# Educational Excellence and Resilience Through Digitalisation: What the UK can learn from India and Others

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## Abstract

*The COVID-19 pandemic has exposed significant vulnerabilities in the UK's educational system, particularly in its capacity to adapt to rapid changes and maintain educational excellence during crises and into the future. As the UK continues to recover from the pandemic, this paper suggests there is an urgent need to reimagine and future-proof our education system through effective digitalisation. A comprehensive strategy for 'Educational Excellence and Resilience Through Digitalisation' is outlined by drawing on successful international models from Estonia, India, and beyond, as well as the best of existing UK policies, to unify infrastructure, inspection, curriculum design, resources, technologies and training policies. To facilitate further discussion and analysis, the paper presents a set of fourteen actionable recommendations designed to modernise the UK education system through the effective and coherent provision of digital education capable of addressing persistent issues such as educational inequality, absenteeism, and mental health challenges and providing high-quality, resilient education for future generations.*

## Introduction

The COVID-19 pandemic and associated lockdowns have had a profound impact on students in the UK across various dimensions such as educational attainment, socialisation, and motivation for learning. Firstly, during the pandemic period school closures and the shift to remote learning led to significant learning losses, with UK and global students losing an average of between 1.5 and 3 months of learning, with disadvantaged and SEND students being particularly affected (e.g. Ofsted, 2022; DfE, 2021; EFF, 2021; Dorn et. al., 2020; Green et. al., 2020; Angrist et. al., 2021; UNICEF, 2021; Seusan & Maradiegue 2020). The Education Endowment Foundation (EEF, 2022) reported that the attainment gap between disadvantaged students and their peers widened considerably during the pandemic, a phenomenon also observed globally (Naidu, 2021). Secondly, the lockdowns also severely disrupted the social development of secondary school students. Prolonged isolation and the lack of in-person interaction with peers and teachers affected students' social skills and emotional well-being. Research from UCL's Institute of Education highlights that many students experienced increased feelings of loneliness and disconnection during the pandemic (Anders et. al., 2021). This disruption in socialisation could have long-term implications for students' ability to form and maintain relationships. The UK Department for Education (DfE) also identified an increased prevalence of poor behaviour in school by students, including more bullying and fighting once students returned to school post-

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lockdown (DfE, July 2022). Thirdly, the transition to remote learning also negatively impacted students' motivation. The absence of a structured school environment, reduced direct interaction with teachers, and the challenges of home learning environments contributed to lower engagement and enthusiasm for academic activities. Many students reported struggling to stay focused and motivated when learning from home (Ofqual, 2021; Anders et. al., 2021).

These factors may go some way towards accounting for some of the increases in absenteeism and mental health episodes that have become apparent in the UK since the end of the pandemic period. Secondary school absenteeism in the UK has seen notable changes before, during, and after the COVID-19 pandemic. Prior to the pandemic absenteeism rates in secondary schools in England were relatively stable, with the overall absence rate around 5% (DfE, 2020). However, during the pandemic period absenteeism increased significantly to 21.3% (DfE, Oct 2022) due to various factors, including school closures, remote learning challenges, and illness and health concerns. Pupils from disadvantaged backgrounds and those eligible for free school meals experienced even higher rates of absenteeism, exacerbating pre-existing educational inequalities (Benhenda, 2023). Despite concerted recent efforts by UK schools to monitor and address absenteeism, post-pandemic data for England indicates that absenteeism rates remain higher than pre-pandemic levels at 7.1% for academic year 2023/24 and that one in five children in England (20.3%) continue to persistently miss school (defined as missing 10% or more of their school days) (DfE, 2024).

There is a long-acknowledged cyclical effect of persistent absenteeism whereby the absent student falls so far behind their peers that returning to school presents serious educational challenges such as struggling to understand the lessons and to catch-up the assignments, which then leads to further absenteeism. This also has an impact on the student's mental health, as feelings of anxiety and an inability to cope, coupled with loneliness resulting from reduced opportunities for socialisation and friendship-forming, lead to mental health episodes and further absenteeism (Gottfried, 2014). Finally, there is a link between absenteeism and drug misuse (Gakh et al, 2020). Together, this absenteeism has significant impacts on attainment and educational outcomes, frequently leaving those students disadvantaged for life (e.g. Patnode et al, 2018; Sosu et al, 2021; Cattan et al, 2023).

Another important after-effect of the pandemic has been the increase in mental health episodes within school-aged students. During the pandemic the mental health of secondary school students noticeably deteriorated with increased anxiety, stress, and depression commonly reported, linked to the uncertainty and disruption caused by the lack of routine, concerns about academic progress, and fears about the future (Ofqual, 2021). Prior to the pandemic, data from 2017 indicated that 11.6% of 6 to 16-year-olds had a probable mental disorder. This figure rose significantly during the pandemic, reaching 17.4% by 2020 and remained at that level into early 2021 (NHS England Digital, 2021) (Early Intervention Foundation, 2021). Furthermore, an additional 39.2% of 6 to 16-year-olds reported experiencing a deterioration in their mental health during the pandemic (NHS England Digital, 2021). Students aged 8-19 continue to suffer increasing mental health disorders, with the reported number rising to 21.8% by 2023 (NHS England, 2023), which is highly likely to exacerbate the persistent absenteeism issue and further contribute to lifelong disadvantage.

As a result of the lost learning, relatively high levels of persistent absenteeism, and increasing mental health concerns during and after the Covid period, developing a resilient educational system capable of withstanding 'shock' events and of supporting absent students by enabling continued excellent learning when they not physically present in the classroom is of urgent individual and societal importance.

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Resilience in organisations in general can be understood as either state-like or trait-like, where a state-like resilience is not inherent, but can be fostered through training and systemic development (e.g. Stokols et. al., 2013), while a trait-like resilience implies an inherently stable condition of an organisation (e.g. Bonnano et. al., 2015). Traditionally a "*state-like definition of resilience is represented in a positive dynamic capability to bounce back and successfully cope with significant change, adversity, or risk*" (Hillman, 2021, section 3.4) and this is the predominant notion within the education domain in the UK (Price, 2023). This includes coping with challenges like financial crises, natural disasters, or the rapid shift to online learning during the COVID-19 pandemic. However, this traditional view often focuses on short-term survival rather than long-term sustainability and innovation and does not plan for post-event absentee students. Instead, Kuldus & Foody (2022), in relation to the individual and drawing from Unger (2008), argues for a move away from state- versus trait-based conceptualisations and towards a transactional resilience, whereby resilience is "*a mixture of intrinsic and extrinsic characteristics or transactions between characteristics of individuals and the environment"* (Kuldus & Foody, 2022, p.1364). This can be extended to the organisational level as an "*adaptive function of the capacity of socio-cultural and physical environment to facilitate* [organisational] *growth"* (ibid.) whereby an education system would be structured by the State such that it enables flexibility, adaptation, growth, and therefore resilience.

Price (2023) argues that a proactive, transformative, 'designer resilience' strategy centred on anticipating challenges in advance and developing flexible, creative systems that can cope with a range of educational and external contexts, including integrated mental health support, through co-design and iterative development with stakeholders is one route towards creating this sort of flexible system. Price (2023) suggests that this can only be effectively implemented by the development of networks and partnerships, and the effective sharing of resources, knowledge and best practices.

Similarly, Naidu (2023) argues for a reimagined education system that enables greater openness, addresses mental health as a key aspect of resilience, has the flexibility capable of accommodating different modes of instruction including in-person, online and hybrid models, and empowers the transition to modern, student-centred pedagogical approaches (such as Networked Learning (e.g. de Laat & Lally, 2023; Blaschke et al, 2021; Jones & de Laat, 2016; Siemens & Conole, 2011; Downes, 2010)). Critical to this reimagining is government-led investment in digital education infrastructure (including high-speed connectivity, up-to-date devices and digital literacy programmes for teachers and students) in order to provide resilient education that addresses issues such as absenteeism and mental health by making full use of the affordances of existing and emerging technologies, including AI (Artificial Intelligence) and XR (eXtended Reality) to underpin personalised learning, provide access to a wider range of resources, and facilitate self-paced/self-directed learning that can occur in or out of classroom settings.

In a recurring theme, Green et. al. (2021) published a Framework for Adaptability which aims to ensure that resilience in education is not limited to short-term crisis management but includes proactively creating conditions for long-term adaptability. This would involve creating systems that are flexible, can quickly pivot in response to new challenges, and that prioritise mental health and well-being. Again, the authors stress the role of digital technologies in enabling that flexibility and adaptability and the need for significant investment in digital infrastructure to ensure that the Framework's guiding principles of equitable, accessible and sustainable systems for all students can be guaranteed. Furthermore, within the UK Higher Education context, Nandy et. al (2021) found that institutions that were more adaptable fared better during the pandemic, in particular those with flexible curriculum delivery, strong leadership, and the ability to quickly mobilize resources. In their Resilience Framework the authors also focus on the need for strategies for digital transformation (including high-quality, accessible digital tools and devices, and

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high-speed, reliable internet connectivity), the implementation of in-person, online and hybrid learning models, and integrated mental health support systems.

In a similar way, the OECD in their 2020 Education Working Paper (Gouëdard, et. al., 2020) during the early stages of the pandemic called for governments to *"explore ways forward to [...] design new models of education that expand the borders of physical schools through technology"* (p. 5) and that focus *"on the use of technology, distance and hybrid models of learning as a compliment to school-based learning"* (p.9). As with Price (2023), the OECD recommends the sharing of resources and experience through networks and partnerships between schools and universities. As with Naidu (2023) and Green et. al. (2021), the OECD also state, *"investing in technology to support learning [...] will be required [...] [and] countries will need to analyse their educational budgets against these needs and potentially explore working with other ministries to provide connectivity and support staff to maintain networks and platforms and provide skilled support"* (p.13). Finally, Burbules et al, (2020) have identified five trends in education and technology, of which the use of interactive and immersive technologies (XR) and online platforms to transform traditional learning contexts (e.g. classrooms) into hybrid educational ecologies deploying blended learning pedagogies are three (p.93-95). The authors consider these developments essential in ensuring the resilience and effectiveness of educational systems going forward and call for policymakers to focus on funding infrastructure to support these technological advancements.

There appears then to be a considerable degree of unity among educational experts from the UK and across the world on how to improve educational resilience. This includes the need for:

1. the structure and design of education systems to enable institutional-level flexibility and adaptability
2. significant government-led investment in digital technologies, infrastructure, support and training
3. the introduction of modern pedagogies and modes of learning
4. the sharing of resources and experience through professional networks, partnerships and collaborations at school, university and ministry levels
5. the integration of mental health support systems.

## What can be learnt globally?

Given this general agreement on how to develop resilient education systems that can survive 'shocks' and help address absenteeism, the question now becomes one of what and how - what should be done? and how can it be implemented? In answering these questions there is much that nations can, and should, learn from each other.

During the pandemic many countries introduced networks and technologies to help deal with the emergency transition to online education. For example, the OECD Working Paper (Gouëdard, 2020) highlights the creation of digital education task forces in places like Iceland, Kentucky (USA) and Wales to *"bridge the gap between governments and stakeholders"* that included IT experts in their make-up (p.19); a teacher mentoring programme to network tech-savvy teachers with those with fewer digital skills in South Korea (p.25); the two national 'Learning from Home' digital platforms set up by the New Zealand government to help teachers with advice and guidance (p.25); and the extension of existing online and TV platforms, the provision of pedagogical support with lesson planning, and the encouragement for educators to use MOOCs (Massive Open Online Courses) and attend international conferences on digital tools by the Mexican government (p.25). All of these actions provide useful lessons for others.

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Furthermore, the UK DfE's report: 'Future Opportunities for Education Technology in England 2022' (Vincetini, et. al., 2022) detailed learning from four other nations - France, Denmark, the USA, and China. Of note was the French commitment to digital skills training for teachers *and* families; Denmark's multi-million Euro, long-term, regular government investment from 2011 onwards in digital devices, online resources and teacher digital skills resulting in a *"high level of digital infrastructure and competences…*[which]*...paid off during the pandemic, facilitating education continuity and the transition from physical to online learning"* (p.22); the US national EdTech evaluation platform to help influence and inform decision-makers on the effectiveness of EdTech products and services; and the widespread use of MOOCs and other online courses in Chinese schools and classrooms. In addition, the report notes that in response to public-private distrust, capital and financing complexities, and an over-emphasis on hardware, the French government developed and published an overarching digital education strategy (the TNEs, 2021) which includes national capital investments earmarked for digital learning; the acceleration of the provision of digital equipment; the collection and sharing of educational content; the training and digital skilling/upskilling of teachers and families; and a commitment to a 77 million Euro digital education research programme. It also reports on Denmark's 2018 Technology Pact strategy to further strengthen an already digitally advanced education sector through increased focus on technology and digital skills development, the provision of digital education as a stand-alone subject, and a single login for all teachers and school students accessing national digital education systems and tools.

These many examples are informative, but perhaps the two most illuminating examples can be found in Estonia and India. The former evidences the value of an established digital educational system and can provide insight into the sorts of policies and approaches that facilitate a resilient system. The latter provides evidence of the value and importance of a national policy-level response and commitment to educational resilience planning through the Indian National Education Policy of 2020 (NEP 2020) (Ministry of Human Resource Development, 2020).

## What can be learnt from Estonia?

Estonia is widely recognized as one of the most digitally advanced countries in the world, and its education system is no exception. The country has had a significant, long-term commitment to digital education and inclusive, accessible online platforms and resources. This has been supported by a combination of innovative policies, robust infrastructure, and a commitment to digital literacy.

One of the cornerstone platforms in Estonia's digital education landscape is eKool - an electronic school management system, allowing teachers, students, and parents to track academic progress and communicate with each other. Another critical resource is the Estonian Ministry of Education and Research funded, developed and operated E-Koolikott platform, a central digital repository of learning materials aligned with the national curriculum. This platform includes interactive textbooks, exercises, and multimedia content, which enables students to study independently and at their own pace in hybrid modes. It also has a content creation service for teachers which leverages H5P interactivity. In addition, Education Estonia operates a searchable Services & Products repository of digital solutions for schools, educational games, online courses, mentoring programmes and more, developed by public and private organisations. Finally, Estonia encourages school participation in the European Union eTwinning community which facilitates Estonian students and teachers to engage in cross-border projects with schools in other countries, thereby enriching their learning experiences with diverse perspectives, developing digital and cultural competencies, and supporting peer and networked learning pedagogies.

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Significant policy support and government-led investment from an early stage has been critical in facilitating and supporting these aspects of the Estonian education system. Firstly, from the mid-1990's Estonian schools were granted a high degree of autonomy as part of educational reforms in the post-Soviet era, which has enabled flexibility and adaptability at a local level (Byrne & Plekhanov, 2019). Next, in terms of the digital transformation of the system, among others, the 2012 ProgeTiger policy introduced programming, robotics, and digital creativity into the curriculum at all age levels; invested in both digital tools and teacher training; developed and provided teaching materials; and has recently evolved to include a greater focus on educating for and about AI systems. Accompanying this there has also been an overt digital focus within the national curriculum whereby general digital competencies and skills are integrated into all subjects from early years onwards through the use of digital tools and devices, and interactive and multimedia resources. In addition, strong Public-Private Partnerships (e.g. with Samsung) have ensured that robust digital infrastructure and cutting-edge digital tools are provided to Estonian schools. This works because the innovation-driven mindset and autonomy of schools and teachers makes it an ideal testbed for private tech companies to develop and test new educational technologies.

Turning to Estonian school provision for child mental health, a 2015 study of the psychological well-being of students aged 9 to 17 reported on student-suggested approaches to improving well-being, which included the idea of having mental health support staff present in schools (Viitpoom & Saat, 2016). To compliment this, and in line with Estonian commitment to harnessing the benefits of private sector technology partnerships, educational psychologists worked with start-ups to co-create the Clanbeat digital platform for students to self-monitor, set goals and plan their daily activities, and develop health games such as TriumfHealth which raises awareness of mental health and develops effective coping skills. For a student population already used to exploring mental health matters via digital resources, it was not particularly disconcerting when, during the pandemic, school counselling moved online (or via telephone). Indeed, this aligned so well with student expectations and preferences that online counselling is now considered *"an important addition to their* [counsellors] *toolbox* [because] *many young people prefer virtual meetings to a psychologist's office"* (Urm, 2021).

Positioning these aspects of the Estonian education system against the resilience features previously identified, we can see that there has been a long history of school autonomy promoting a culture of flexibility and adaptability. There has also been consistent public and private investment in digital infrastructure, advanced digital tools, devices and platforms, and teacher training for over a decade. Pedagogical innovation has been implemented through the integration of digital skills throughout the curriculum and the provision of extensive, curriculum-aligned digital teaching materials and other resources that enable self-directed, self-paced and networked learning pedagogies and hybrid modes of learning. Furthermore, the central eKoolikott and Service & Products resource repositories and the involvement with the eTwinning community has supported the sharing and sourcing of materials, experiences, and best practice; enabled the building of networks and partnerships; and facilitated peer and networked learning pedagogies among teachers. Finally, pre-existing digital resources and services and established digital communication technologies enabled a continuity in child mental health provision during the pandemic that proved to be so aligned with student digital literacies and their behavioural preferences that online counselling has continued into the post-Covid era.

All of this has had significant benefits for both educational attainment and educational resilience. In terms of attainment, the result of these state-driven policies, investment and commitment to innovative digital education and mental health has been that Estonian 15 year-olds are the highest scoring European students overall in the PISA tests and are top for maths and science (OECD, 2024). Estonian adults also have high digital skills levels (Byrne & Plekhanov, 2019), giving them a competitive edge in modern workplaces, perhaps

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reflected in Estonia having the most start-ups and unicorns per capita of any country (e-estonia, 2023). Equally, from a resilience perspective, the robust digital infrastructure and advanced levels of staff and student digital literacies meant that during the pandemic Estonia was able to transition to fully online teaching and mental health provision with only minimal disruption and maximum continuity in learning. This led the OECD (2020, p.25) to comment that in Estonia because *"all learning materials were already online,* [it] *gave teachers room to focus on teaching"* as opposed to juggling teaching commitments with learning new technologies and digital skills, as was the case in the UK. Clearly, there is much that can be learnt from the Estonian model in terms of effective resilient education.

## What can we learn from India?

While the Estonian example provides ample evidence of the benefits of a digital approach to teaching and learning for both excellence and resilience, it is true that Estonia is a small nation of just 1.4 million people, with a total number of school students of only 158,000 (Ministry of Education and Research, 2024), so perhaps it is relatively easy to implement policies, services, platforms and tools, and to find the necessary investment for a comprehensive digital education plan, when compared with more populous nations. The same can not be said for India, with a population of 1.4 billion and a school-aged population of 265 million (although official enrolment figures for secondary school stand at only 34.3% (UNICEF, 2023) and education is only compulsory to age 14). Overall, Indian school student attainment levels appear to have been declining, with 48% of students at grades 3 (9 years old), 5 (11 years old) and 8 (14 years old) achieving targeted performance levels in 2017, but just 34% reaching the same in 2021. Furthermore, the Indian education system has unique contextual challenges many of which stem from the colonial legacy. These include multiple languages and dialects; access; enrolment; urban-rural divides; resource inequalities; literacy rates (especially among women); marginalised communities (e.g. Scheduled Castes, Scheduled Tribes and Other Backward Classes); regional and federal variation in policy, quality and teacher training; unregulated private schools; and a significant digital divide. To this can be added the disruptive effect of the Covid-19 pandemic.

In an effort to try to address some of these challenges a wide-ranging overhaul of the Indian education system was passed in 2020 and is known as the National Education Policy (NEP 2020), which sits alongside the broader Digital India Campaign and builds on the earlier SITE programme of the 1970s and the 2012 ICT in School Education Policy. The NEP 2020 mainstreams digital education as a goal in its own right, as opposed to being an aid for traditional teaching as it was framed in the earlier programmes and policies. It aims to transform India into a digitally empowered society and knowledge economy. There are several critical areas of focus in the NEP 2020:

1. Universal access to education
2. Improved quality of teaching
3. Integration of technology in education
4. Multilingualism
5. The need for early childhood care and education (ECCE) as a foundation for Lifelong Learning
6. Public-Private Partnerships

From the perspective of the various key features of educational resilience previously identified in this paper, of particular relevance within the NEP 2020 are the specific clauses concerning new pedagogical foundations, the digitalisation of provision (including robust infrastructure), the deployment of public-private partnerships, and increased government investment. Firstly, the NEP 2020 states,

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*"New circumstances and realities require new initiatives. The recent rise in epidemics and pandemics necessitates that we are ready with alternative modes of quality education whenever and wherever traditional and in-person modes of education are not possible. In this regard, the National Education Policy 2020 recognizes the importance of leveraging the advantages of technology"*. (Clause 24.1).

As such, the NEP 2020 is premised on a new pedagogical commitment to transforming India into a Global Knowledge Superpower through global collaborations and internationalisation (Clause 12.7); active online learning blended with offline hands-on experiential and activity-based learning (Clauses 15.7, 24.3, 24.4i, 4.6, 4.33-35); and a focus on critical thinking, competencies and skills, such as communication skills, creativity, collaboration, problem-solving and so on, rather than solely on knowledge (Clauses 4.6, 4.23, 4.34). Indeed, on this latter point concerning an increased focus on skills and competencies, the NEP 2020 explicitly states,

*"computers have largely surpassed humans in leveraging factual and procedural knowledge, our education at all levels excessively burdens students with such knowledge at the expense of developing their higher-order competencies"* (Clause 23.7).

These statements constitute a significant, far-sighted vision and pedagogical shift, and to enable this to manifest, the NEP 2020 places considerable emphasis on the digitalisation of education throughout the Indian system at all levels from primary to tertiary. In this regard the NEP 2020 makes a number of specific commitments to the broader structures required to facilitate digitalisation in Clause 23 'Technology Use and Integration', as follows;

1. Clause 23.3-5 & 23.8 - The establishment of the autonomous National Education Technology Forum (NEFT) to facilitate knowledge exchange; provide policy advice; guide research directions; support the integration of technology in education at all levels in classrooms, teacher training and educational management; and monitor and analyse emergent technologies such as AI and 3D/XR (eXtended Reality)…etc.
2. Clause 23.6 (and 24.4c) - The expansion of national e-learning platforms (DIKSHA/SWAYAM) to host e-learning content developed by all Indian States, educational bodies and teachers, including content that is more inclusive of students with special educational needs, remote students, and different languages, and content intended for teacher training and professional development, and that includes video and audio conferencing functionalities.
3. Clause 23.10 - Partnerships with Higher Education Institutions (HEIs) to develop online courses for teaching of students and for skilling/reskilling/upskilling teachers in cutting-edge domains.

The NEP 2020 then goes on to address the need for 'Online and Digital Education: Ensuring Equitable Use of Technology 'in Clause 24. Firstly, it recognises the complementary and primary role of the Digital India Campaign in addressing the digital divide through the provision of computing devices and infrastructure nationally, before moving on to stress the need for teacher training and professional development in online pedagogies and teaching practices, especially for blended (or hybrid) learning that effectively combines online and offline education. Next Clause 24 turns to a series of practical commitments, as follows;

1. Clause 24.4b - The need to invest in open, future-proof, public digital education infrastructure suitable for multiple devices, platforms, and software solutions at scale.
2. Clause 24.4d - The development of a national digital resources repository hosting coursework, learning games and simulations, apps and software tools, and AR and VR materials for teaching, with a public user-rating system for effectiveness and quality.

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3. Clause 24.4e - The expanded use of existing TV and radio mass media services for educational broadcasts all day in all Indian languages.
4. Clause 24.4f - The development of Virtual Labs for HEIs and for schools available on https://www.vlab.co.in/ and linked to the national platform (DIKSHA) to provide all students with access to practical, hands-on, experiment-based learning via appropriate devices such as tablets, and in the future VR headsets.
5. Clause 24.4g - Training in quality, pedagogically-grounded digital content creation for teachers who are to use online teaching platforms and tools for content creation.
6. Clause 24.5 - The creation of a dedicated unit to build digital infrastructure, digital content and digital capacity within the Indian Ministry of Education composed of administrative, education, technology and pedagogy experts.

In relation to student mental health, there are also commitments to *"the development of capacities that promote student wellness such as fitness, good health, psycho-social well-being, and sound ethical grounding"* (Clause 12.1, p.39) by providing counsellors for all students to support emotional well-being (Clause 12.4), encouraging student participation in Health & Well-being Clubs (Clause 4.44), and promoting the Arts and Sport as routes to psychological well-being (Clauses 22.3 & 4.8). In addition to NEP 2020 mental health commitments the Indian Ministry of Education has already provided the Manodarpan service (IMoE, 2020) which provides free tele-counselling, live 1-to-1 online counselling sessions and group webinars, resources and services for teachers and families, and an online directory of counsellors working at school and university levels.

To enable all the above to happen, the NEP 2020 also sets specific financial commitments in Clause 26, where it states that the Indian government *"commits to significantly raising educational investment, as there is no better investment towards a society's future than the high-quality education of our young people"* (Clause 26, p.61). To this end there is now a legal requirement for education expenditure to increase from 4.4% of GDP to 6% by both the Indian and State governments (Clause 26.2), with expenditure to focus on the extensive use of technology and online education; enabling universal access; developing and providing learning resources; student well-being; teacher training and professional development; and one-time costs such as infrastructure. Central funding is to be enhanced with private philanthropic activity and partnerships with private organisations within a 'light but tight' regulatory framework.

To further stimulate the uptake of these reforms by the teaching profession the NEP 2020 also incentivises teachers by linking promotions and salary increases to excellence and outstanding teaching in all types of educational institution. This is assessed through a process of appraisal of performance and is merit-based, not length-of-service-based (Clauses 5.2 & 8.6). Within the HE sector, this has added to the 2018 Academic Performance Indicator calculator (Table 2, p.105, University Grants Commission, 2018) for HE educator performance whereby excellence constitutes, among many other factors, making full use of new digital capabilities to deliver high quality online or digital education and to contribute to the national online education platforms. It is explicitly stated that as part of the promotion process HE staff must evidence one or more of the creation and use of:

- innovative ICT-mediated pedagogy
- new digital curricula and courses,
- MOOCs
- e-Content

It is anticipated that a similar set of appraisal criteria will be introduced to school-level appraisal and promotion processes soon, in order to complement the already existing National Teaching Award criteria, which includes recognition for the well-established drive towards students and staff becoming 'prosumers' (both producers and consumers of digital

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content). The NEP 2020 has been further supported in schools through the deployment of the NDEAR platform, which has the objective "*to facilitate achieving the goals laid out by NEP 2020, through a digital infrastructure for innovations by, through and in the education ecosystem*" (IMoE, 2021, About NDEAR). The platform enables a coherent multi-channel, multimodal learning continuum for individuals at school, but also after school, at community centres, and at home by supporting digital pedagogies including synchronous/ asynchronous interactions; blended offline and online learning, and self-directed learning (see Fig. 1 below).

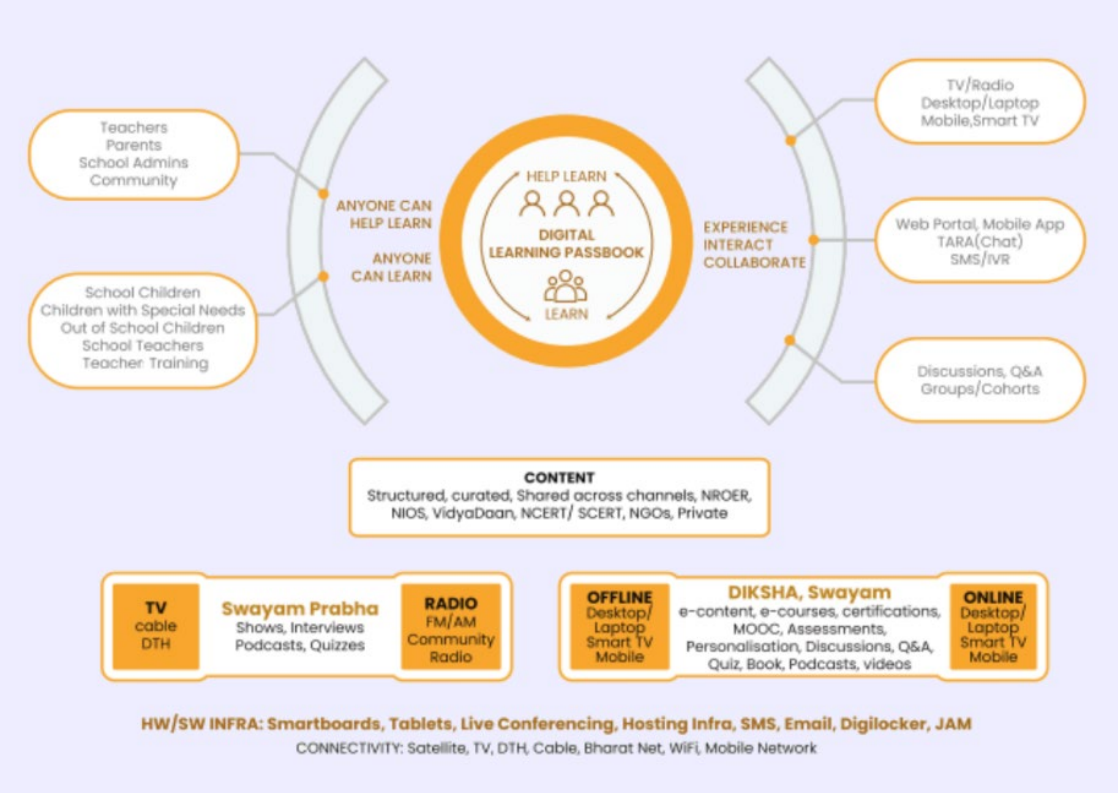


*Figure 1: The NDEAR multi-channel, multimodal digital education ecosystem (IMoE, 2021, About NDEAR)*

NDEAR provides a repository of digital textbooks, micro-courses, live learning sessions, digital student report cards, and learning resource QR-codes, and is built on open APIs from the existing DIKSHA platform, and open standards and specifications in order to facilitate innovation. Beyond teaching and learning, NDEAR-supported projects also extended and integrated existing learning analytics services such as the Vidya Samiiksha Kendra (VSK). Initially developed by the state of Gujarat, the VSK is now a national service that collects regional-level (state and district) analytics data and aggregates and analyses over 500 core datasets to provide a National VSK Dashboard. This provides near-real-time data on learning and, among others, teacher and student attendance and assessment. The overview this enables is used to support "*shared 'seeing' for amplifying data-based decision making […] by key stakeholders for academic and non-academic activities*" (VSK, 2019, Solution Approach). In practice, the VSK has also served to highlight where there are data gaps at the ground level, thus also helping to target research and training efforts. In February 2024 more than twenty Education Ministers from countries across Africa and Asia visited the VSK facilities as part of the World Bank organised 'Harnessing Technology to Improve Learning and Service Delivery' event in New Delhi (Yagnik, 2024).

The result of the NEP 2020 reforms and its associated platforms and services is that although the primary aim is to modernise and improve a struggling Indian education system, it also is clearly and explicitly designed to ensure a resilient education system as well. There

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are legal commitments to significant government-led investment in digital technologies, infrastructure, support, training and data; the introduction of modern pedagogies and modes of learning; the sharing of resources and experience through professional networks and national platforms; and the integration of mental health support services. However, while the NEP 2020 permits curriculum, pedagogical and resource flexibility within Indian HEIs, this remains structured within approved frameworks, and primary and secondary school systems remain even more closely governed by Central and State policies and directives. This may be a necessity of the transformation process, but weakens the resilience of the overall system by somewhat reducing the scope for local-level flexibility.

## What Impact has the NEP 2020 had?

With the introduction of the NEP 2020, is it possible to discern any early impact on the Indian education system, especially as this coincided with the Covid-19 pandemic period? Primary research conducted by the authors of this paper during 2022 has shown that the NEP 2020, despite only being introduced a very short time previously in an educationally challenging context, has already produced interesting results when compared with the UK in some aspects.

Initially developed as part of an EC-funded Erasmus+ 'Partnerships for Digital Education Readiness' project entitled: 'Bridges: Bridging Educational Emergency to Digital Pedagogies' (ID 095042), and then extended through global collaborations with researchers from, among others, India, Japan, and Ghana, via connections made through the volunteer UNESCO Open Education Mentorship programme (where both author's were mentors supporting the development of MOOCs in Bahrain and India), the behaviours of HEI teaching staff before, during and after the Covid-19 pandemic were investigated, with a particular emphasis on digital technologies and their use.

25 initial 1-to-1 expert interviews were conducted with HEI educators across Europe and analysed thematically to inform the design of an online survey which was disseminated across researcher networks via email and social media (ERGO 68029). In total, 511 responses were received from 16 countries (7 within the EU), with 55% of responses coming from educators at Lecturer or Researcher level and 42% from Professor or Associate Professor level across all academic domains (Arts & Humanities 17%, Life Sciences 18%, Science & Technology 26%, Business & Social Sciences 36%). In total, data was received and descriptively analysed from 80 responses from India and 39 responses from the UK, constituting almost a quarter of the sample. It should be noted that this research only relates to HEIs, not the entire educational system, and so can not be taken as definitive evidence for the impact of NEP 2020 in all educational contexts.

Firstly, prior to the pandemic there was no significant difference between the amount of online teaching occurring in Indian and British HEIs, with around two-thirds of Indian (65%) and UK (69%) HEI educators reporting using online for less than 10% of their teaching. As expected, these figures dramatically decreased during the pandemic, where just 6% of Indian and 5% of UK educators were using online teaching for less than 10% of their time. Post-covid this increased again, but remained significantly lower than pre-covid levels, with one in five Indian (19%) and one in four UK (26%) HEI educators reporting using online teaching for less than 10% of their time. Clearly then the pandemic resulted in a similar permanent increase in the use of online teaching within Indian and UK HEIs, where pre-covid median amounts of online teaching increased after the pandemic period (in India from 10-25% to 26-50% and in the UK from less than 10% to 26-50% of teaching being conducted online).

However, more interesting and informative differences can be found in the use and non-use of certain online teaching tools and services during the 2020-2022 period, rather than in the

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amount of online teaching. In these data it is possible to discern the impact of national behaviours more clearly than in the data concerning the amount of online teaching, as this latter was more heavily influenced by the necessarily similar responses to the pandemic by all nations.

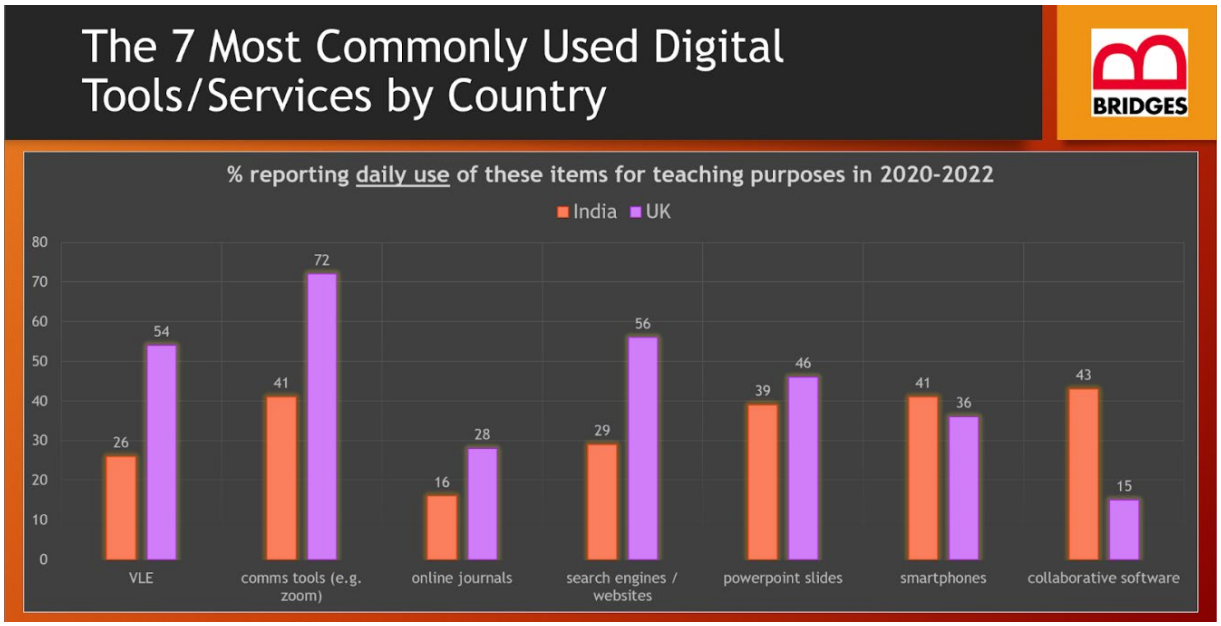


*Figure 2: The most commonly used digital tools by Indian and British HEI educators during 2020-2022*

*(Note: VLE = Virtual Learning Environment, now commonly known as a Learning Management System, such as Blackboard, Moodle, Teachmint or SWAYAM)*

Figure 2 indicates that UK HEI educators made noticeably more use of what might be termed the 'standard' digital tools, such as communications software like Teams, Zoom, etc; VLEs/LMSs such as Blackboard or Moodle; basic Web functionalities such as webpages and search engines; and online journals, and somewhat more use of powerpoint slideshows than did their Indian counterparts. Conversely, slightly more 'non-standard' devices and services, such as smartphones and collaboration software, were used more by Indian HEI educators than their UK equivalents.

This pattern for the greater use of more non-standard tools by Indian HEI educators was even more evident in the data concerning the *least* used digital tools and services during the 2020-2022 period (see fig. 3 below).

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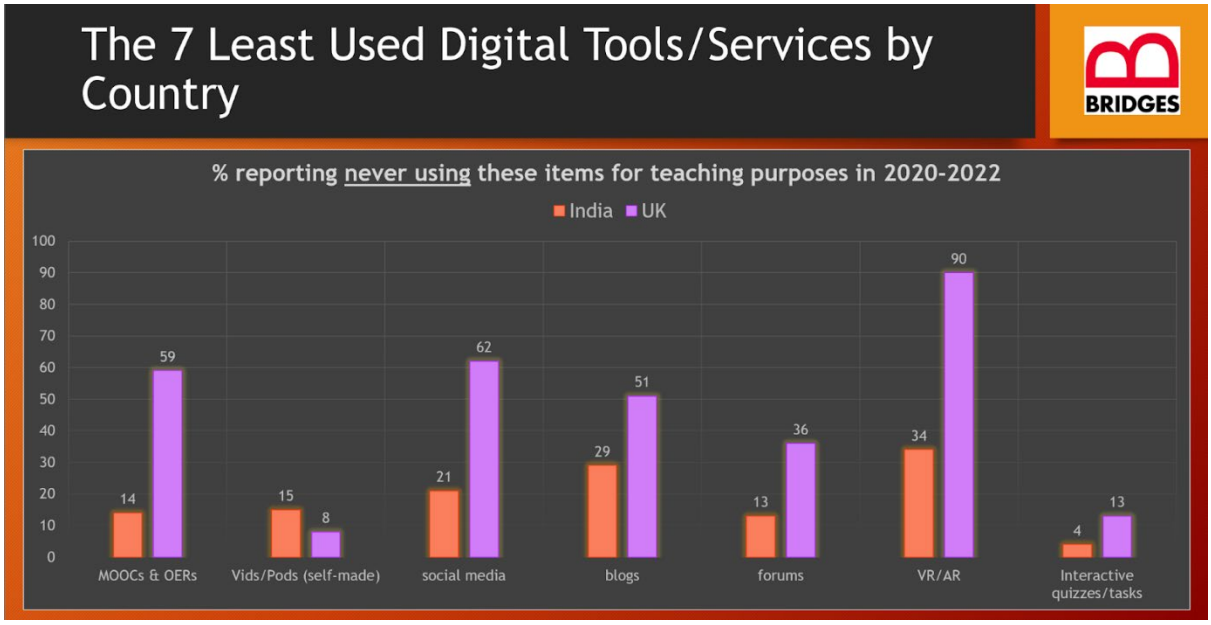


*Figure 2: The least used digital tools by Indian and British HEI educators during 2020-2022*

In stark contrast to the more standard digital tools and services the data clearly indicates a considerably higher use of almost all the more non-standard and advanced digital education resources by Indian HEI educators, with the exception of educator-made videos or podcasts. Of particular note is the fact that between a half to two-thirds of UK HEI educators *never* use social media, blogs, Massive Open Online Courses (MOOCs) or Open Educational resources (OERs) in their teaching, while this is true for only a third to an eighth of Indian educators.

Perhaps most strikingly however is the use/non-use of the most cutting-edge of digital education devices and resources - Virtual, Augmented and Mixed Reality (collectively XR). The UK Department of Education 2022 Report into the future of education technology cites XR as one of the three main future directions for EdTech, suggesting that there *"has been a revolution in availability of high-quality, usable and affordable applications"* (Vincentini et. al., 2022, p.30). Despite that, the data indicates that only 10% of UK HEI educators have *ever* used XR in their teaching compared with 66% of Indian educators - a significant difference. In this area UK HEI teaching and learning is lagging far behind its Indian equivalent.

Other findings reveal that just 5% of Indian HEI educators report receiving no formal support and training from their institution for online teaching since the end of the pandemic compared with 28% of UK educators, and in corollary, 34% of Indian educators have received regular and on-going support and training compared with just 10% of UK educators in the same period. UK educators also reported that learning through their own trial and error was the most useful method to gain knowledge and understanding of online teaching tools, devices and software (74%), which was higher than India (60%) (and any other country surveyed), while just 31% rated the formal training sessions they did receive as extremely useful (compared with 42% in India).

The data indicates that in both the UK and India the amount of digital education has increased since the end of the Covid period compared with the pre-covid period, meaning that educators now require an expanded set of digital skills, additional digital resources and infrastructure, and modernised pedagogical understanding. However, it seems that UK HEI educators only make frequent use of the 'standard' digital education services, which they have had to learn how to use through their own efforts rather than through formal training and support. Furthermore, they make little use of the most advanced digital tools and

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services available to them. In contrast, Indian HEI educators, while using the ‘standard’ digital services less often, make much more frequent use of the more non-standard and advanced digital education tools, such as XR, which they have learnt through more formal training and support. As a result, the Indian Higher Education sector appears to be making good use of these advanced digital tools and services when compared with the UK

# Discussion

The differences between UK and Indian HEI educator behaviours, especially in relation to the use of advanced/non-standard technologies may provide some early evidence of the impact of the Indian NEP 2020. The focus on digitalisation that forms a key part of the policy may already mean that the UK is falling behind when it comes to creating a resilient, excellent and future-proofed education system. For example, the lack of uptake of the more advanced digital education technologies by UK HEIs, specifically XR, has potentially important future-proofing impacts. The global market for XR in education is projected to grow from $4.4bn in 2023 to $28.7bn by 2030 and there is an expected increase of 5.5 million VR headsets between 2024 and 2028, and in addition, XR-related jobs are predicted to increase from around 80,000 today to 2.3 million by 2030 (Olarreaga, 2023). Alongside market growth, XR is becoming increasingly commonplace in work domains including manufacturing and engineering, medicine, business, the arts and culture, retail, the military, and gaming. British academic institutions and businesses ought to be well placed to capitalise on this growth, but only if British students and workers have the right skills and educational experiences to understand and operate effectively in the domain.

Equally, recent education research into the effects of XR on learning indicates, among others, important benefits for knowledge and skills development, retention and recall (Klingenberg et al, 2020, Wu et al, 2020); learning gain (Barsom et al, 2020); motivation (Di Natale et al, 2020; Cheng & Tsai, 2020); attainment - especially for struggling students (Jong et al, 2020); academic achievement (Liu et al, 2020); cognitive and team engagement (De Freitas et al, 2022); and confidence with dangerous machinery in manufacturing domains, inclusive learning and training, and social competencies development for learners with impairments and autism (Virtual machina project, 2024; Asad et. al., 2021; Hutson, 2022; Bravou et. al., 2022). Hence the integration of XR into digital education programmes is likely to help improve learning outcomes, equity and inclusion and ensure UK educational excellence, resilience and future-proofing going forward.

Therefore, the currently slow uptake of XR technologies in the UK HEI sector, especially when compared with overseas counterparts, risks both future economic growth and student employability, as well as undermining UK educational excellence. The latter risks UK HEIs becoming less attractive to overseas students as they fail to keep pace with emerging technologies. This could have a serious potential knock-on effect of declines in the £130bn the HEI sector contributes to UK GDP, including the £14bn spent by overseas students annually, and the around 768,000 jobs across the UK it supports (UniversitiesUK, 2024), should students choose to study at home or in countries other than the UK.

It is the assertion of these authors that one of the important reasons for this difference in digital education behaviours between the UK and Indian Higher Education sectors is the lack of a coherent, comprehensive digital education strategy in the UK when compared with the Indian National Education Policy 2020. The co-ordinated and committed Indian central government emphasis on, investment in, provision for, training about and educator incentivisation for the digitalisation of the entire Indian education system has already begun to result, at speed and scale, in educator behaviour change and pedagogical and technological modernisation, alongside the development of a much more resilient education system - and to date the entire NEP 2020 has not even finished being introduced.

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Anecdotal evidence from the ground suggests that Indian school education is even better than the Indian HE sector in terms of teacher training, awareness, and technology acceptance and use, as the school roll-out of NEP 2020, as well as earlier programmes and policies, has tended to start in advance of the HE sector. However, further research into the impact of the NEP 2020 directives, policies and commitments on the primary and secondary sectors, and continuing and on-going research into all educational sectors in the future is required to confirm these early HE findings and anecdotal evidence from the ground.

# The Current UK Digital Education Policy Landscape

Turning to the situation in the UK, currently there is no standalone, comprehensive UK government policy document specifically related to digital education policies. However, digital education initiatives and policies can be found in several broader government strategies and documents. Firstly, in 2019 the Department for Education (DfE, 2019) published its EdTech Strategy, which had the stated aim

> *"to support and enable the education sector in England to help develop and embed technology in a way that cuts workload, fosters efficiencies, removes barriers to education and ultimately drives improvements in educational outcomes"* (Ministerial Forward).

There were two main roles for educational technologies outlined in the strategy. The first was at the administrative and structural level, with the deployment of AI systems to automate routine lesson planning, grading, and administrative paperwork, and improve resource management, communication, and collaboration within schools and between schools and parents. The second, (with a prescient relevance to educational resilience despite the pre-pandemic context), related to the adoption of cloud-based systems to ensure that educational resources could be more easily accessible and shared efficiently across different settings, and ensuring access to high-quality education for students, regardless of geographical location or personal circumstances, through the use of online learning platforms and digital resources to provide flexible learning opportunities. The Strategy also calls for the roll-out of full-fibre connectivity to schools most in need; the provision of infrastructure implementation, cybersecurity and procurement guidance documents; the deployment of online teacher training in the use of technology (in conjunction with the Chartered College of Teaching); and the alignment of post-16 technical education in Colleges with employer-led digital standards to ensure that students gain the skills most needed by the digital economy. Finally, the Strategy emphasises the role of the private sector in developing a "*vibrant market for EdTech products and services…*[and]*...supporting tech-led businesses to grow and thrive*" (DfE, 2019, p.6), promising access for the private sector to funding and advice via the Industrial Strategy, the British Business Bank and the Digital Catapult.

Recently, as part of the public-private EdTech approach, the DfE has accredited an online provider - EDClass (www.edclass.com) - through Ofsted inspection (Ofsted, May 2024) to deliver online learning for up to five students per school that are unable to learn in-person in classrooms either through illness-based, permitted absenteeism or as a result of behavioural challenges. This private provision offers core subject, foundational subject and functional skills lessons as well as mental health, behaviour, reintegration and careers services in virtual classrooms. Classes are delivered by trained teachers external to the school earning comparable or even higher salaries than their in-person counterparts, while internal school teachers have access to the EDClass digital resources without charge, and the school receives student engagement analytics. Currently this costs the school just under £8,000 per year. The EDClass provision is clearly aimed at supporting the learning of those unable to

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attend in person by harnessing the affordances of an online learning approach and offers a potentially promising model for both resilience and excellence, particularly if the schools themselves had more control over content, resources and staffing and the service was available to all schools at less cost. However, as it stands, the EDClass service has drawbacks including the potential risk of exacerbating inequalities. This is most visible in terms of unequal uptake of the service by schools with or without the available budget (for example, many early-adopters have been Academy Trusts); unequal provision and content for those students studying online compared with those in class; unequal pay and responsibilities for EDClass teachers compared with those in school; and unequal provision for the five 'selected' students compared with other students who are absent but not part of the EDClass programme.

As is evident from the current uptake of the EDClass service for example, the implementation of promising EdTech and the EdTech Strategy directives more generally has been patchy at best. The EdTech Demonstrator Programme launched in 2020 identified schools and colleges that effectively use technology and tasked them with supporting others. It was expanded to help with remote learning during the COVID-19 pandemic, proving to be a support for some schools as they shifted to online education. Improved assistive technologies in schools for SEND students has also been witnessed. Beyond this though challenges remain in ensuring consistent access and uptake of teacher training in digital pedagogies and tools across all UK regions; in an over-reliance on private sector companies to deliver expensive and proprietary EdTech innovation and solutions (albeit sometimes in partnership with schools and government); and most importantly in funding constraints and disparities in digital infrastructure, which have hindered the widespread adoption of educational technologies, particularly in less affluent areas.

Furthermore, the EdTech Strategy implementation was backdropped against the Covid-19 pandemic, which had not been foreseen at the time of its publication. Once the immediate emergency period was past, the then UK government adopted the overall vision of 'Build Back Better'. Educational recovery was considered essential in this vision and £1.7bn in short-term catch-up funding to support pupils in England was committed by the government (EPI, 2021). The DfE also reported on particular 'catch-up' strategies employed by schools, including curriculum adaptation to focus only on the 'key' knowledge required for national assessments or to move to the next stage of education, and creating tutoring systems through funding existing staff in this new role (rather than using the more costly and complex National Tutoring Programme or private tutors) (Ofsted, 2022). However, there was little in the way of a focus on future educational resilience, nor on accelerating the EdTech Strategy suggestions for teaching and learning, nor on funding for the development and expansion of state digital provision in the education system. This questions the notion of Build Back Better - can a reduced curriculum, staff having to work even harder, and no financial commitment for EdTech implementation for future resilience be considered better?

The EdTech Strategy 2019 was further developed with the publication of the DfE 'Future Opportunities for Education Technology in England Report' in 2022 (Vicentini et. al., 2022) which positions EdTech as a cornerstone of future educational development in England, with a focus on enhancing learning, supporting teachers, promoting equity, ensuring data security, and preparing students for the future. The Report highlights the potential of EdTech to create more personalised and engaging learning experiences. For example, by leveraging tools like artificial intelligence (AI) and data analytics, educators can tailor instruction to individual student needs, thereby improving outcomes, and as such schools are advised in the Report to experiment with AI tools in areas such as automated grading, adaptive learning platforms, and learning analytics to support data-driven decision-making that improves

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educational outcomes. To support this, the Report also recommends that schools invest in professional development programs that equip teachers with the skills to integrate AI into their teaching practices.

Furthermore, the Report encourages schools to incorporate VR/AR technologies to create immersive learning experiences. It suggests that VR can make abstract concepts more tangible, providing examples of virtual field trips or complex scientific VR simulations, while AR can bring interactive elements into physical textbooks and classrooms. Again, to support this the Report recommends that schools participate in pilot programs to assess the effectiveness of VR/AR tools in the classroom by collaborating with EdTech companies and other schools in research into engagement and learning outcomes. A final recommendation was for the creation of "digital resource-centres" from which schools could borrow equipment (such as VR headsets).

Finally, the research conducted with nearly 5,500 UK teachers and detailed within the Report indicated that they felt that EdTech offered great potential benefits for classroom teaching (55%) and independent self-study (41%) and that evidence-based resources (51%) provided via a national resource centre (30%) and supported by professional networks (29%), national guidance (24%) and revised teacher training and professional development programmes (21%) would be most effective in supporting EdTech use. However, they also felt that existing budgetary constraints (71%) were the biggest barrier to the adoption of EdTech. These findings provide useful policy guidance.

However, within the report EdTech is mainly conceptualised as a market sector and business opportunity, more than a route to educational resilience and excellence. Indeed 'resilience' is not mentioned anywhere in the report. Furthermore, the report only contains a set of recommendations, advice, encouragements, suggestions, and intentions as opposed to clear policy directives and specific government commitments. As such, and despite its good points, it can not be considered a UK digital education strategy document.

Beyond these EdTech documents, consideration is also given by the UK government to the incentivisation of digital education use via the Ofsted Education Inspection Framework (Ofsted, 2023). The current framework includes considerations of how schools are integrating digital learning and ensuring that students are developing appropriate digital skills, although these too are embedded within broader areas of assessment rather than being stand-alone requirements. Within curriculum design and implementation consideration is given to how well the curriculum prepares students for the future, including the development of digital literacies and competencies. Within teaching and learning consideration is given to how technology is used to support teaching and enhance learning outcomes, including the effective use of digital resources, online platforms, and tools that help personalise learning and make it more accessible to all students. There is also a consideration of how well schools use technology to have a motivating, engaging, positive impact on students' learning experiences and to develop skills for responsible technology use, online safety and digital citizenship. Overall though, Ofsted does not mandate the use of specific technologies or digital tools but instead focuses on how effectively they are used to support educational outcomes.

Continuing this somewhat disjointed approach to digital education policy, in the immediate post-covid landscape of 2022, the Department for Digital, Culture, Media and Sport (DCMS) published its Digital Strategy 2022 (DCMS, 2022) policy document in which the stated aim was to "*strengthen* [the UK's] *position as a Global Science and Tech Superpower*"

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(Ministerial Forward). There were a number of aspects of this strategy that related to education. The Strategy places a strong focus on enhancing digital skills across all levels of education, from primary schools to lifelong learning, including digital skills training in schools and the expansion of apprenticeships and bootcamps in areas such as data science, cybersecurity, AI, and digital design. It also emphasises the importance of collaboration between educational institutions and the private sector. This includes working with companies like Amazon, Google, and Microsoft to deliver digital skills training and creating pathways from education to employment through partnerships with industry leaders. This contradicts to some degree the findings of the 'Future Opportunities' Report (DfE, 2022), which suggests that *"A recent United Nations paper argues that…an improved system of checks and balances is needed to balance the public and social value of EdTech with commercial interests. Education innovation is driven by the private sector..[but]...it does not reach most classrooms, and benefits only a very small proportion of learners globally"* (p.45). Partnering with such large global players is likely to distort competition, limit innovation and potentially impact resilience and excellence, and as the DfE Report suggests a *"diversification of the supplier base is important in a future digital education landscape"* (p.45).

In the Higher Education sector the DCMS Digital Strategy promotes the integration of digital innovation into curricula and research, with investment provided through the Research Councils for the development of cutting-edge technologies such as AI and quantum computing. However, in all these cases, the focus is on skilling, reskilling or upskilling the population rather than on providing specific support for digital education, digital pedagogy training and open digital resources to be used in the re-/up-/skilling teaching and learning process and in the development of a resilient education system. The 2022 Digital Strategy also complimented the 2020 National Infrastructure Strategy, part of which aims to ensure high-speed broadband access for all schools, especially those in remote or underserved areas.

In the domain of mental health support, a number of policy documents, including the Transforming Children and Young People's Mental Health Provision (DH & DfE, 2017), which prompted the gradual roll out of Mental Health Support Teams (MHSTs) to provide targeted support to school staff and students; the 2023 updated Keeping Children Safe in Education, with a new focus on online safety and well being; and the Digital Inclusion Strategy (CO & GDS, 2014), have all helped to contribute to an increased provision for safeguarding students and supporting mental health challenges. However, as with the digital aspects of resilient education, the patchy implementation of these policies across the country has meant that the provision of mental health support in schools varies significantly across the UK. While some schools have dedicated mental health professionals, such as counsellors or wellbeing officers, others may rely on external services, or their staff may take on these roles in addition to their teaching duties. In addition, although there has been a drive for schools to appoint a senior mental health lead to oversee the school's approach to mental health and wellbeing, this role is not necessarily filled by a trained counsellor or therapist.

Next, in relation to education data and analytics, the Individualised Learner Records data and a large number of other datasets, covering areas including child social care; funding; outcomes and performance; and teacher workforce and training among others, are collected and analysed as part of the DfE's Explore Education Statistics (EES) service. These datasets are openly available and searchable, and analysis of them is also provided. However, this service is currently underdeveloped being at only Beta-testing stage and, at the time of writing, the analysis service was not functioning (returning a 'page isn't working'

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error message). Also, the datasets are created by agencies other than the DfE, including the Higher Education Statistics Agency (HESA) and the Office for National Statistics (ONS). Nevertheless, this centralised data service has great potential to help support the digitalisation of education in the near future.

Finally, the most recent Education in a Digital Age Report (Jopling & Nobes, 2024) from the British Educational Research Association found that the implementation of those UK policy aspects that relate to digitalisation in the curriculum is not sufficiently preparing students with future-proof skills and that the computer science curriculum in particular is not fit for purpose; that teacher professional development lacks sufficient focus on digital literacies; that institutional implementation tended to be top-down and hardware/systems/connectivity focussed, while teaching innovation tended to be bottom-up, small scale, and teacher-driven; and that, despite the positive impacts reported by teachers on engagement, learning and feedback, "*many digital innovations introduced by schools during the pandemic had been reversed* [with one teacher stating]: *'I think post-Covid what's happened is that people have just gone back to what they always know'(P1P)*" (Jopling & Nobes, 2024, p.8). Supporting the advances that have and are being made regarding school data discussed in the previous paragraph, the report also notes that for one school ICT director digitalisation and digital innovation was "*'all about data'*" (ibid., p.8), rather than being about teaching excellence and learning outcomes. For example, the report notes that most schools ban or seriously restrict mobile phone use on school premises – even if used solely for learning purposes. Finally, teachers also reported considerable confusion arising from the requirement to use multiple different platforms, systems and devices, which often result in compatibility issues, such as those noted with the government-funded 'Get Help With Technology' emergency Key Stage 3 Chromebooks provided to 1.3million students (Archer, 2021) during the pandemic lockdown period. Clearly the current digitalisation landscape in secondary schools is disjointed and data-focussed at best, and regressive, restrictive and confusing at worst, with inadequate curricula and professional development.

Consequently, although the former UK government's approach to education claimed to involve a combination of digital infrastructure development, various digital education and mental health support policies, data collection and analysis, hardware provision, digital literacy training and professional development, and Ofsted accreditation frameworks, in reality, there is actually a disjointed approach to and implementation of digital education, typified by policies and data originating from different departments; a continued lack of serious and on-going investment; a real-world regression rather than 'build back better'; an over-emphasis and over-reliance on the role of the private sector and EdTech markets; a confusion of platforms, systems and devices; inadequate curricula and professional development; and an unequal implementation of existing policies. While the forthcoming closure of the Education and Skills Funding Agency and its absorption into the DfE in March 2025 (DfE & ESFA, Sept 2024) could be optimistically interpreted as a move towards greater consolidation and unification of the education landscape, nevertheless, the broad lack of policy coherence has negatively impacted the introduction of the sort of resilient, effective, equitable, future-proofed education system that can be seen in the Estonian system and emerging as a result of the Indian NEP 2020.

# Recommendations

If the benefits of digital education for resilience and excellence are to be achieved, and if the UK education sector is not to fall behind other nations, and if the application of cutting-edge technologies and digital skills to domains such as education is essential for future economic growth, as the recent Institute for Global Change's 'Future of Britain' Conference (July 2024) has strongly suggested, it may be worthwhile undertaking a critical examination of and

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discussion about the UK education landscape with all stakeholders. We suggest that this process can be usefully informed by learning the lessons from across the world, and in particular from Estonia and India. As a first step in the process of analysis and discussion, and based on those lessons from overseas, we propose the following **Key Recommendations:**

- develop a single, coherent, unified 'Educational Excellence and Resilience Through Digitalisation' strategy that incorporates the best parts of the existing disparate UK government strategies and policies and extends them with vision and the sorts of practical directives and specific commitments that can be found in the Estonian and Indian examples.

Among other things, this could include, for example:

1. A visionary positioning statement recognising the critical role of digital education in ensuring educational resilience, excellence, engagement, and inclusion, and in developing future-proofed skills.
2. An on-going financial commitment to increase government investment in digital education by at least 1% of GDP above current spending plans, with this amount ring-fenced for digitalisation, thereby ensuring the UK at least matches the 6% of GDP pledged by the Indian government in the NEP 2020 (previous spending per annum on average over the last Parliament was around 5% of GDP).
3. A National Digital Resource Repository (NDR Repo) for educators, students and parents of high-quality, curriculum-aligned digital resources to include:
    a. a tagged, searchable, user-rated and curated educator-created digital resource library to share materials
    b. a tagged, searchable, user-rated and curated links library of Open Educational Resources (OERs) and other free resources
    c. links to easy-to-use digital content creation tools, including emerging XR content creation services for non-experts
    d. a wide-ranging, high-quality XR resource section (similar to the Indian Virtual Labs) with content researched and developed through Research Council funded co-design programmes, private sector partnerships, and by teachers.
4. An extension of incentivisation beyond Ofsted assessments to recognise and reward educators (through appraisal and promotion processes) and students (through national examinations and assessments) who exhibit 'prosumer' behaviours by creating, sharing (on the NDR Repo) and using digital resources for teaching and learning, including advanced resources such as XR.
5. To properly support this via a National Digital Education Training (NDET) platform of resources, courses and programmes for teacher professional development and upskilling in digital education pedagogies, digital content creation, and use of digital tools, services, OERs, MOOCs and XR.
6. An extension of the EdTech Strategy concerning online 'use of technology' courses for teacher training to introduce a significantly increased focus on all aspects of digital education, especially modern pedagogies such as peer-, personalised- and Networked Learning and modern modes of teaching such as blended and hybrid modes, in all accredited Teacher Training programmes (e.g. University Education degrees, PGCEs…etc)
7. The creation of a National Digital Education Hub with a network of Regional Spokes, either with close links to or as part of the new Digital Regulation Cooperation Forum (DCRF) AI and Digital Hub, consisting of academic and domain experts, IT specialists, teachers & administrators, policy makers, and private partners to provide formal advice, support and equipment to institutions by:
    a. developing and deploying an AI-powered EdTech Evaluation Service capable of accounting for local educational contexts and user requirements; specific technical features and functionalities; and the full range of national regulatory

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and cybersecurity requirements, in order to provide institutional-level hardware and software procurement and deployment decision and implementation support
    b. monitoring and communicating the latest advances in EdTech hardware, software and research through a knowledge exchange service
    c. providing long-term, no-cost equipment loans to disadvantaged students and students who are persistently absent
    d. facilitating no/low-cost equipment loans to schools for 'try-before-you-buy' and piloting programmes
    e. facilitating public-private EdTech development and in-school piloting programmes in a balanced way that ensures public and social value as well as commercial interest
    f. providing local and national policy advice.
8. Extend, improve and integrate the Explore Education Statistics and All Education Dataset for England to a single, near-real-time, national/regional/authority-level analytics service and dashboard (similar to the Indian VSK).
9. Enable a single login for all national platforms for teachers and students.
10. Further develop the national curricula to embed digital learning, digital creativity, digital skills development, and digital device and resource use across all subject areas from Early Years to KS5.
11. A commitment to provide *a minimum of one* trained online mental health and well-being counsellor for every state primary and secondary school and Further Education college in England and Wales by 2028 (a single counsellor could have multiple institutions within their portfolio).
12. A collaborative partnership of educational psychologists, academic experts, teachers, students of all ages, parents and private sector technology companies to co-design, develop, validate, update and moderate a national Online Student Health and Well-being Club with tools, resources, information, and 'safe-spaces' specifically designed to enable student-led monitoring, understanding and sharing of their own mental health and well-being and to act as a counterpoint to unregulated, ill-informed, false, misleading or dangerous online mental health forums.
13. A 'light-but-tight' Ofsted inspection regime that rewards the introduction of digital education across all institutions, but that also rewards institutional autonomy in doing so responsibly - in other words, recognising the centrality of the institution in making evidence-based procurement, deployment, usage and training decisions that appropriately, practically and safely reflect the specific context, learner needs, and wider stakeholder community of that institution.
14. An extension of the National Infrastructure Strategy to prioritise the provision of high-speed connectivity (5G and full-fibre broadband) to *all* schools and institutions in England and Wales by 2028 as a necessary foundation for the equitable implementation of the 'Educational Excellence and Resilience Through Digitalisation' strategy.

It is hoped that these recommendations might help contribute to a wider stakeholder debate on the future of the UK education sector, rather than be seen as a set of prescriptive suggestions, and as such remain open to improvement and refutation.

# Conclusion

To conclude, a coherent, long-term, strategic commitment to 'Educational Excellence and Resilience Through Digitalisation' for the UK education sector, based on some form of the 14 points above, would result in direct benefits by enabling institutional autonomy and flexibility through the fully funded implementation of digital technologies, pedagogies, resources, infrastructure, support and training and the integration of mental health support systems.

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This would help to ensure educational resilience, excellence in learning, and improved learning outcomes and attainment, as well as help to reduce the impact (and perhaps also occurrence) of absenteeism and develop future-proofed digital skills for school-leavers. Perhaps more importantly however, a failure to commit to such a digitalisation programme risks the UK falling behind other nations with the result that the education system could potentially negatively impact future generations of young people which could lead to increased absenteeism, more lost learning resulting from shock events, and further increasing mental health challenges in the future. In turn these negative consequences of failing to digitise and modernise will impact the UK economy and education sector in the long-term. We suggest that now is the time to learn the lessons from digitised and digitising countries and to unify and refocus our own strategies, policies and commitments in order to create a high-quality, resilient, future-proofed UK education system.

## Bibliography


Anders, J., Macmillan, L., Sturgis, P. and Wyness, G., 2021. Inequalities in young peoples' educational experiences and wellbeing during the Covid-19 pandemic. EconPapers. No 21-08, CEPEO Working Paper Series from UCL Centre for Education Policy and Equalising Opportunities, Institute of Education.

Angrist, N., de Barros, A., Bhula, R., Chakera, S., Cummiskey, C., DeStefano, J., Floretta, J., Kaffenberger, M., Piper, B. and Stern, J., 2021. Building back better to avert a learning catastrophe: Estimating learning loss from COVID-19 school shutdowns in Africa and facilitating short-term and long-term learning recovery. *International Journal of Educational Development*, 84, p.102397.

Archer, G., July 2021. Inside Policy: Laptops for learning in lockdown. Available on https://civilservice.blog.gov.uk/2021/07/13/inside-policy-laptops-for-learning-in-lockdown/

Asad, M.M., Naz, A., Churi, P. and Tahanzadeh, M.M., 2021. Virtual reality as pedagogical tool to enhance experiential learning: a systematic literature review. *Education Research International*, 2021(1), p.7061623.

Barsom, E.Z., Duijm, R.D., Dusseljee-Peute, L.W., Landman-van der Boom, E.B., van Lieshout, E.J., Jaspers, M.W. and Schijven, M.P., 2020. Cardiopulmonary resuscitation training for high school students using an immersive 360-degree virtual reality environment. *British Journal of Educational Technology*, 51(6), pp.2050-2062.

Benhenda, A., 2023. Attendance Matters: Evidence-based Solutions to the Post-Covid Absenteeism Crisis. Available on https://blogs.ucl.ac.uk/cepeo/2023/05/18/attendance-matters-evidence-based-solutions-to-the-post-covid-absenteeism-crisis/ Accessed August 2024

Blaschke, L.M., Bozkurt, A. and Cormier, D., 2021. Learner agency and the learner-centred theories for online networked learning and learning ecologies. *Unleashing the power of learner agency*. EdTech Books.

Bonanno G. A., Romero S. A., Klein S. I. (2015). The temporal elements of psychological resilience: An integrative framework for the study of individuals, families, and communities. Psychological Inquiry, 26(2), 139–169. https://doi.org/10.1080/1047840X.2015.992677

Bravou, V., Oikonomidou, D. and Drigas, A.S., 2022. Applications of virtual reality for autism inclusion. A review. Retos: nuevas tendencias en educación física, deporte y recreación, (45), pp.779-785.

Burbules, N.C., Fan, G. and Repp, P., 2020. Five trends of education and technology in a sustainable future. *Geography and sustainability*, 1(2), pp.93-97.

Byrne, K. and Plekhanov, A., 2021. Education reforms and adult skills: Evidence from Estonia. *Economics of Education Review*, 82, p.102106.

Cabinet Office & Government Digital Service (CO & GDS), Dec 2014. Government Digital Inclusion Strategy. Available on https://www.gov.uk/government/publications/government-digital-inclusion-strategy#:~:text=The%20Digital%20Inclusion%20Strategy%20has,developed%20the%20strategy%20with%20partners. Accessed August 2024

Cattan, S., Kamhöfer, D.A., Karlsson, M. and Nilsson, T., 2023. The long-term effects of student absence: Evidence from Sweden. The Economic Journal, 133(650), pp.888-903. Department for Education (DfE), 2019. Pupil absence in schools in England: 2018 to 2019. Available on https://explore-education-statistics.service.gov.uk/find-statistics/pupil-absence-in-schools-in-england/2018-19 Accessed August 2024


DOI https://doi.org/10.5258/SOTON/PP0092

Cheng, K.H. and Tsai, C.C., 2020. Students' motivational beliefs and strategies, perceived immersion and attitudes towards science learning with immersive virtual reality: A partial least squares analysis. *British Journal of Educational Technology*, 51(6), pp.2140-2159.

de Freitas, F.V., Gomes, M.V.M. and Winkler, I., 2022. Benefits and challenges of virtual-reality-based industrial usability testing and design reviews: A patents landscape and literature review. *Applied Sciences*, 12(3), p.1755.

Department for Digital, Culture, Media and Sport (DCMS), Oct 2022. UK Digital Strategy. Available on https://www.gov.uk/government/publications/uks-digital-strategy/uk-digital-strategy Accessed August 2024

Department for Education (DfE), April 2019. 'Realising the potential of technology in education: A strategy for education providers and the technology industry'. Available on https://assets.publishing.service.gov.uk/media/5ca360bee5274a77d479facc/DfE-Education_Technology_Strategy.pdf Accessed July 2024

Department for Education (DfE), October 2021. 'Understanding Progress in the 2020/21 Academic Year' by the Renaissance Learning and Education Policy Institute. Available on https://assets.publishing.service.gov.uk/media/6239cb5fe90e0779a2c9952a/Understanding_progress_in_the_2020_to_2021_academic_year_Findings_from_the_summer_term_and_summary_of_all_previous_findings.pdf Accessed August 2024

Department for Education (DfE), July 2022. Education recovery in schools: summer 2022. Available on https://www.gov.uk/government/publications/education-recovery-in-schools-summer-2022/education-recovery-in-schools-summer-2022 Accessed August 2024

Department for Education (DfE), October 2022. Pupil absence in schools in England: Autumn and Spring Terms 2020 to 2021. Available on https://explore-education-statistics.service.gov.uk/find-statistics/pupil-absence-in-schools-in-england-autumn-and-spring-terms Accessed August 2024

Department for Education (DfE), Sept 2023. Keeping Children Safe in Education 2023. Available on https://assets.publishing.service.gov.uk/media/64f0a68ea78c5f000dc6f3b2/Keeping_children_safe_in_education_2023.pdf Accessed August 2024

Department for Education (DfE), August 2024. Pupil absence in schools in England July 2024. Available on https://explore-education-statistics.service.gov.uk/find-statistics/pupil-attendance-in-schools Accessed August 2024

Department for Education (DfE), 11th September 2024. ESFA Functions to Move to the Department for Education. Available on https://www.gov.uk/government/news/esfa-functions-to-move-to-the-department-for-education Accessed September 2024

Department for Health & Department for Education (DH & DfE), Dec 2017. Transforming Children and Young People's Mental Health Provision. Available on https://assets.publishing.service.gov.uk/media/5a823518e5274a2e87dc1b56/Transforming_children_and_young_people_s_mental_health_provision.pdf Accessed August 2024

Di Natale, A.F., Repetto, C., Riva, G. and Villani, D., 2020. Immersive virtual reality in K-12 and higher education: A 10-year systematic review of empirical research. *British Journal of Educational Technology*, 51(6), pp.2006-2033.

Dorn, E., Hancock, H., Sarakatsannis, J., Viruleg, E,. 2020. 'COVID-19 and learning loss—disparities grow and students need help' Available on https://www.mckinsey.com/industries/public-sector/our-insights/covid-19-and-learning-loss-disparities-grow-and-students-need-help Accessed August 2024

Downes, S., 2010. Learning networks and connective knowledge. In *Collective intelligence and E-Learning 2.0: Implications of web-based communities and networking* (pp. 1-26). IGI global.

e-Estonia, Dec 2023. PISA test 2022 results: Estonia's education is the best in Europe. Available on https://e-estonia.com/pisa-test-2022-results-estonian-students-rank-high-in-europe/ Accessed August 2024

Early Intervention Foundation, April 2021. 'Only 4% of secondary school teachers have seen no major changes in pupils' mental health in the last year' Press Release. Available on https://www.eif.org.uk/press-release/only-4-of-secondary-school-teachers-have-seen-no-major-changes-in-a-pupils-mental-health-in-the-last-year Accessed August 2024

Education Endowment Foundation, August 2021. 'Impact of School Closures on the Attainment Gap: Rapid Evidence Assessment (June 2020). Available on https://educationendowmentfoundation.org.uk/education-evidence/evidence-reviews/school-closures-rapid-evidence-assessment Accessed August 2024

Education Endowment Foundation, May 2022. 'Impact of COVID-19 on Learning: A Review of the Evidence' Available on https://educationendowmentfoundation.org.uk/guidance-for-teachers/covid-19-resources/best-evidence-on-impact-of-covid-19-on-pupil-attainment Accessed August 2024

Education Policy Institute (EPI), May 2021. Education Recovery and Resilience in the UK. Available on https://epi.org.uk/publications-and-research/education-recovery-and-resilience-in-england/ Accessed August 2024

DOI https://doi.org/10.5258/SOTON/PP0092

Gakh, M., Coughenour, C., Assoumou, B.O. and Vanderstelt, M., 2020. The relationship between school absenteeism and substance use: An integrative literature review. *Substance Use & Misuse*, 55(3), pp.491-502.

Gottfried, M.A., 2014. Chronic absenteeism and its effects on students' academic and socioemotional outcomes. *Journal of Education for Students Placed at Risk* (JESPAR), 19(2), pp.53-75.

Green, D.A., Karimirad, A., Simard-Duplain, G. and Siu, H.E., 2021. COVID-19 and the Economic Importance of In-Person K–12 Schooling. *Canadian Public Policy*, 47(2), pp.265-280

Gouëdard, P., Pont, B. and Viennet, R., 2020. Education responses to COVID-19: Implementing a way forward. OECD iLibrary. Available on https://www.oecd-ilibrary.org/education/education-responses-to-covid-19-implementing-a-way-forward_8e95f977-en Accessed August 2024

Hutson, J., 2022. Social virtual reality: Neurodivergence and inclusivity in the metaverse. *Societies*, 12(4), p.102.

Indian Ministry of Education (IMoE), 2019. Vidya Samiiksha Kendra (VSK). Available on https://www.ndear.gov.in/vidya-sameeksha-kendra.html Accessed August 2024

Indian Ministry of Education (IMoE), 2020. Manodarpan: Empowering Minds, Enriching Lives. Available on https://manodarpan.education.gov.in/ Accessed August 2024

Indian Ministry of Education (IMoE), Department of School and Education Literacy, 2021. NDEAR: National Digital Education Architecture - Digital Infrastructure for the education ecosystem. Available on https://www.ndear.gov.in/index.html Accessed August 2024

Jones, C. and de Laat, M., 2016. Networked learning. The SAGE handbook of e-learning research, pp.43-62.

Jong, M.S.Y., Tsai, C.C., Xie, H. and Kwan-Kit Wong, F., 2020. Integrating interactive learner-immersed video-based virtual reality into learning and teaching of physical geography. *British Journal of Educational Technology*, 51(6), pp.2064-2079.

Jopling, M., & Nobes, T. (2024). How (post)digital are schools? British Educational Research Association. Available on: https://www.bera.ac.uk/publication/how-postdigital-are-schools

Klingenberg, S., Jørgensen, M.L., Dandanell, G., Skriver, K., Mottelson, A. and Makransky, G., 2020. Investigating the effect of teaching as a generative learning strategy when learning through desktop and immersive VR: A media and methods experiment. *British Journal of Educational Technology*, 51(6), pp.2115-2138.

Kuldas, S. and Foody, M., 2022. Neither resiliency-trait nor resilience-state: Transactional Resiliency/e. Youth & Society, 54(8), pp.1352-1376.

Lally, V. and De Laat, M., 2023, January. Cracking the code: Learning to collaborate and collaborating to learn in a networked environment. In *Computer Support for Collaborative Learning* (pp. 160-168). Routledge.

Liu, R., Wang, L., Lei, J., Wang, Q. and Ren, Y., 2020. Effects of an immersive virtual reality-based classroom on students' learning performance in science lessons. *British Journal of Educational Technology*, 51(6), pp.2034-2049.

Ministry of Education and Research, Republic of Estonia, 2024. Statistics and Analysis Academic Year 2022-23. Available on https://www.hm.ee/en/ministry/statistics-and-analysis#annual-analyses Accessed August 2024

Ministry of Human Resource Development, Government of India, 2020. National education Policy 2020. Available on https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf Accessed July 2024

Naidu, S., 2021. Building resilience in education systems post-COVID-19. Distance education, 42(1), pp.1-4.

Nandy, M., Lodh, S. and Tang, A., 2021. Lessons from Covid-19 and a resilience model for higher education. *Industry and Higher Education*, 35(1), pp.3-9.

NHS England, Nov 2023. 'One in five children and young people had a probable mental disorder in 2023' News Report. Available on https://www.england.nhs.uk/2023/11/one-in-five-children-and-young-people-had-a-probable-mental-disorder-in-2023/#:~:text=One%20in%20five%20children%20and%20young%20people%20in%20England%20aged,probable%20mental%20disorder%20in%202023 Accessed August 2024

NHS England Digital, Sept 2021. Mental Health of Children and Young People in England 2021 - wave 2 follow up to the 2017 survey. Available on https://digital.nhs.uk/data-and-information/publications/statistical/mental-health-of-children-and-young-people-in-england/2021-follow-up-to-the-2017-survey Accessed August 2024

DOI https://doi.org/10.5258/SOTON/PP0092

OECD, June 2024. PISA Results 2022 (Volume III) - Factsheets: Estonia. Available on https://www.oecd.org/en/publications/pisa-results-2022-volume-iii-factsheets_041a90f1-en/estonia_9e8b79ea-en.html Accessed August 2024

Ofqual, 12th July 2021. 'Learning During the Pandemic: Review of Research from England.' Available on https://www.gov.uk/government/publications/learning-during-the-pandemic/learning-during-the-pandemic-review-of-research-from-england Accessed August 2024

Ofsted, 20th July 2022. 'Education Recovery in Schools: Summer 2022'. Available on https://www.gov.uk/government/publications/education-recovery-in-schools-summer-2022/education-recovery-in-schools-summer-2022 Accessed August 2024

Ofsted, 14th July 2023. Education Inspection Framework (updated). Available on https://www.gov.uk/government/publications/education-inspection-framework/education-inspection-framework-for-september-2023 Accessed August 2024

Ofsted, 14th July 2023. Ofsted's Accreditation Visit to EDClass. Available on https://files.ofsted.gov.uk/v1/file/50247472 Accessed September 2024

Olarreaga, I., Dec 2023. VR Stats for the Training & Education Industry in 2024. Available on https://virtualspeech.com/blog/vr-stats-training-education Accessed August 2024

Patnode, A.H., Gibbons, K. and Edmunds, R., 2018. Attendance and chronic absenteeism: Literature review. *Central for Applied Research and Educational Improvement*, pp.1-55.

Price, R.A., 2023. A review of resilience in higher education: toward the emerging concept of designer resilience. *Studies in Higher Education*, 48(1), pp.83-99.

Seusan, L.A. and Maradiegue, R., 2020. Education on Hold: A Generation of Children in Latin America and the Caribbean Are Missing out on Schooling Because of COVID-19. UNICEF.

Siemens, G. and Conole, G., 2011. Connectivism: Design and delivery of social networked learning. *International Review of Research in Open and Distance Learning*, 12(3).

Sosu, E.M., Dare, S., Goodfellow, C. and Klein, M., 2021. Socioeconomic status and school absenteeism: A systematic review and narrative synthesis. *Review of Education*, 9(3), p.e3291.

Stokols D., Lejano R. P., Hipp J. (2013). Enhancing the resilience of human-environment systems: A social–ecological perspective. Ecology and Society, 18(1), 7. https://doi.org/10.5751/ES-05301-180107

Ungar M. (2008). Resilience across cultures. The British Journal of Social Work, 38(2), 218–235. https://doi.org/10.1093/bjsw/bcl343

Unicef, 2021. The state of the global education crisis: a path to recovery: a joint UNESCO, UNICEF and WORLD BANK report. Paris: UNESCO, cop. 2021.

Unicef, 2023. Country Office Annual Report – India. Available on https://www.unicef.org/media/152691/file/India-2023-COAR.pdf Accessed August 2024

University Grants Commission, India, 2018. Academic Performance Indicator, UGC REGULATIONS ON MINIMUM QUALIFICATIONS FOR APPOINTMENT OF TEACHERS AND OTHER ACADEMIC STAFF IN UNIVERSITIES AND COLLEGES AND MEASURES FOR THE MAINTENANCE OF STANDARDS IN HIGHER EDUCATION. The Gazette of India, 18th July 2018, New Delhi

Universities UK, May 2024. 'Call to back universities as report reveals £116 billion contribution to UK economy' News Report. Available on https://www.universitiesuk.ac.uk/latest/news/call-back-universities-report-reveals Accessed August 2024

Urm, A., Sept 2021. How to Support the Mental health of Young People? Available on https://www.educationestonia.org/how-to-support-mental-health-of-students/ Accessed August 2024

Viitpoom, K. and Saat, H., 2016. *Psychological well-being of students in Estonia: Perspectives of students, parents, and teachers*. International Handbook of Psychological Well-Being in Children and Adolescents: Bridging the Gaps Between Theory, Research, and Practice, pp.51-59.

Vincetini, L., Day, L., Gill, V., Lillis, J., Komers, S., Olausson, N., June 2022. Ecorys and Department for Education. 'Future Opportunities for Education Technology in England'. Available on https://assets.publishing.service.gov.uk/media/629f2065e90e070395bb3e4c/Future_opportunities_for_education_technology_in_England_June_2022.pdf Accessed August 2024

DOI https://doi.org/10.5258/SOTON/PP0092

Virtual Machina Project, University of Applied Sciences and Arts of Southern Switzerland (SUPSI), 2024. Available on https://www.supsi.ch/en/virtual-machina Accessed August 2024

Wu, B., Yu, X. and Gu, X., 2020. Effectiveness of immersive virtual reality using head-mounted displays on learning performance: A meta-analysis. *British journal of educational technology*, 51(6), pp.1991-2005.

Yagnik, B., 2024. Officials From 20 Countries To Visit Vidya Samiiksha Kendra. Times of India Online, 1st Feb 2024. Available on https://timesofindia.indiatimes.com/city/ahmedabad/officials-from-20-countries-to-visit-vidya-samiksha-kendra/articleshow/107307122.cms#:~:text=With%20the%20twin%20aim%20of,500%20crore%20data%20sets%20annually. Accessed August 2024

DOI https://doi.org/10.5258/SOTON/PP0092