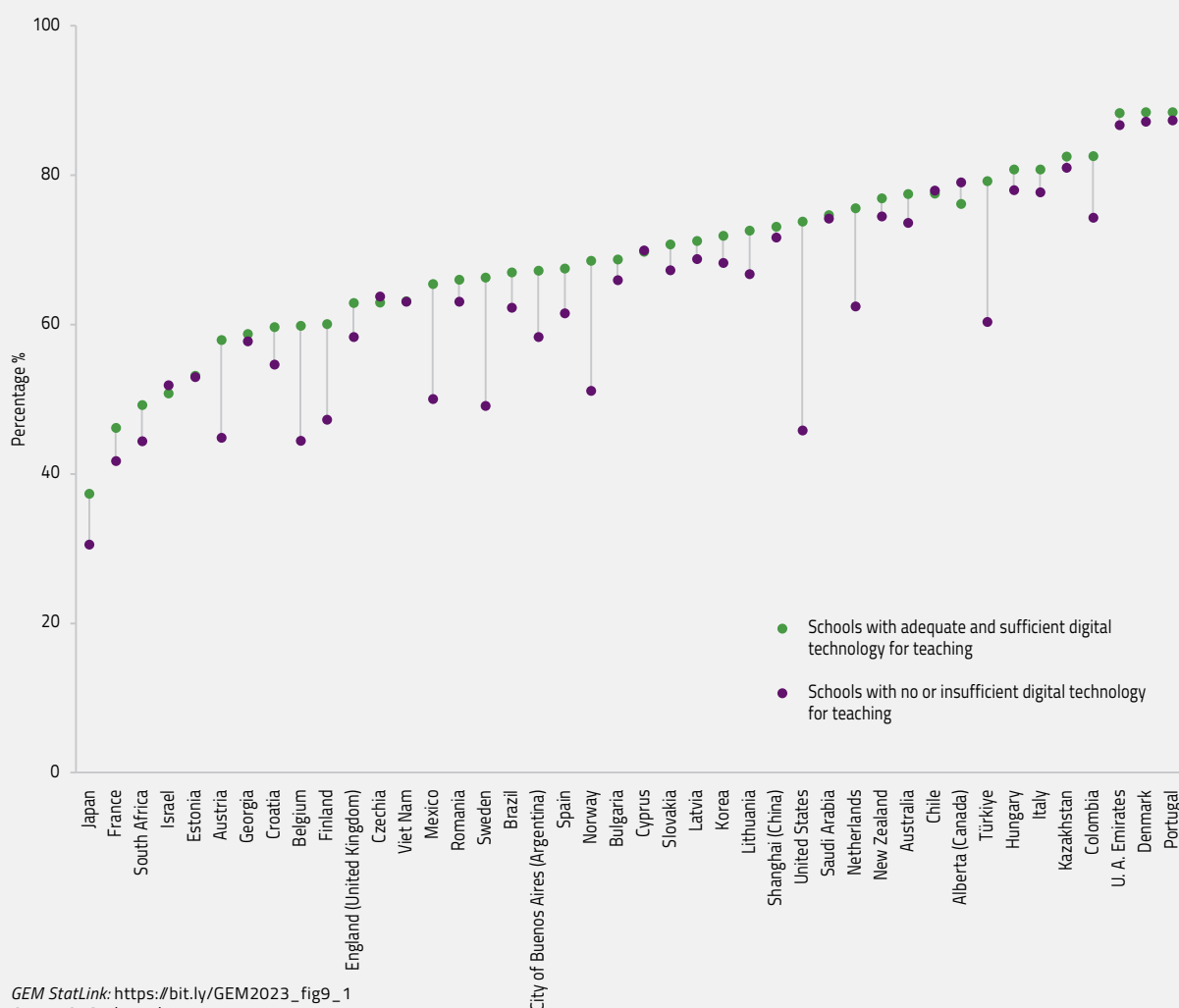
Technology is changing teacher training.

- Technology can make training opportunities more accessible, overcoming location and time barriers. Distance education programmes have been found to promote teacher learning in mathematics in South Africa and even to equal the impact of in-person training in Ghana.
- Teachers can use technology to learn from each other. About 80% of more than 1,500 teachers surveyed in the Caribbean belong to professional WhatsApp groups and 44% use WhatsApp and similar messaging applications to collaborate at least once a week.
- Technology can facilitate coach and mentor involvement. In Kenya, the Teachers for Teachers initiative in Kakuma refugee camp led by Teachers College Columbia University uses real-time reporting through text messages and email, classroom observations and summaries to organize training and mentoring for teachers.
- Technology can help teachers engage in collaborative online learning, particularly for teachers in emergency settings. A review of practitioners in emergency settings found that virtual communities of practice were seen as a form of continuous professional development: more than half believed their participation had fostered a sense of community and improved their confidence and well-being.

FIGURE 1:

Teachers feel that their teaching is hampered by the lack of digital technology

Percentage of teachers who feel they can support student learning through the use of digital technology 'quite a bit' or 'a lot', by availability of digital technology for instruction, selected education systems, 2018



GEM StatLink: https://bit.ly/GEM2023_fig9_1
Source: OECD (2018).

Many education actors are required to support teacher professional development in ICT.

- Head teachers are generally responsible for setting conditions for ICT integration into schools. But according to the 2018 International Computer and Information Literacy Study, only some 40% of students attended schools whose head teachers considered it a priority to encourage teachers to integrate ICT into their teaching.

“ Teachers need a technology coach in every building - someone who can help them integrate, who can model.
Ann Todd Leftwich, Indiana University, United States ”

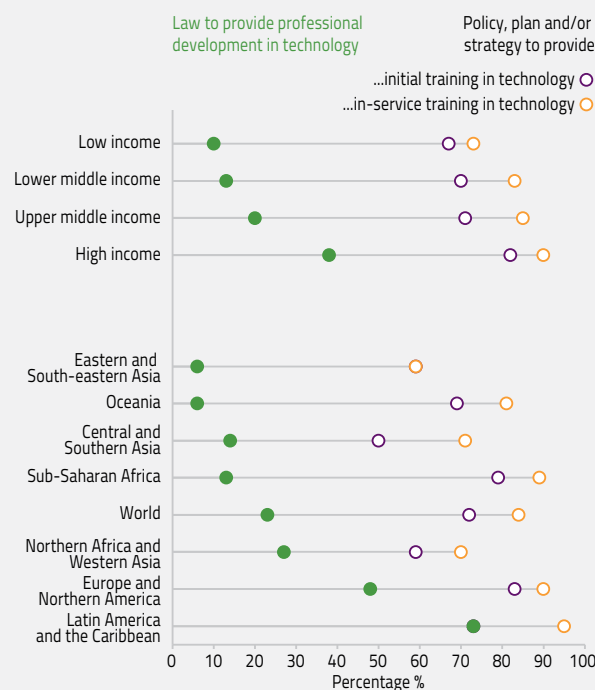
- Teacher unions also advocate for policies that support teachers working conditions with technology. For example, through social dialogue with their government and within their agreed collective agreement, the Confederation of Education Workers of the Argentine Republic, has secured the right to disconnect for teachers.
- Analysis of PEER profiles shows that only one quarter of education systems have legislation to ensure teacher training in technology, through initial or in-service training. Of these, some make such training mandatory in their legislation, or even define it as a teacher’s right.
- Education systems are taking steps to define professional development needs, ICT standards are an important step. Around half of countries have ICT standards for teachers and about one fifth of those countries have specified or readjusted them since the COVID-19 pandemic.

“ If we really want to capitalise on the benefits of technology for learning, we need proper pre- and in-service training.

Nunci Mulcahy O’Mahony, teacher, Ireland ”

FIGURE 2:
One in four countries has a law and three in four countries have a policy, plan or strategy on teacher training in technology

Percentage of countries that have laws and policies, plans or strategies to provide teacher education in technology, by region, and income level, 2022



GEM StatLink: https://bit.ly/GEM2023_fig9_4
 Source: GEM Report team based on PEER.



Teaching about technology is hindered by the global teacher shortage.

- Among teaching specialties, the science, technology, engineering and mathematics (STEM) subjects face some of the greatest staffing shortfalls in many countries.
- Turnover rates in STEM are consistently the highest, including compared to other shortage subjects such as special education or English as a second language. In rural areas, STEM teachers rarely stay in a teaching position for more than five years.
- STEM graduates often enjoy many alternatives to teaching. The average pay gap for mathematics and science graduates between teaching and non-

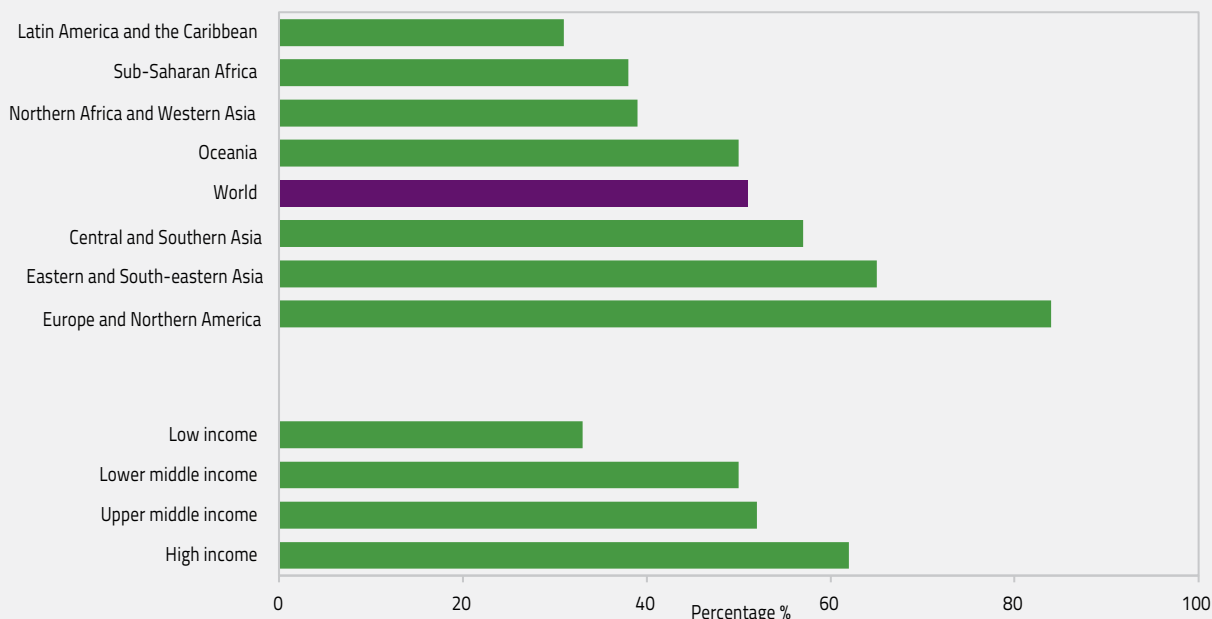
teaching careers is higher than for other subjects, and STEM students may further overestimate this gap and the financial disadvantage of becoming teachers.

- Where there is scarcity, there is inequity. The shortage of STEM teachers brings heightened challenges of diversity and equitable provision. In the US state of California, three quarters of secondary STEM students are non-white, but only one quarter of secondary STEM classes are taught by a non-white teacher. STEM teachers are not distributed equally across schools. STEM teachers are missing from schools that are already disadvantaged, further aggravating inequality.

FIGURE 3:

About half of countries have identified ICT standards for teachers

Percentage of countries with ICT standards for teachers, by region and income level, 2022



GEM StatLink: https://bit.ly/GEM2023_fig9_2
 Source: GEM Report team based on PEER.

Technology can support the facilitation of teaching and learning processes but requires further research, contextualization, consultation with teachers, and integrated support.

There is a lack of evidence on the positive long-term impact of technology on student learning, leaving teachers in the dark.

- Technology evolves faster than it is possible to evaluate it: Education technology products change every 36 months, on average. In brief, while there is much general research on education technology, the amount of research into specific applications and contexts is insufficient.
- Evaluations of what works are limited in geographical, subject and durational scope, and can often obscure the role of various pedagogical factors in influencing outcomes, therefore, policy decisions have been made based on marketing and economic rationales, instead of student outcomes and research. Most evidence comes from the richest countries.
- Technology companies can have disproportionate influence in the sector. With tremendous incentives to show effectiveness, they may present only evidence that supports them. While independent evaluations of Success maker, a reading and mathematics instruction tool, found negative or null effects on learning in the United States, Pearson – the company that developed the product – continues to publicize self-funded findings and conclusions of significant, positive effects.
- Reviews from education technology suppliers tend to omit issues such as security and quality standards. Moreover, ratings can be manipulated based on fake reviews and disseminated through social media.
- There are also risks of ICT in education, which are often ignored by research and evaluations. A large review of research focusing on the effectiveness of online and blended learning in schools found that many studies failed to report on all pedagogical elements.

- Evidence on how technology interventions affect learning should inform the adoption and scaling up of technology use in education settings. Systematic, comprehensive reviews over the past two decades on the effects of the use of technology on learning generally find small to medium positive effects on learning outcomes.
- Evidence is mixed on its impact. Some types of technology seem to be effective in improving some kinds of learning.

Technology can facilitate creation and sharing of teaching and learning resources but this potential is often not fulfilled.

- The ways in which technology has been used over time to support teaching and learning continue to evolve, alongside a better understanding of how technology should be used.
- Digital libraries and educational content repositories help learners and teachers discover more content. Examples include the National Academic Digital Library of Ethiopia, National Digital Library of India and Bangladesh's Teachers Portal, which has over 600,000 users.
- Collaborative tools can improve diversity and quality in content creation. In South Africa, the Siyavula initiative supported tutors in collaborating on creating textbooks for primary and secondary education. Social media can improve access to user-generated content and sharing. YouTube is used by about 80% of the world's top 113 universities. In Indonesia, social media and communication channels were among the most widely used platforms for teaching, learning and support. More than 5 million teachers reportedly used WhatsApp groups for official information dissemination, from pre-primary to tertiary education.
- Although technology has decentralized content production and removed some barriers to participation, content is still mostly created by relatively privileged groups. The supremacy of English and the main European languages and the need to 'de-Westernize' educational materials still pose significant barriers towards accessibility and use of digital content worldwide.



- A study of individual educational content creators with at least 1,000 subscribers on YouTube in Spain found that 76% of them were men. The gender gap is particularly pronounced in science and social science, and opposite to what is found among primary and secondary teachers in the country. More than just reflecting existing inequality, technology may in fact exacerbate it.

The full costs of education technology are unknown.

- The short- and long-term costs of using digital technology appear to be significantly underestimated.
- On the whole, it can be said that, while countries invest in digital technology for education, business rather than education arguments are more commonly deployed to justify these investments. With some notable exceptions, countries often appear to pay little attention to whether their investment has been relevant and had an impact on learning, whether it has been equitable and inclusive, whether it is economically efficient, and whether it has longer-term negative effects on human rights and well-being.
- Questions are hanging over the type and quality of evidence used in making decisions. Countries tend to describe progress in terms of the technology inputs they have purchased instead of the learning improvement these inputs have achieved.
- Sustainability and funding are challenges that go hand in hand, as donor-funded projects do not operate for more than 36 months on average.

Digital technology can facilitate regular parental communication to support children's learning.

- Technology provides teachers with several low-cost and convenient ways to communicate up-to-date information to parents about their child's school progress. Almost 45% of students who participated in the 2018 ICILS were in schools whose head teachers expected teachers to communicate with parents through ICT.
- Sending caregivers regular nudges can positively influence learning outcomes. A systematic review of 29 studies found that such behavioural interventions resulted in improvements in academic outcomes. During COVID-19, Botswana's Education Ministry provided parents with over-the-phone tutoring for numeracy concepts, leading to learning outcome improvements.

Technology does not need to be advanced to have an impact; it needs to be context specific.

- Pre-recorded lessons can reduce urban–rural teaching quality divides. In China, high-quality lesson recordings were delivered to 100 million rural students, improving student outcomes by 32% and reducing urban–rural learning gaps by 38%.
- Television can be effective when accompanied by in-person guidance. In Mexico, televised lessons combined with in-class support helped increase secondary school enrolment by 18% between 1970 and 2020.
- Devices with pre-loaded content need contextualization and integration support. In Peru, the One Laptop Per Child programme distributed over 1 million laptops without any positive impact on learning.
- Technology may promote a highly individualistic approach to gaining knowledge that undermines the collaboration and civic engagement that are needed in public institutions.
- Technology can narrow learning priorities to those areas served best by the most marketed and accessible technological products.

Digital data can transform learning but capacity to use it is lacking and it opens the door to privacy concerns.

- In China, learning analytics have been used in primary and secondary schools to identify learner difficulties, predict learning trajectories and manage teacher resources.
- Yet the widespread use of dashboards, charts and tables to support decision making requires minimum data literacy for increasing numbers of users, including teachers and parents.
- Schools collect a lot of data on students, families and teachers, some of which are sensitive. Regulations are rare with only 16% of countries guaranteeing data privacy in education. In Europe, public schools are covered as 'public authorities' by the GDPR and must appoint data protection officers.

“ We must harness and master the digital revolution and AI so they are understood not as the dreaded substitute for teachers but rather as teachers’ best ally in guiding their students’ quest for inquisitive, critical and creative teaching and learning.

Leonardo Garnier, Special Adviser on the Transforming Education Summit and former Minister of Education of Costa Rica

Digital technology can improve student engagement with appropriate pedagogical integration, but risks lowering engagement and performance without.

- Digital technologies – games, interactive whiteboards, simulators and collaboration tools – when effectively integrated in pedagogy by teachers and with appropriately designed features can engage students through varied representations and interaction.
- Options for working with multiple teaching and assessment resources and for interacting with students accelerated during COVID-19. A survey of teachers in 165 countries found that 27% used technology daily to assess students during the pandemic.
- Digital game-based applications improved cognitive and behavioural outcomes in primary and secondary mathematics in 43 studies published in 2008–19.
- Interactive whiteboards can potentially support the visual, auditory and tactile experiences of teaching and learning if well integrated. The quality of teacher training is critical. In Catalonia, an autonomous community of Spain, a programme provided interactive whiteboards along with one-to-one devices to more than 600 schools. Teachers who had received specialized training using examples from publishers and peers were more likely to use the boards interactively to generate content or allow students to write on them. Studies using data from large-scale international assessments, also indicate a negative association between excessive ICT use and student performance.

- Analysis of PISA data between 2009 and 2018 showed a negative correlation between the use of social media in school and digital reading performance.
- A meta-analysis of research in 2008–17 across 14 countries covering students from pre primary to higher education found a negative effect of mobile phones on academic performance, which was larger at the university level.

The influence of technology companies has reduced the amount of control that teachers have over pedagogical decisions.

- Teachers seldom take part in decisions on technology: 45% of teachers from 94 countries participating in Education International’s Teaching with Tech study reported that their unions had not been consulted at all regarding the introduction of new digital technologies, while 29% had been consulted on ‘only a few aspects’. At the same time, 57% of respondents indicated that their unions had not been consulted on the digital technology they wanted.

“ I felt it could have been useful for teachers to be consulted when the new curriculum was being designed to make sure we were able to use the technologies well when teaching as they expected us to.

Monica Kinyuai, teacher, Kenya

- Consultation with multiple actors is necessary for solutions to be pedagogically appropriate. In Germany, the not-for profit Bündnis für Bildung (Alliance for Education) brings together education authorities at the federal, regional and municipal levels with the education industry to develop joint solutions to digital education challenges, helping protect content, privacy, school transformation and teacher training.
- Online learning platforms targeting marginalized learners that are run by non-state actors, raise sustainability and affordability concerns.



- Some educational platforms through companies like Apple, Google and Microsoft can reduce teacher autonomy by forcing teachers to use them in the interests of profit-making instead of allowing them to choose the tools they want to use. They can also define education in ways that fit big data analyses, shaping content, intended learning outcomes and their measurement.
- Working with a wide range of educational practitioners, including teachers, is key to developing education technology policies. Involving teachers and reflecting their experiences at an early stage of policy development will increase teachers' acceptance of technologies and will help make these policies more effective.

“

No screen will ever replace a teacher. Learning means listening, trusting, creating connections. Everything else is a tool and tools can be useful and effective but they can do nothing without the fundamental relationship between teacher and student.

Audrey Azoulay - Director General of UNESCO

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- Ongoing, school-based teacher professional development is critical to build their skills and confidence in using digital technologies. Ideally, such programmes should provide hands-on experience and opportunities for teachers to share experiences and best practices with peers.

#TechOnOurTerms

The #TechOnOurTerms campaign calls for decisions about technology in education to prioritize learner needs after an assessment of whether its application would be appropriate, equitable, evidence-based and sustainable. It is essential to learn to live both with and without digital technology; to take what is needed from an abundance of information but ignore what is not necessary; to let technology support, but never supplant, the human connection on which teaching and learning are based.

Technology should not be viewed as the solution, but as a supportive tool in overcoming certain barriers to education access. Given the overwhelming number of technology products and platforms available, governments need to base their decisions on procurement and scaling up on reliable evidence that looks at the long-term effects of interventions. The most effective interventions are those that put learners' interests as the focal point, support, not replace, human interaction and are backed up by strong evidence that they are the most effective tool to reach the targeted learners and respond to identified needs. It is not enough to just deliver materials without contextualizing them and providing support. Teachers need to be integrated into these efforts. Positive impact is often dependent on strong pedagogical alignment and teacher input.

The following four questions, however, have been framed for, and are directed primarily at governments, whose responsibility it is to protect and fulfil the right to education. However, the questions are also meant to be used as advocacy tools by teachers and by all education actors committed to supporting progress towards SDG 4 to ensure that efforts to promote technology, including artificial intelligence, take into account the need to address the main education challenges and to respect human rights.

RECOMMENDATIONS

Is this use of education technology appropriate for the national and local contexts? Education technology should bring added value to support the strengthening of education systems and should align with learning objectives.

Teachers should call on governments to therefore:

- Reform curricula to target the teaching of the basic skills that are best suited to those digital tools that have been proven to improve learning and are underpinned by a clear theory of how children learn, without assuming either that pedagogy can remain the same or that digital technology is suitable to all types of learning.
- Design, monitor and evaluate education technology policies with the participation of teachers and learners to draw on their experiences and contexts and ensure that teachers and facilitators are sufficiently trained to understand how to use digital technology for learning, not simply how to use a specific piece of technology.
- Ensure that solutions are designed to fit their context, and that resources are available in multiple national languages, are culturally acceptable and age-appropriate, and have clear entry points for learners in given education settings.

Is this use of education technology leaving learners behind?

Although technology use can enable access to the curriculum for some students and accelerate some learning outcomes, digitalization of education poses a risk of benefiting already privileged learners and further marginalizing others, thus increasing learning inequality.

Teachers should call on governments to therefore:

- Focus on how digital technology can support the most marginalized so that all can benefit from its potential, irrespective of background, identity or ability, and ensure that digital resources and devices comply with global accessibility standards.
- Set national targets on meaningful school internet connectivity, as part of the SDG 4 benchmarking process, and target investment accordingly to allow teachers and learners to benefit from a safe and productive online experience at an affordable cost, in line with the right to free education.
- Promote digital public goods in education, including free accessible e-pub formats, adaptable open education resources, learning platforms, and teacher support applications, all designed so as not to leave anyone behind.

Is this use of education technology scalable? There is an overwhelming array of technological products and platforms in education and decisions are often made about them without sufficient evidence of their benefits or their costs.

Teachers should call on governments to therefore:

- Establish bodies to evaluate education technology, engaging with all actors that can carry out independent and impartial research and setting clear evaluation standards and criteria, the aim being to achieve evidence-based policy decisions on education technology.
- Undertake pilot projects in contexts that accurately reflect the total cost of ownership and implementation, taking into account the potentially higher cost of technology for marginalized learners.
- Ensure transparency on public spending and terms of agreements with private companies to strengthen accountability; evaluate performance to learn from mistakes, including on matters ranging from maintenance to subscription costs, and promote interoperability standards to increase efficiency.

Does this use of technology support sustainable education futures?

Digital technology should not be seen as a short-term project. It should be leveraged to yield benefits on a sustainable basis and not be led by narrow economic concerns and vested interests.

Teachers should call on governments to therefore:

- Establish a curriculum and assessment framework of digital competences that is broad, not attached to specific technology, takes account of what is learned outside school and enables teachers and learners to benefit from technology's potential in education, work and citizenship.
- Adopt and implement legislation, standards and agreed good practices to protect learners' and teachers' human rights, well-being and online safety, taking into account screen and connection time, privacy, and data protection; to ensure that data generated in the course of digital learning and beyond are analysed only as a public good; to prevent student and teacher surveillance; to guard against commercial advertising in educational settings; and to regulate the ethical use of artificial intelligence in education.
- Consider the short- and long-term implications of digital technology deployment in education for the physical environment, staying clear of solutions that are unsustainable in terms of their energy and material requirements.



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