

# How can technology support pupils and educators to catch up, keep up and get ahead?

EPI and Microsoft Roundtable on Technology in the Classroom (April 2022)

## Introduction

As the UK education system recovers from the effects of the global pandemic and associated lockdowns, there has been a significant rise in the attention paid to the increased use of technology in teaching and learning. While making a success of online and remote learning was initially the priority, the sector is now taking stock of how the rapid increase in online learning over the pandemic has affected the interaction of technology and pedagogy in the classroom, as many students now return to classrooms with new technology to hand.

Research has shown that “computer-assisted learning” may lead to large impacts on students’ learning,<sup>1</sup> but it is less clear how this is currently applied in English schools and how much appetite there is for it. How can this personalisation, itself a disputed term, support an equitable and inclusive education recovery while navigating the issues around access to technology, digital skills (of students, teachers and parents) and data use.

In April 2022, EPI, in partnership with Microsoft, brought together policymakers, school leaders and sector experts to discuss these issues and the potential opportunities and challenges for personalising students’ learning. The discussion considered how technology could help teachers personalise learning to the needs of each student, and what is the best way of integrating technology in the classroom without compromising the benefits of student-teacher interactions.

This paper provides a summary of the discussion that occurred during the event. We are grateful to all participants for their contribution.

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<sup>1</sup> <https://www.aeaweb.org/articles?id=10.1257/jel.20191507> Upgrading Education with Technology: Insights from Experimental Research

## Tech as an accessibility tool

Technology in the classroom is seen by many school leaders and education experts, as one of the most important drivers of change when referring to accessibility of education for those with special educational needs and disabilities (SEND), or any other need for adjustment.

With the COVID-19 pandemic moving most or all learning online, the many benefits of using technology to bridge accessibility concerns have been highlighted. A survey presented by one of the participants polled teachers about their experiences in working with SEND children during the pandemic. The results showed the decreased need for in-person interaction, the opportunity for children to work in their own adjusted environment at home, the access to playback content, videos with subtitles and eliminating the distractions of the in-person classroom all had perceived benefits for students with autism, ADHD, dyslexia and those who are blind or hard of hearing.

Conversely, speakers also highlighted the need for the education sector to go further in supporting this cohort of students. The lack of teacher assistance in person, the need for students to self-organise and work independently more regularly, and the reliance on written information or specific devices or connectivity specifications, all contributed to increasing barriers for students with special educational needs or disabilities.

It was concluded that there is a need to pair the use of technology with existing classroom and teacher skills, while simultaneously fostering training and development for educators, parents and students to work together and maximise the potential of new resources. For technology to truly become a proactive, adaptable and an inclusive tool in teaching and learning, the limitations in its deployment, the need for training and reasonable adjustments and the ever-present need for in person teacher-pupil interaction must be taken into consideration.

## Disparity of access to technology

The closure of schools due to the COVID-19 pandemic, coupled with a move from in-person to fully virtual or remote learning, meant a historic shift in the way teachers, students, parents, and all those involved in education communicate and interact. This shift has consequentially had an impact on plans for what the future development of education could or should look like, with a heavy focus on the use of technology in the classroom as a tool, not a substitute, of the teaching and learning experience.

The key concept participants primarily agreed on was the immense capability and promising future of technology in the classroom to adapt to change, increase accessibility and assist or even reduce teacher workload, sharing the common goal of an enhanced teaching and learning experience. However, an essential aspect of the use of technology that must not be overlooked is the challenge that accessing such technology can present for many families. This is not only in terms of economic

cost and the need to train both students and teachers in the new technology and associated software, but also to ensure that they can use it to its full potential.

Studies have shown pupils that can access a laptop or desktop computer to use online resources and learning platforms, spend on average 4 to 5 times longer learning online than those using mobile phones. The accessibility not only to technology as a general concept, but to the correct tools to maximise the effectiveness and student experience, must be addressed if we are to bridge the disparity in learning performance, and experience. In order to bridge this gap, attendees at this event suggested the following:

1. **Device sharing:** allowing devices provided by schools to be taken home by students to use; while equally allowing students to bring devices into school they may have at home, which they are familiar and comfortable with (allowing for safeguarding concerns that must be addressed).
2. **Funding:** schools (or local authorities and multi academy trusts) should ensure the prioritisation of funding for both the obtaining of physical devices for learners and teachers to use. Additionally, incorporate technology as part of their operation to streamline the experience, be that through changing workflow models to include technology, rethinking new models based around technology or simply providing the correct training and development to realise the full potential of available technological resources.
3. **Fulfil the capacity of existing resources:** studies show most students over 16 years old own a smartphone or mobile device, with the rate of ownership in the 12–15-year-old group being particularly high.<sup>2</sup> Schools must ensure existing devices and online learning platforms can be matched, closing the gap for those who may have access to a phone but not a computer. It is a shared view that access to any form of device for online learning, even if not the most suitable, is better than no access to a device at all.
4. **Improve accessibility of technology infrastructure:** ‘Zero tariffs’ or social tariffs, whereby an internet provider offers low-cost tariffs to households that may be struggling to afford their broadband or mobile services, are currently available. However, speakers noted there is slow uptake from families that could benefit from this. Lobbying policy makers to disseminate further information and increase uptake is crucial to remove hurdles to accessing and using devices at home.

## Uses of Data

Alongside the opportunities for increasing accessibility that technology provides, speakers highlighted the wealth of data that education technology offers. One speaker noted that technology allows us to “unlock the black box of education data” and understand a child’s learning journey in a way that wasn’t

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<sup>2</sup> [http://www.childwise.co.uk/uploads/3/1/6/5/31656353/childwise\\_press\\_release\\_-\\_monitor\\_2020\\_-\\_immediate\\_release.pdf](http://www.childwise.co.uk/uploads/3/1/6/5/31656353/childwise_press_release_-_monitor_2020_-_immediate_release.pdf)

previously possible. Be this through logging the time a child spends on a certain task, recording areas that students consistently do well or poorly in, or by noting hours spent in extra-curricular programmes, education technology allows the collection and centralisation of data on a child across their years spent in school. It was highlighted that this data can then be used to build up a holistic picture of the student's learning to share with everyone who cares about that pupil, such as teachers, parents and carers and learning support assistants, facilitating discussion on areas for focus and improvement. One speaker noted the wide use of data and evidence under the surface in their organisation; they were able to use Artificial Intelligence (AI) data analytics to visualise and assess the most effective ways of learning in the classroom, the metacognition processes occurring, and intervene if needed to support learning.

On a larger scale, data and evidence are important across the education sector. Beyond the classroom, a speaker emphasised that education leaders and policy makers can aggregate data to develop strategies and policies that are rooted in the evidence these devices provide. This enables a feedback loop by which data-driven policy can increase and improve the technologies available which in turn ameliorates the quality of the data driving policy change. Yet, building on the points above concerning disparity in access to technology, these inequalities could mean that in-depth edtech data is collected predominantly from more affluent areas and care must be taken to ensure the data is wide-ranging and as free from bias as possible.

Finally, a speaker pointed out a certain limitation in the data, mentioning the difficulty of evaluating the benefits of education technology and devices. It is challenging to separate cause and effect and emphasised the importance of seeing technology as an accelerator of what was already happening in the classroom rather than something completely new. This links to a wider theme of the discussion: while technology builds on the great pedagogy and skills of teachers, widens resources available in the classroom and may facilitate and expedite the learning process, it does not mean that technology is designed to replace them.

### Personalisation of Learning

A key theme of the discussion was the personalisation of a student's learning journey and the way in which education technology and the data it provides can facilitate this. The possibilities of AI to assist with digital teaching and learning are profound. One speaker mentioned the benefits of personalised AI coaching through tools like Immersive Reader and noted how the engineers in their organisation worked with students throughout the design process to ensure pupil needs and opinions were centred in the creation of these tools. Moreover, another speaker mentioned the major impacts computer-adaptive learning (CAL) can have, especially in mathematics. This educational method uses computer algorithms and AI to "coordinate the interaction with each student and deliver customised resources

and learning activities to address individual needs.”<sup>3</sup> Research has shown that CAL may have a greater benefit for students than increased school hours or intensive tutoring programmes. A randomised controlled trial in Texas demonstrated overwhelmingly positive results accompany this adaptability, with an improvement of 0.6 standard deviations in pupils’ mathematics scores when used to teach advanced middle school mathematics.<sup>4</sup> The targeted exercises for students, some with immediate feedback, have immense potential for improving students’ skills and knowledge.

Furthermore, personalised or tailored learning not only allows for differentiated content to teach the same curriculum element, but it also facilitates a differentiation of the student’s path through the various curricula to reach the same outcome. Children can learn different things or follow varied paths through the way the device learns about the pupil and their strengths and weaknesses. One speaker noted that in their school, they found this individualisation also helped to remove stigma in the classroom on both sides – both for high-achieving and slower learners. Because each student was following a variation of the lesson dependent on their own needs and skills, the opportunities for comparison were lessened. Moreover, digital devices provide invisible personalised learning due to the reasons behind a certain differentiation not being made explicit. Once again, this led to a reduction in stigmatisation of pupils.

Finally, one speaker noted that working within a framework or mindset of personalising learning allowed innovation to flourish at an output level too. Digital devices and CAL facilitate creativity in the way that children are allowed to solve a problem or present work too. They described how, when they were young, they were primarily assessed on the ability to write and produce documents – for those children and young people who find this difficult, the freedom to personalise how they present their work could have significant benefits. The speaker emphasised how technology, and the individualised learning it facilitates, can play a big part in bringing young people back into learning and help them to become agents in their own education.

While the possibilities and advantages that personalised learning present were celebrated, several speakers also highlighted its drawbacks. Alongside the challenge mentioned above of getting hardware to schools and students that need it most, there were issues with how to integrate CAL into classrooms effectively. A speaker highlighted the possible danger of CAL resulting in a reduction in teacher-student and peer interactions. Another speaker countered this with the opportunities that technologies offer to give teachers back their time. They felt that ‘personalisation’ is something that teachers have tried to do for a long time, but it is difficult without high numbers of personnel to facilitate it. For example, worksheets with different size fonts and colours to help students with visual impairments or varying lesson plans to cater to different learning styles. This speaker felt technology

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<sup>3</sup> <https://tophat.com/glossary/a/adaptive-learning/#:~:text=Adaptive%20learning%20is%20a%20teaching,activities%20to%20address%20individual%20needs.>

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[https://www.researchgate.net/publication/250184906\\_Integration\\_of\\_Technology\\_Curriculum\\_and\\_Professional\\_Development\\_for\\_Advancing\\_Middle\\_School\\_Mathematics\\_Three\\_Large-Scale\\_Studies](https://www.researchgate.net/publication/250184906_Integration_of_Technology_Curriculum_and_Professional_Development_for_Advancing_Middle_School_Mathematics_Three_Large-Scale_Studies)

provides the means to personalise learning without consuming huge amounts of time and effort. Thus, CAL could be used outside the classroom to facilitate learning, giving teachers time in the classroom to create a meaningful, interactive environment, informed by data on what their students need. Another speaker built on this to add a further point of contention, that in fact personalisation from the point of view of digital products is provocative to teachers, given that they already do it every day through their pedagogy and knowledge of their students.

The utility of the term “personalisation” itself was also called into question. This speaker recognised that technology and AI have a huge role to play in how we personalise learning but felt that personalisation is a “toxic” term and that it suggests low expectations of students and emphasised the need to shift the narrative to one of high expectations for all that technology can help to achieve.

CAL and the use of technology to personalise learning remains, therefore, an area of debate. It has been demonstrated to offer immense advantages to learning and to empower children to become agents in their own education. Yet, more work must be done to effectively integrate the technology into the classroom and ensure it does not increase the already considerable disparity in educational outcomes.

### Pedagogy and Teachers’ CPD

As mentioned throughout this summary paper, one of the most important elements of the incorporation of technology in the classroom is the development of realistic, achievable and effective rollouts. If technology slows down or disrupts the learning process in the long run, it will quickly be dismissed, becoming underutilised and not fulfilling its goal to maximise the effectiveness and efficiency of the teaching and learning experience.

One barrier to the uptake of technology in the classroom and the transmission of digital skills to children and young people, is the knowledge and skills of educators themselves. While not an indictment of teachers who have had to quickly adapt to online learning alongside many other pressures of the pandemic, one speaker felt “stunned by the lack of many teachers’ IT competence.” They emphasised that technology is only so good as its user and teachers need a lot of support to feel confident using a platform with AI components. By including digital skills as part of Continuing Professional Development (CPD), not only is the education workforce upskilled, but their ability to then impart such knowledge and assist students with technology related queries would exponentially increase.

Technology can also be seen not only as a component of CPD, but as a tool to access a wider network of CPD itself. Connecting teachers, educators, administrators and school leaders to a network of CPD opportunities without the costly limitations of time, travel, resources and even borders is one of the largest untapped resources of technology in education. Participants highlighted the many existing and potential future opportunities to connect technology providers with school administrations, governance, educators and parents to create more tailored, accurate and targeted teaching and

learning programmes and systems (be that both in person and online) to maximise teaching and learning quality and performance overall.

## Digital skills and employment

In discussing the role of technology in the classroom, speakers also felt it was key to examine the possibilities that this would present for children's futures in the workplace. It was agreed that the use of technology as a learning tool would also translate into the use of technology as a professional skill in an increasingly digital world. Recent Microsoft research in partnership with LinkedIn revealed that nearly 80% of employers believe graduates do not arrive fully equipped with the skills they need to work ready, a digital skills gap that needs addressing<sup>5</sup>. To do so, speakers emphasised the importance of not assuming that pupils are digital natives and ensuring there is enough "digital skilling, coaching and support". In fact, one speaker mentioned that teachers note a lack of basic digital skills: while some students are very competent, most struggled with the basics and felt this was major of focus needed for the future. This builds on the discussion above on teacher CPD. To digitally upskill pupils, teachers need to feel comfortable working with technology and teaching digital skills themselves.

The discussion thus moved on to how to increase digital skills. According to one speaker, from a policy perspective this can be done in two ways – either through qualifications or pedagogy. Currently, students are assessed using pen and paper, so inevitably schools will prepare students to sit pen and paper exams. They concluded with the thought that "if we're serious about increasing pupils' digital skills, we need to adapt the examination and accountability systems to include digital skills. In turn, this would lead to schools investing heavily in digital skills". Another speaker challenged this assumption, asking if it was not rather the low teacher supply that led to the lack of digital skills. This led to an interesting clarification: in terms of take-up of the computing qualification, the low response is due to a lack of teachers, but if we want digitally skilled college graduates who haven't done this qualification, schools and colleges won't invest in the skill if they aren't held accountable later on.

Another speaker agreed with the necessity of changing the assessment model, contending that the English education system has an assessment-led curriculum model and this model of high stakes assessment for everything, especially in Key Stage 4, does not lend itself to virtualisation if, for example, GCSEs were to be sat online all on the same day at some stage. Some participants also expressed regret that there was no safe space for schools, pupils and parents to enjoy innovation within the curriculum due to this high-stakes model. Thus, assessment and accountability were mentioned several times as a perceived hindrance to digital upskilling.

Two speakers also drew attention to the lack of clarity over what we are in fact using technology for. They asked if it was simply to boost performance standards, for example through improving Maths and English skills, or is it to actually teach children digital skills? Is technology used to improve

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<sup>5</sup> [DEGREE+DIGITAL, Microsoft in partnership with LinkedIn](#)

standards or to digitally upskill for the future? Indeed, schools can be unaware of technology developments but still be classed as a good school – a dangerous widening divide one speaker noted. This duality speaks to that noted above of the difference between a computing qualification and general digital skills that could be taught across the curriculum. For children to learn digital skills and close the skills gap reported by business leaders, this grey area needs to be clarified and policies implemented that set standards and disseminate best practice.

### The role of policy makers

Building on the above, one speaker opened their statement with the “blindingly obvious point” that until there is a government policy that sets out a minimum specification for each device and ensures that every school has access to these devices and the connectivity to use them, we are not going to get very far. There will continue to be inequalities in access, uptake and skill levels. The speaker was concerned that currently there are no technology demands or assumptions built into policy and that without this policy imperative, the use of technology in the classroom will be varied across the country and lead to increasingly disparate outcomes. Similarly, another speaker noted that any progress in closing the attainment gap will not succeed if, there is no strategy on how and why technology will be used.

Additionally, a third speaker described the confusion over leadership between the EdTech and policy sector. They felt EdTech positions itself as wanting to work with policymakers and other stakeholders to improve products and the way in which they facilitate the operation of education. However, policymakers say that the EdTech sector is leading the innovation and provides the products. This speaker emphasised the need for a shift in dynamics so that policy makers take charge and start determining priorities. Policy must be proactive and shape the products that the EdTech sector offers, rather than the other way round. Ultimately, “without a policy push, there will be no progress”.

### Conclusion

As the above summary demonstrates, there are significant opportunities in the increased use of technology in the classroom in the short and long term.

The uptick in digital learning due to the pandemic can be harnessed as a powerful tool in making classroom learning more accessible, particularly to those students with SEND. Furthermore, there is a growing body of evidence showing that personalised learning, facilitated by the increased use of technology, can lead to improved outcomes for all students and build on pre-existing techniques employed by teachers. The data gathered through this style of learning could also provide policy-makers and school leaders with rich data on learner journeys to be used from the classroom up to system level. Looking further ahead, exercising and expanding the digital skills of our young people will also leave them better placed when it comes to meeting employer demand in the future.



This optimism comes with several important caveats. As with all advances in digital learning, a nuanced and comprehensive plan for ensuring equal access to the required technology is essential. What came across strongly in the discussion is that just having a device in hand is not enough, the ability to use it effectively is crucial. Similarly, the push for personalisation will only be successful if accompanied by a resourced plan for ensuring teachers, parents and students can use new the tools to their potential.

Finally, as one participant stressed, the move to further use technology to support pupils will only have lasting impact if that technology is an accelerator of what is already happening in the classroom. The teacher-student relationship remains at the heart of positive learning outcomes. Participants urged policy-makers to ensure all students and schools can take advantage of this potential to accelerate best practice in inclusion, personalisation and digital skills.