

# Future Opportunities for Educational Technology in England

## Introduction and background

This report presents findings from work carried out over 4 months as part of the Future opportunities for education technology in England study, which was commissioned by the DfE and carried out by Ecorys UK. The research comprised a rapid review of the literature, telephone interviews with policy and industry key stakeholders, workshops with teachers and EdTech sector representatives, and a survey administered with teachers through the Teacher Tapp app.

The report gives an overview of the global drivers and trends of EdTech. It also explores the future priorities of teachers and EdTech providers in England and considers how these might be addressed.

## Key findings

### Global EdTech – key drivers and trends

- Although EdTech is becoming globally more prominent, the education sector has been described as “grossly under digitised,” with less than 4 per cent of overall global education expenditure on tech.
- EdTech is projected to grow by two and a half times from 2019 to 2025. However, even at this level, it will make up only 5.5 per cent of the global education market.
- Educational software makes up almost half of global EdTech (49%), followed by educational services (42%), with only 9 per cent small fraction consisting of EdTech hardware such as headsets and simulation devices.
- The COVID-19 global pandemic has accelerated the demand and created opportunities for educational technology, tools, and services, with rapid development of new or existing provision across many education systems.
- Another driver of EdTech is the imperative to address a host of global education challenges. These include the accessibility of education, the cost of higher education, the quality of learning in remote settings, and the difficulty for teachers of attending to large class sizes with diverse learners.
- Finally, there is the general trend for digitisation and process automation across many sectors including education. This is contributing to the demand for digital skills, and therefore to pressure for schools and colleges and educational services to equip young people with digital skills and competences.
- Recent growth in AI is attributed to its potential to improve access, dramatically reduce cost, and accelerate learning outcomes. The greatest impact of AI in education is expected in testing and assessment.
- China has the highest number of internet users, almost double the number of the next highest user, which is in India, followed by the USA. China and the USA also appear to be some of the highest users of tech in the classroom. In Europe, the highest number of internet users are in Germany, followed by the UK, and France. However, when it comes to the digital skills of the population, the most skilled countries in Europe are the

Nordic and Baltic countries (Finland, Sweden, Denmark, Estonia, and Norway).

- In 2018, Cambridge Assessment conducted a survey of students and teachers in 100 countries. They found that the countries with highest use of tech in the classroom are the USA for desktop use (75% of students) smartboard use (59%) and smartphone use (74%); China for the use of tablets (50%); and Indonesia for IT suites (40%). Two-thirds of students (65%) do their homework on a laptop, but almost all students (98%) still use pen and paper. Nearly two-thirds of students (64%) said they use a smartphone to do their homework.

### A snapshot of digitally mature countries

- Researchers compared key characteristics of the EdTech sector in Denmark, the United States, France, and China.
- France is a growing player in the global EdTech market. In 2021, it was estimated to have a €1.3 billion turnover and hosted 500 start-ups, with a total of 10,000 employees. Its key challenges are the lack of a national vision, complex rules for gaining access to private and public capital, and an imbalanced focus on hardware at the expense of software and digital resources.
- Denmark owes its high level of digital infrastructure and competences to a long-standing tradition of high investment since 2011. This paid off during the pandemic. One of the barriers for Danish EdTech firms is the small size of the domestic market, which is dominated by big players. Many EdTech businesses in Denmark must look abroad to build a market position and revenue.
- Globally, the United States has the largest number of EdTech companies and the most venture capital funding for those companies. The American EdTech sector is characterised by private sector procurement of education technologies. Since before COVID-19, there has been a strong digital divide in accessing EdTech across groups of different socioeconomic background. For example, in 2019, only 54% of all low-income families had a computer at home, compared to 83% and 94% among middle- and high-income



families. The digital gap has been widened over the course of the pandemic. There is a growing demand in the USA for products to facilitate tutoring and those which help teachers to differentiate instruction.

- In China, the rising popularity of online and mobile learning, is partly driven by improved bandwidth. However, China faces uneven distribution of EdTech products and services. There is a threat to EdTech in the form of a new double reduction policy, ordering schools and colleges to reduce the time students spend each night on homework and implementing tough new measures to rein-in private tutoring institutions.
- All these countries have tried to find ways to bring teachers and EdTech providers together in a more direct and inclusive way, whether through innovation projects (France), a cross-sectoral EdTech alliance (Denmark), a collaborative project to define standards of evidence for EdTech (USA), or through local symposia and communities of practice for schools and colleges and providers (China).

### The emerging technologies: AI, VAR, blockchain, and social robots

- NESTA defines artificial intelligence (AI) as ‘Computers which perform cognitive tasks, usually associated with human minds, particularly learning and problem-solving.’ It can support teachers and students, with examples including learning companions, delivery of continuous assessment, essay scoring, and diagnosis of learning difficulties. However, the literature warns of a lack of AI strategy and leadership at national and school levels limiting its growth.
- Robotics have been used to enhance learner support and to engage students who are unable to access classroom-based teaching, while the immersive potential of VR/XR is fast becoming apparent for the assessment of practical skills and competences, and gamification has shown real potential for students with learning difficulties or disabilities.

### Future proofing – evidence-based solutions

- Respondents to the teacher survey were asked “Which are the main barriers to using EdTech in the next 10 years?” The 3 most common responses were funding, staff knowledge about what different products do, and staff confidence with technology. The fourth most frequently cited barrier to future EdTech use in the survey was the digital divide and/or access barriers among households, with just over one third (35%) of teachers selecting this.
- Several other challenges were highlighted in the workshops including concerns around data privacy and GDPR, and complex technical processes such as 2-factor authentication.
- There is evidence, both from this research and from existing literature, that digital solutions may have negative impacts on pupils’ educational and social development where they are not fully integrated to teaching and learning practices and / or lack a sound pedagogical basis. Over-reliance on digital tools at the expense of high-quality instruction has been linked with negative outcomes for pupils’ cognitive and social emotional development.
- Teachers were asked, “Which of the following uses of EdTech have the greatest potential benefits for your school in the next 10 years?” The most cited uses for

the future were classroom-based technology, formative and summative assessment tools, communication with parents/carers, and independent self-study tools.

- Other future EdTech opportunities mentioned in the workshops were the ability for staff to teach remotely, thereby saving the costs of cover, or the use of AI to assist with marking and reports.
- Teachers were asked, “What policy support would be the most effective in helping schools and colleges get the best out of EdTech in future?” The main priority, cited by 51 per cent of teachers, was evidence-based EdTech teaching resources. The workshops highlighted a demand for more nuanced information about the educational benefits of different tools and platforms, along with guidance to support practical implementation.

### System characteristics

- EdTech is not inherently democratic and that there are inevitable tensions between commercial and public interests. Education innovation is driven by the private sector, and it has been rapidly expanding. However, it does not reach most classrooms, and benefits only a very small proportion of learners globally.
- Looking to the future, concerns about larger EdTech companies commanding a growing share of the market, the ‘platformisation’ of digital content, and the restrictive influence of paywalls and algorithms over what teachers and learners can access and how digital content is recommended to them.
- Educational authorities can try to protect small-scale players in the field and encourage more experimental uses of digital tools and approaches, particularly those which support lower achievers. Public authorities can also encourage the establishment of nationally and/or regionally coordinated and funded “digital resource-centres” from which local schools and colleges can borrow digital equipment free of cost.
- From an inclusion perspective, facilitating closer links between schools and colleges, the EdTech sector, and representative organisations is an important future priority. It can bring the developments of the sector closer to the classroom generally, and the needs of vulnerable learner groups specifically. It is also important for governments to implement long-term national solutions to mitigate the impacts of the digital divide.
- There is a consistent finding from the research about the importance of digital leadership. Teachers in schools and colleges where the head teacher has a strong vision and commitment to EdTech are more likely to have a positive view towards the role of technology in education.
- The research has shown that teacher’s digital skills gaps within and between schools and colleges must be addressed if EdTech is to be effectively harnessed for teaching and learning.
- Teachers, learners, parents, and carers must become ‘experts by experience.’ Investment in EdTech needs to be coupled with awareness-raising and opportunities for teachers to test and experiment within a safe and controlled space, including communities of practice.
- There is a need for collaboration between public authorities, academics, and the sector to work together to evaluate EdTech innovations so that they are evidence-based.

The full document can be downloaded from:

<https://www.gov.uk/government/publications/future-opportunities-for-education-technology-in-england>