The background of the page is a complex geometric composition. It features a grid of squares and triangles in various shades of grey, white, and teal. A large teal shape is in the top-left corner, and another teal shape is in the bottom-right corner. The central area is filled with a pattern of overlapping squares and triangles, some of which are shaded in different tones of grey.

The role of digital transformation on the UK economy: **Education**

A Cebr report for Virgin Media Business

June 2021

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Authorship and acknowledgements

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London, June 2021

Contents

| | |
|--|-----------|
| Executive Summary | 4 |
| 1. The impact of Covid-accelerated digital adoption | 6 |
| Education sector | 8 |
| 2. VMB case studies | 10 |
| 2.1. How Covid-19 accelerated Britain’s digital education | 10 |
| 2.2. How smart teacher training will end the loneliness of the long-distance worksheet | 12 |
| 2.3. Creativity through technology: How one college has taken a digital-first approach to hands-on education | 14 |
| 2.4. The day I realised virtual reality can teach kids real-world skills | 15 |
| 3. Literature review and panel insight | 17 |
| Education sector | 17 |
| 4. Industries in practice | 20 |
| Remote working in the education sector | 20 |

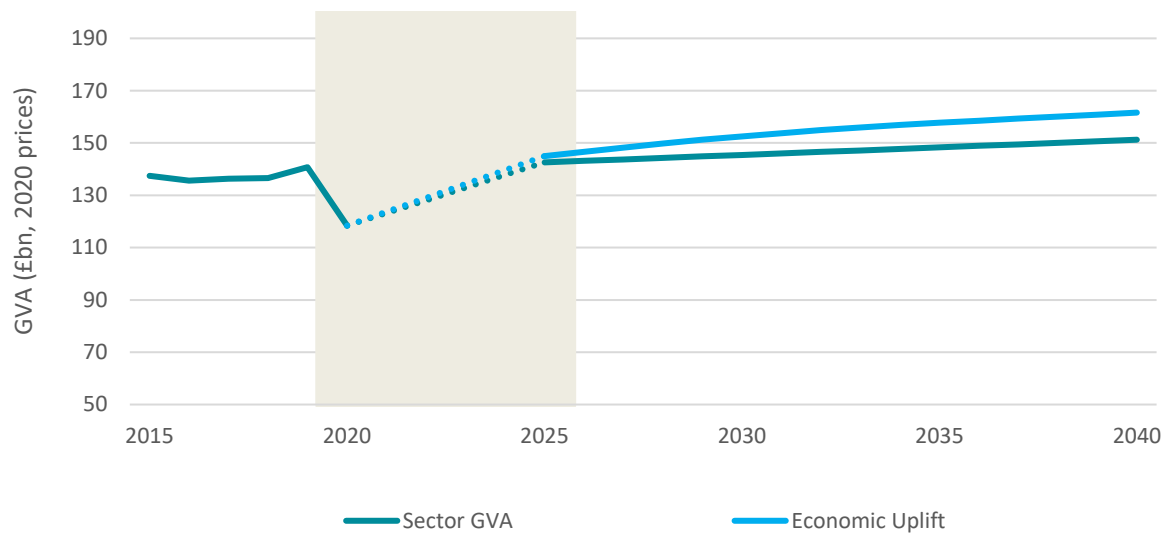
Executive Summary

- This is a Cebr report for Virgin Media Business on the impact of Covid-accelerated digital transformation (CADT) in the **education** sub-set of the public sector.
- Following the release of Cebr's extended report for Virgin Media Business on the topic of [Covid-accelerated digital transformation](#), and its impact on the UK economy more broadly, this report serves focuses on the **education sub-sector**.
- This is the sixth in a **series of sector-specific vertical reports** based on analysis undertaken in late 2020, providing a review of the role that digital transformation is expected to play in accelerating the UK's rebound from Covid-19.
- Within **education**, we consider **pre-primary, primary, secondary and higher education**, together with relevant **training institutions and facilities**.
- As detailed in the main report, increased adoption of key digital technologies due to the pandemic could lead to a period of Covid-accelerated Digital Transformation (CADT). **Boosted investment and fast adoption of CADT technologies over the coming decades is set to increase UK GDP by £232bn¹ or 6.9% by 2040.**
- We find that approximately **one third of economywide tech-enabled growth** will be supported by public sector investment in the **three** public sub-sets that were analysed in the wider report (local and central government and blue light services, education and healthcare). This is an increase to **economywide GDP of £75bn, or 2.4% in 2040.**
- Of this, approximately **£10bn originates from activity in the education sub-sector**. This GDP boost will be realised across the whole of the UK economy, representing an **uplift of approximately 0.3% of UK GDP in 2040.**

¹ All figures are presented in 2020 prices.

- **Figure A**, below, sets out the **forecasted size of the education sector** under the **baseline scenario**, together with the **estimated size of the cumulative gain** which will be realised across the whole UK economy, as a result of **accelerated digital transformation in the education sub-sector**.

Figure A: Education sector GVA, 2015-2040.



Source: Cebr analysis

1. The impact of Covid-accelerated digital adoption

This section sets out the findings of the research, that is, the estimated sector-specific impact of accelerated adoption of digital and technological initiatives, in response to Covid-19, estimated over a 20-year time horizon.

For reference and context, Table 1 sets out a summary of the results for the whole of UK economy, after which the education sub-sector results are presented.

Table 1: UK-wide impact of post-Covid digital transformation adoption

| Year | Baseline GDP (£bn, 2020 prices) | Uplifted GDP (£bn, 2020 prices) | Additional GDP (£bn, 2020 prices) | Percent Boost |
|------|---------------------------------|---------------------------------|-----------------------------------|---------------|
| 2020 | 2178 | 2178 | 0 | 0.0% |
| 2025 | 2651 | 2725 | 74 | 2.8% |
| 2030 | 2891 | 3018 | 127 | 4.4% |
| 2035 | 3143 | 3314 | 171 | 5.4% |
| 2040 | 3361 | 3593 | 232 | 6.9% |

Source: Cebr analysis

The 2021 – 2025 short run

It should be noted that this research was carried out in real-time, against an uncertain economic backdrop with particular respect to the long-awaited Brexit deal announcement, and indeed Covid-19 – the surrounding circumstances of which have been subject to frequent and last minute changes. Results were estimated using assumptions based on the state of the world in late 2020. As noted in Cebr's [extended report](#), the shape of 'economic recovery', in the period 2021 – 2025, was uncertain at the time that this analysis was carried out (late 2020).² Opinion ranged from a quick 'V-shaped' to a prolonged period of lower output. The economic and forecast models driving the findings in this report are reflective of the conditions presented in late 2020. While there is continued uncertainty as to the speed of the economic recovery, data on vaccine efficacy and rollout – together with early macroeconomic indicators – suggest a faster economic recovery than previously expected.

We therefore placed greater focus on the medium and longer-term findings by excluding annual estimates for the years between 2020 and 2025. Longer-term findings are more robust and less likely to be impacted by the current – and ongoing – changes to government policy and pandemic trajectory. By the start of the long-term steady state period (currently estimated to be 2025), increased Covid-accelerated Digital Transformation is estimated to have added £74bn to GDP.

² The immediate term between 2021 and 2025 can be thought of as the of the 'economic recovery' period, before the UK transitions into a long term steady state. 2025 has been chosen as a suitable analytical starting point from which to undertake the analysis because that is a steady state marker that is identified.

It can be seen in Table 1 that under the baseline scenario, sectors operate under normalised, assumptions, following non-accelerated technological usage trajectories. In this case, GDP across the UK economy as a whole is estimated to be approximately £2,891bn by 2030. However, the results of the model in which we consider accelerated technological adoption, indicate that GDP could increase to approximately £3,018bn – an uplift of £127bn, or 4.4%.

By 2040, the counterfactual GDP – with normalised assumptions regarding technology adoption – is estimated to be approximately £3,361bn. However, with increased used of digital technologies, it could be uplifted by around 7% to £3,593bn – an increase of £232bn.

As detailed in the extended report, the public sector is treated differently from the private sector. The uplift accruing to increased adoption of digital transformation in these government-dominated sectors is expressed with respect to its impact on wider UK sectors. Any innovation that raises either the quality or the quantity of output from the public sector), will not necessarily directly boost the GVA of that sector, rather, it is assumed that the benefits achieved can be expressed as cost savings in each year for the respective public sub-sectors. The cost savings are then invested and re-invested across the sector each year, the economic yields of which will be realised as broad-based benefits across the wider UK economy.

Table 2 summarises the impact of accelerated technological adoption across the three public sector sub-sets of interest: LCGS,³ education and healthcare.⁴

Table 2: Impact of accelerated digital transformation in the education, health and LCGS sub-sectors of the public sector

| (Real, £bn, 2020 prices) | | | |
|---|------------------------|--|--------------------|
| Public Sector | Size of sector in 2040 | Economywide gains attributable to public sector investment | Gain as a % of GDP |
| Local and Central Government and Blue Light Services (LCGS) | 121 | 32 | 1.0% |
| Education | 151 | 10 | 0.3% |
| Health & Social Care | 270 | 33 | 1.0% |

Source: Cebr analysis

It is estimated that by 2040, increased adoption of digital and technological initiatives in the **education** sector could increase GDP across the economy by around **£10bn** – a gain of approximately **0.3% of GDP**. Across healthcare, GDP gains (to be realised across the overall UK economy) are estimated to be approximately £33bn in 2040. In local and central government and blue light services, the GDP uplift is estimated to be £32bn, or around 1% of UK GDP in 2040.

3 'Public administration and defence' (as defined in Cebr's macro model) can be considered an appropriate proxy for 'local and central government and blue light services' in the context of this analysis.

4 Per the scope of the research, we have considered only three sub-sets of the broader public sector. It should be noted that the activity of these three sub-sets is not the complete extent of public sector activity.

Education sector

Table 3 sets out the estimated size of the education sector, starting in 2020, and then each year from 2025-2040.

Table 3: Impact of accelerated digital transformation in the education sector – in terms of economywide gains

| Year | (Real, £bn, 2020 prices) | | |
|------|--------------------------|--|--------------------|
| | Size of education sector | Economywide gains attributable to public sector investment | Gain as a % of GDP |
| 2020 | 118 | 0 | 0.0% |
| 2025 | 143 | 2 | 0.1% |
| 2026 | 143 | 3 | 0.1% |
| 2027 | 144 | 5 | 0.2% |
| 2028 | 144 | 6 | 0.2% |
| 2029 | 145 | 6 | 0.2% |
| 2030 | 145 | 7 | 0.2% |
| 2031 | 146 | 8 | 0.3% |
| 2032 | 147 | 8 | 0.3% |
| 2033 | 147 | 9 | 0.3% |
| 2034 | 148 | 9 | 0.3% |
| 2035 | 148 | 9 | 0.3% |
| 2036 | 149 | 10 | 0.3% |
| 2037 | 149 | 10 | 0.3% |
| 2038 | 150 | 10 | 0.3% |
| 2039 | 151 | 10 | 0.3% |
| 2040 | 151 | 10 | 0.3% |

Source: Cebr analysis

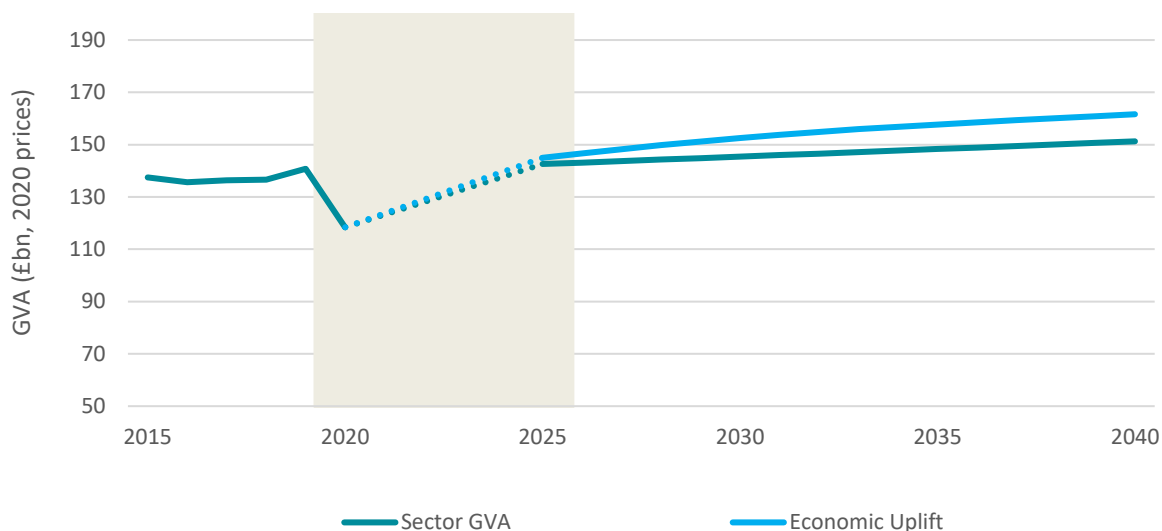
Estimates from Cebr's macro model indicate that the total size of the education sector in 2020 is approximately £118bn. By 2025, this will increase in size under normal, steady state assumptions to approximately £143bn.

Gains from accelerated digital transformation will not be realised immediately. Indeed, re-investment of the efficiencies that are brought about will also take time. By 2025, such gains will begin to accrue. By 2030, the gains are estimated to be approximately £7bn, increasing to £10bn by around 2036 – the equivalent to 0.3% of UK GDP.

The cumulative uplift – which is realised across the whole economy – is illustrated in Figure 1. The delta between the two lines represents the size of the digital transformation uplift that is

attributable to investment in the education sector.⁵ While there might be a number of ways in which the gain is channelled, our scenario assumes that cost savings – examples of which are given in the literature review – are reinvested. This becomes possible because fewer operational resources are needed to provide the same quality of education as is currently provided.

Figure 1: The impact of accelerated digital transformation in the education sector.



Source: Cebr analysis

Figure 1 also sets out the 2015-2020 pre-Covid time frame as a point of reference against which the current and projected size of the education sector can be contextualised. It can be seen that the sector decreased in size by approximately 16% between 2019 and 2020, but is estimated to return to pre-Covid levels by 2025.

⁵ On the basis that the education sector is substantively government-run, our scenario employs a simplifying assumption in which we treat the whole sector as a public sector sub-set. The same is true for the local and central government and blue light services and health sectors reported on in separate verticals.

2. VMB case studies

The following case studies supplied by Virgin Media Business serve to demonstrate the forms of digital transformation organisations working in throughout the education sector have successfully implemented throughout Covid-19.

2.1. How Covid-19 accelerated Britain's digital education

The global pandemic and the need for distance learning fuelled the drive to get more schoolkids online, transforming the way we teach forever.

But many schools were already embracing the benefits that digital technology can bring.

In the past 18 months LGfL, the National Grid for Learning, has helped deliver ultra-fast fibre networks to children online in a safe environment so that schools could deliver online learning nationwide.

But when home-educating became a reality up and down the country, every school needed to up its game.

LGfL CEO John Jackson says: "We've installed and upgraded more schools during Covid than we did pre-pandemic.

"In a time of crisis, the engineers were in schools upgrading them, giving them the capacity they needed. I'm pleased Virgin Media Business were in the trenches with us.

"We didn't slow down, we sped up. Virgin Media Business sped up during Covid, and that's extraordinary."

The need for speed in the classroom and security when logging on from home was already clear long before the pandemic, but enforced national lockdowns made it absolutely essential.

Our education system depended on it.

Boosting poorly connected schools

John explains: "At the start of Covid we estimate nationally between 12,000 and 14,000 schools did not have cloud-based platforms for teaching. That's roughly half of all schools.

"Now that's been stood on its head."

"During Covid we've upgraded nearly 3,000 schools to a world-class network. Consumption was rising before but we've seen it continue to rise rapidly.

"The foot is firmly down on the accelerator. I see no slowing down of device demand."

In fact, the only thing John sees that might slow down innovation in the classroom is the cables that connect to the school.

"If the only thing you have got is copper wire, it isn't fit for purpose. And anyone who thinks it is needs to move on.

“The moment you land in the classroom and you get 30 kids trying to pull down 4K streams, that copper does not function. It can’t do it.”

Part of last year’s revolution in education has been down to increasing numbers of frontline teaching staff recognising the importance of digital.

Changing attitudes are empowering education

John says: “One of the things that was blocking change was the need to do it. Teachers needed to be thinking digitally by default.

“We’ve had video conferencing for a while, we’ve had platforms in the cloud for as long as I can remember.

“The problem with digital adoption wasn’t the tech, it was the culture and organizational change needed to do it.

“It’s like an iceberg. Above the line it’s the adoption of technology but underneath the water is nine-tenths of the problem. I call that the absorption of technology.

“That’s the paradigm. Organisations can adopt it but they don’t absorb it. When they absorb it, the change happens it becomes part of what you do.

“You have to collaborate together on remote teaching and learning, you have to integrate the digital tools into your pedagogy. Otherwise you’re going to fail.

“What Covid has done is to accelerate the cultural change that was needed.”

Extending digital protection to all

The next challenge facing education is making sure that all schools can level up, to make sure all children everywhere have the same opportunities to benefit from the digital revolution.

John says: “Without the connectivity and platforms none of this transformation would have happened.

“We wouldn’t have been able to do any of this five years ago. The platforms weren’t mature enough, the speed of platforms was not mature enough.

“We wouldn’t have been able to do home filtering without the connectivity and manageability. It would have been a nightmare.

“There’s still deep inequality of connectivity in this country. There’s a big issue in rural and poor areas of this country. You get areas where it’s not happening fast enough.

“A lot of schools still don’t have the connectivity they need. And I’m on a one-man mission to transform teaching and learning in this country.”

To deliver these “monumental changes”, LGfL recognises it has to go beyond providing great broadband and helping schools secure the best technology - offering security alongside speed.

John says: “We don’t just do connectivity, we do teaching and learning support, wellbeing support. Our partnership with Child Bereavement UK is an important part of our content offering.”

2.2. How smart teacher training will end the loneliness of the long-distance worksheet

During the pandemic we witnessed a decade of classroom innovation crammed into a few short months. Frontline teachers declared it nothing short of a revolution.

How do we make use of the new tools that came into being during lockdown to benefit pupils in the years to come?

Teachers have the answers.

Haringey Education Partnership (HEP) works with 95 schools across north London, helping them to improve education outcomes for students aged five to 18. Many of those schools also work with LGfL.

The team have seen first-hand how digital bloomed during Covid. And they have valuable insights about how to reap its benefits.

HEP's CEO James Page says: "Other businesses and other sectors might have been further down the digitalisation route – for schools it simply wasn't a thing.

"Learning was done in the classroom and homework at home. Everything was in service of classroom learning.

"The digital divide had never really been huge deal in that sense. It was 20th-century or even 19th-century thinking, focused on the classroom. The level of challenge in schools was enormous."

Fran Hargrove, HEP Lead on School Improvement, adds: "There's been innovation the likes of which we've never seen before. Ordinarily that would've taken five to 10 years to develop."

Schools turned to existing platforms like Google Classroom, Microsoft Teams, J2E and Tapestry as they were forced into distance learning by default.

At first, Fran explains: "None of them served all the needs. Schools were not equipped to start exploiting them. And it took time for the technical side of things to work well.

"But there's been significant development in providers of digital platforms ... they are really responding to feedback from schools, to their needs and wants."

Now she believes there are five questions schools need to answer for success:

- How do we ensure universal access to devices and the internet?
- Can we find the right platform to deliver teaching?
- How should we structure the day in an age-appropriate way?
- What does good teaching look like in a virtual classroom?
- How can we capture all this information to improve long-term provision for children?

And Fran is clear that the solution to most of these lies in empowering the teachers to lead the next wave of digital innovation.

She says: “It’s about supporting schools to develop quality teaching in a virtual classroom, not just delivering a load of stuff for children to download. It has to be practitioner-led.

“We’re already seeing it more in how our schools are preparing home learning. Rather than the loneliness of the long-distance worksheet, you’re seeing new tasks alongside that.

“It has to happen at ITT (Initial Teacher Training). Teachers have to start their career knowing they’ll need to prepare for a significant aspect of digital education in their lifetime.”

Only then will schools see the full benefit from primer lessons, classroom recordings and online feedback, so digital works in a way that supports core teaching.

James Page concludes: “The biggest divide going forward is how much schools have embraced online platforms effectively to support what happens in class.

“We’re not looking to get away from the classroom entirely. You can’t have as good teaching and learning virtually as you do in the classroom.

“But there are huge wins to be had. The openness to change is there. We’re in the foothills of what the future will be like.”

2.3. Creativity through technology: How one college has taken a digital-first approach to hands-on education

With the most fortuitous timing, specialist broadcast and digital media college The Global Academy was already introducing a new digital teaching-aid system in the 10 days before Covid struck.

It was intended to be the final piece in a tapestry of cutting-edge digital solutions. Little did the team realise it would prove to be a lockdown game-changer within weeks.

The Academy, a university technical college for 14–19-year-olds located in an old vinyl factory in West London, was formally opened just four years ago but it has already had outstanding success in helping young people into careers in the media and creative industries.

A year ago, Eric Villacarlos was teaching computer science and geography at Global Academy, but has since become de facto head of digital strategy as the importance of such a role has become ever clearer.

He explains how the pieces fell into place for Global Academy to continue to thrive while being locked down: “We were in the fortunate position of being at the forefront of digital learning provision when the pandemic arrived and it’s really made coping with the challenges a lot easier than I think other schools and colleges have found it.” Eric’s digital strategy is built on the use of three main systems.

Canvas is practically a virtual school and library: “It serves as a central place for the students to have access to recordings of lessons, resources, templates, all our educational assets,” Eric explains.

“It’s highly functional and better suited to classroom usage as it has so many more sub-functions than say Teams. It’s a legacy thing for us – we’ll be using it forever.”

Tassomai, which pupils can install as a phone app, is a personalised learning tool that can quickly identify areas where students are weak and target them, offering tailored interventions.

“It maximises pupils’ chances of getting better grades as it concentrates on improving the aspects they’re less strong on,” Eric says.

Finally, Wooclap offers interactive functions so that during lessons students can run polls, note responses to questions and interact on multiple levels without just being talked to. “Wooclap makes lessons more dynamic, which in turn makes them more engaging,” Eric says.

Even parents have become involved in the digital push, embracing the tools to see what their children are up to, using the tailored access that the apps provide. The largely paper-free communication between school and home is a bonus too.

Principal Jonty Archibald is proud of Eric and the whole staff’s achievements and of how their students have taken to digital-first learning. “It’s been a tough year for everyone in education but I think that because what we do here at Global Academy already had a digital foundation it was perhaps easier for us to adapt to virtual learning to make it a positive than some may have found,” he says.

“We are now on the front foot and we want to stay there. That means being across technical innovation as it happens in the future.”

2.4. The day I realised virtual reality can teach kids real-world skills

Forced social distancing delivered a valuable lesson in how to teach essential, real-world life skills in an increasingly virtual world.

It also showed that great classroom connectivity is key, and can save significant sums of money as well.

Former primary teacher Rob Hattersley's safety centre used to give primary-school children essential lessons in safety, by inviting them to a unique venue that included rows of shops, a fully stocked Co-op, a two-storey house, fire and police stations, a GP surgery and even a full-sized Virgin train.

The realistic street layout gave children hands-on experience of everything from travel and fire safety to banking and ecology.

"It was like a film set," said Rob. "But during Covid, we couldn't run visits."

Faced with shutting down the whole location, Rob was wondering how to keep his dream alive, when inspiration came from an unlikely source: a visiting electrician.

"He told me, 'I came here when I was 10. It was absolutely brilliant, a fantastic experience that really made me think about road safety.'"

That feedback helped inspire Rob to found 360 Skills for Life, an educational community interest company that now uses virtual reality tools to bring the realistic street layouts into the classroom.

Rather than bringing coachloads of children to the venue, technology now means he can take the whole experience into classrooms nationwide. To benefit more young people, and save time and money into the bargain.

He explains: "I'm passionate about the need for young people to have skills for life. Education is so focused on careers and academic stuff, but they also need to be happy and safe.

"It was extremely painful to lose the charity and those fantastic learning environments, but what we are doing now will be better in many ways."

360 Skills for Life will use a realistic virtual village, constructed entirely online. And unlike the physical safety centre, it has no size limit.

The company is now developing processes that mean schools don't need to invest in costly virtual reality headsets and can recreate the VR experience on simple whiteboards, so whole classes of young people can experience things together.

Rob says: "Headsets are expensive. It's also a one-to-one experience. The idea of a class of 30 children reacting with the instructor and solving problems together makes it a collaborative experience.

"By doing it online we can provide it to more schools. And we can provide it nationally. We're working with partners and private sponsors, such as the police, to subsidise our work and make it free to schools.

"With the physical centre, only 33% of schools could get their heads round coming in ... they had to go to the cost of booking a coach and having a full day out. Now I'm aiming for 90 to 95% take-up."

3. Literature review and panel insight

In order to undertake the analysis, it was first necessary to conduct an in-depth literature review of each industry. This enabled sector-specific assumptions to be made which were then further verified through panel interviews and workshops with industry practitioners. These assumptions were used as modelling inputs in support of estimating the impact of accelerated digital transformation on each of the UK sectors of interest.

Section 2 sets out the findings from the literature review, together with insight from the panel workshops and interviews. Of particular importance was data pertaining to current levels of technological adoption, from which it would be possible to determine the counterfactual trajectory, and also the various efficiencies that *could* be realised with the increased use of sector-specific technologies – which would provide an indication of the potential gains that could be achieved with accelerated use, owing to events such as COVID-19.

The literature review and panel insight also provide important background information against which findings from the research can usefully be contextualised.

Education sector

According to April 2020 data from the Office for Budget Responsibility (OBR),⁶ the education sector was forecast to be the hardest hit by the Coronavirus crisis, with Universities under severe financial strain and Primary and Secondary students missing out on important in-person teaching.

Overnight, schools, colleges and universities were forced to close and to seek new methods of communication and teaching practices. While technology-enabled initiatives were under consideration prior to Covid-19, the mass uptake of such initiatives from 20th March 2020 became necessary in order to continue providing students with education.

To mitigate the extent of damage to the sector, further adoption of digital transformation programmes will be critical, and could, according to the literature, change the sector for the better⁷ by bringing about innovation.⁸

Digital transformation throughout the education sector will not be a uniform process. Higher education institutions may be able to take full advantage of remote work, allowing universities to recruit from a wider geographic area, and allowing staff to avoid relocating, work closer to home and travel into work a few times a week for in-person teaching duties.

Secondary and primary education providers will be able to make further use of computer aided instruction and digital solutions to track student performance. Non-teaching functions may move towards a shared services model, with LEAs and Academy groups realizing benefits.

While there is evidence of increased use of technology and digital enablers among education providers, the sector is generally considered conservative in its approach to change. In a recent European survey, 67% of respondents revealed that the closure of schools led to their

6 The Guardian. (2020). ['Education hit hardest as coronavirus batters UK economy'](#).

7 The Financial Times. (2020). ['Covid-19 is changing education for the better'](#).

8 World Economic forum. (2020). ['3 ways the coronavirus pandemic could reshape education'](#).

first experience with online teaching, and only 6% stated that they have extensive experience with online teaching.⁹

Inevitably, the accelerated move towards online learning and the use of digital tools brought challenges, the most widely cited of which was pupil access to technology.¹⁰ However, it has also yielded numerous benefits, such as increased innovation, that is, the freedom to experiment with teaching practices.

Technology can be particularly effective in reducing administrative tasks. In turn, this frees up time for student engagement and ultimately supports student retention and attainment.

A report from the World Bank estimates a loss of \$10tn dollars in earnings over time for the current generation of students if remedial action is not taken when students return to school.¹¹ It is likely that remedial action will be driven by digital transformation, with 17% of teachers suggesting that online teaching will become integral to school practice, once schools reopen.¹²

In addition to increasing motivation and self-determination among students,¹³ increased use of digital technologies offers the opportunity for greater customisation (personalised learning) for students, something that has long been on the agenda for education providers.

In 2019, the Department for Education set out a series of EdTech (Education Technology) challenges with a view to identifying what can be achieved through the use of technology, and to inform future use of EdTech in the English education system.¹⁴

The challenges – set for delivery by 2021 – include an intention to improve parental engagement and communication, while cutting related teacher workload by up to five hours per term. Further, through the use of technology, there is a call to determine if it is possible to reduce teacher time spent preparing, marking and analysing in-class assessments and homework by two hours per week more – an efficiency gain of approximately 5.3%. Technology might also reduce teacher time spent on essay marking for mock GCSE exams by around 20%.

Further to the list of challenges, the report also indicated that schools in England spend around £10bn on non-staff costs per year, including £470m on software and hardware for learning. According to a case study identified in the report, a UK Multi Academy Trust (MAT) has reported cost savings of over 50% for on-premises hardware by moving to the cloud. This suggests that, in addition to anticipated efficiency gains realised by teachers, adoption of cloud-based technologies could release funds for reinvestment elsewhere, for example, into further digital transformation initiatives.

Findings from the Higher Education Policy Institute (HEPI) in 2017 highlight technology-enhanced learning through curriculum redesign and learning analytics as two of the biggest opportunities presented by digital transformation. Learning analytics correlates patterns of

9 School Education Gateway. (2020). [‘Survey on online and distance learning – Results’](#).

10 Ibid.

11 The World Bank. (2020). [‘Covid-19 Could Lead to Permanent Loss in Learning and Trillions of Dollars in Lost Earnings’](#).

12 School Education Gateway. (2020). [‘Survey on online and distance learning – Results’](#).

13 Ibid.

14 Department for Education. (2019). [‘Realising the potential of technology in education: A strategy for education providers and the technology industry’](#).

student activity with learning outcomes, and in so doing enables teachers to identify underachieving and disengaged students with a view to improving retention rates. The study identified a 4.2% increase in retention at a US University College; a 2.1% increase at a UK University and a reduction in dropout rates from 18% to 12% during a pilot at an Australian University.¹⁵

In addition to the aforementioned benefits of learning analytics, it is expected that the dataset created by the UK's national learning analytics service will act as an asset for educational research. In particular, it could support new insight into what works in teaching and education.

Quantifiable impacts have also been noted through technology-supported curriculum redesign. A meta-analysis of 156 National Center for Academic Transformation (NCAT) projects found all but three had reduced cost of delivery with an average saving of 31%, in addition to simultaneously improving learning outcomes in 72% of projects. Key aspects of course redesign which lead to the efficiencies were identified as including: the use of interactive learning resources, automated assessment and course management systems. The efficiencies can subsequently be used to teach larger numbers of students and/or to create new courses, among other things.¹⁶ An evaluation by the University System of Maryland found similar results achieved through course redesign, including cost savings of \$7.5m which were used for other investments.

Similarly, the concept of 'blended learning', wherein students learn using a combination of technology and online educational exercises together with in-class teaching, has been seen to reduce the cost of classes by around 15%, according to Prof John Hennessy (former President of Stanford University).¹⁷

A further approach to digital transformation for the education sector is Computer-aided Instruction (CAI) software, an enabler that provides individualised tutoring to students with the computer acting as the teacher. Studies have shown that the software can reduce in-class teaching time by 23.4% and decrease the time spent planning lessons and grading by approximately one third.¹⁸

15 Higher Education Policy Unit. (2017). ['Rebooting learning for the digital age: What next for technology-enhanced education?'](#)

16 Ibid.

17 Ibid.

18 Taylor, E. (2018). ['New Technology and Teacher Productivity'](#).

4. Industries in practice

Remote working in the education sector

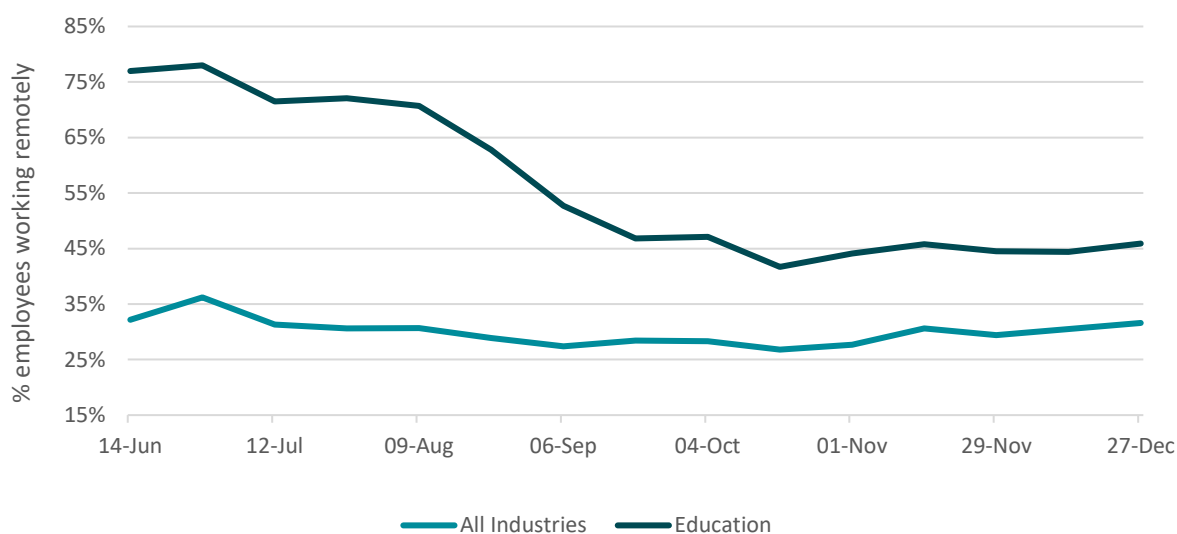
Our analysis of the education sector focuses on the public sector institutions operating within it. However, it is also important to consider the impact on private and higher education businesses operating across the broader education sector, such as training institutions and facilities.

In order to do this, we use ONS data gathered from the voluntary fortnightly business survey (BICS)¹⁹, which looks at financial performance, workforce, trade and business resilience across UK sectors.²⁰ Although this is a business survey, the trends of private educational providers offer insight into the wider sector.

In the context of this research, it is particularly relevant to look at the data pertaining to remote working, and the associated gains and challenges that UK businesses have experienced.

Figure 2 shows the proportion of education sector employees who are working remotely (as opposed to at their normal place of work), together with the average across all industries in the UK. The time frame considers the period from peak lockdown to the end of 2020.

Figure 2: Proportion of education sector employees who are working remotely as opposed to their normal place of work



Source: BICS and Cebr analysis

At the start of the given time series, over three quarters of education sector employees were working remotely, against an industry average of around 32%. Towards the end of August 2020 there was a clear decline in the proportion of remote workers in the education sector – reflecting the relaxation of the national lockdown and the push towards getting students back

19 ONS. (2021). [Business insights and impact on the UK economy: 14 January 2021](#).

20 The education sector is defined here as including: private sector and higher education businesses only; it excludes public provision of education and health.

into the classroom. In line with the industry average, there was a slight uptick in remote working again towards the end of 2020 as new variants of Coronavirus were discovered, forcing the country to take similar lockdown restrictions to those seen earlier in the year.

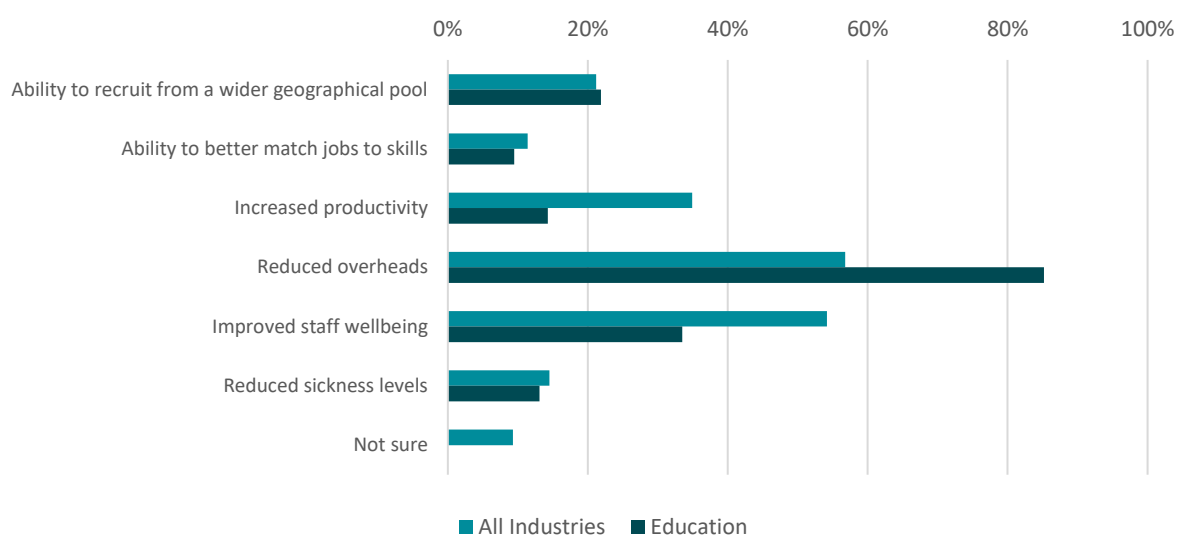
Given the nature of the virus, and the way in which it is transmitted, the move to remote working for most students has been necessary – with the exception of only vulnerable children and children of critical workers, and hence even during the peak of the pandemic, the education sector did not operate under a complete remote working model.

According to BICS survey data from the middle of December 2020, the majority of businesses (57%) in the education sector found the increase in homeworking to have no impact on their productivity.²¹ However, approximately 38% noted a decrease in productivity. This is not necessarily surprising in light of the evidence found in the literature, which revealed that the education sector has been slow to adopt digital transformation, which might otherwise have supported productivity during periods of remote working. This level of decreased productivity is above the average across all industries which was found to be approximately 25%, and suggests that opportunities exist for further transformation among education sector businesses to boost productivity.

It follows, therefore, that more than 60% of education sector businesses do not intend to use increased homeworking as a permanent business model going forward, with the principal reason pertaining to lack of suitability for the respective businesses.²²

However, of the approximately 10% of education sector businesses that *do* intend to increase homeworking permanently, increased productivity was cited by 14% as a reason to do so. This came after: a reduction in overheads, improved staff wellbeing and the ability to recruit from a wider geographic range, as shown in Figure 3, below.

Figure 3: Reasons to use increased homeworking as a permanent business model going forward



Source: BICS and Cebr analysis

21 In this context, perceived impacts on productivity are interpreted by the respondent of the survey. This interpretation may differ to alternative interpretations of productivity.

22 An example of an education sector business might be a training institution, such as a language centre.

