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EVOLUTION AND IMPACT OF TECHNOLOGY INTEGRATION ON STUDENTS' ACHIEVEMENT, TEACHERS' QUALITY AND SCHOOL MANAGEMENT

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ABSTRACT

This paper examines the historical development and contemporary impact of technology integration in education, focusing on its effects on student achievement, teacher quality, and school management. The research traces the progression from early educational tools to advanced digital platforms, illustrating how technology has transformed teaching and learning practices. Through enhanced access to information, personalised learning, and improved engagement, technology contributes to increased student motivation and academic outcomes. For teachers, technology integration enhances professional growth, resource access, and instructional quality, though it also introduces challenges such as increased workload and the need for continuous skill development. In school management, technology fosters efficient administration, data-driven decision-making, and improved stakeholder communication, despite ongoing concerns around privacy, cost, and digital equity. The paper concludes by discussing future directions in educational technology, highlighting the need for sustainable integration strategies that address both benefits and challenges. This analysis offers a comprehensive view of how technology reshapes educational environments, preparing students and educators for a technology-driven future.

Keywords: *technology integration, student achievement, teacher quality, school management*

INTRODUCTION

Technology is rapidly changing the field of education. It has an important role in educational shifts, introducing new approaches and influencing teaching and learning processes. Technology integration in education is the utilisation of tools, platforms and systems to support and enhance teaching methods, resulting in better access to information, improved knowledge retention and overall student engagement. The current reliance on digital resources in the classroom emerged from an early introduction of mechanical equipment and tools, highlighting how the evolution of

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technology in education and its adaptation to the changing needs of learners and educators have similarly progressed to meet society's increasing dependence on technical advancements.

HISTORY OF TECHNOLOGY INTEGRATION IN EDUCATION

Early Tools and Media

In the 1970s, the term "media" could refer to real objects and computerisations. It encompassed both equipment and materials brought into the classroom to provide opportunities for students with disadvantaged backgrounds, physical handicaps or overprotective parents who sometimes missed field trips to experience real objects (Smith, 1973). At this time, educational approaches were shifting and had begun to emphasise on experiential learning, where hands-on experiences and real-world applications became central to the teaching and learning process.

Teachers often used a variety of tools incorporated into their lessons, from simple media such as print, objects and games to more sophisticated media such as audio recordings and visual projections. In language learning, audio recordings were used extensively to mimic real-life usage of target languages, which was beneficial for developing natural listening and speaking skills among foreign language students. In fact, the use of audiovisual instruction had been growing since the 1920's, with radio and sound recordings gaining a great deal of attention and favoured over the expenses associated with visual instructions (An, 2021).

As cost became less of an issue, visual projections gained traction especially since images produced are large and more suited to group instructions. Overhead projectors, which became a staple in classrooms beginning from 1960, were simple to operate and added visual stimuli as well as provided control of presentation to the teachers as it was out of reach from students' hands. Handwritten sheets of film can be prepared in advance, and using the overhead projector, what was written was projected onto the screen behind the teacher's head, and information can be added or erased easily as the lesson progressed (Bissex, 1967). As these traditional media continued to evolve, the emergence of the personal computers in the late 1970s began a revolution, setting the stage for a new era in educational technology.

The Computer Revolution

By January 1983, over 40% of elementary schools and 75% of secondary schools in the United States were using computers (The Centre for Social Organization of Schools, 1983 in An, 2021). Computers combined textbooks, audio, visuals and motion media, quickly expanding from its primary purposes of basic programming and word processing to other subjects. Computer Assisted Instruction (CAI) emerged as a popular method of combining computer-assisted teaching with traditional educational methodologies, resulting in different types of blended teaching approaches (Li, 2023).

Software developers started to produce more and more educational programmes targeted to teach science, mathematics and languages, using interactive elements that engaged learners

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more effectively than traditional methods. Programming languages were designed for children to develop computer skills as well as problem solving and logical thinking through hands-on and interactive activities. Visual projections relied on an electronic projector connected to a computer, displaying moving images and interactive presentations and making lessons easier to prepare for educators, and more engaging for learners.

In the late 1990s personal computers became more affordable and computer labs were established in schools across the globe. These labs allowed students to access digital content and develop essential computer literacy skills, welcoming in new ways of learning that were more student-centred. Most educational technology now falls under the category of Information Communication Technology (ICT) which covers any products that can store, retrieve, manipulate or transmit information electronically. When the World Wide Web became publicly available in 1991, dial-up Internet was being used by schools to change the ways of teaching and learning by providing learners with immediate access to information (An, 2021).

Era of the Internet

Education was revolutionised again with the advent of the Internet. Students now have immediate access to a world of knowledge previously limited to textbooks and local libraries (Li, 2023). With the Internet, online resources became invaluable for subjects like science and history, and communication and collaboration were easily facilitated among students and teachers. With exchanges using emails, discussion forums, and educational platforms becoming more and more common in schools, colleges and universities, terms such as e-learning, learning management system (LMS) and digital literacy have become ubiquitous in the education sector all over the world.

As the Internet evolved, so did the way students and teachers interacted with it. By the early 2000s, faster broadband connections had become more widespread, allowing for multimedia-rich content to be streamed directly into classrooms. Blogs, wikis and eventually, social media were emerging as educational tools that enabled more collaborative and participatory learning experiences for learners (Ansari & Khan, 2020). A student could learn by creating and sharing content online, thus interacting with their teachers and peers, as well as connecting with a global community, all at the click of a button.

The COVID-19 pandemic brought a forced shift to online learning almost overnight. This sudden transition in education was only made possible with the existence of the Internet. Online conferencing platforms like Zoom, Google Classroom and Microsoft Teams have become education essentials making real-time interaction for teachers and students possible anytime, anywhere, resulting in the rise of asynchronous learning. The pandemic also accelerated the adoption of mobile devices for education, as students became more reliant on smartphones and tablets for online classes and completing homework while being locked down at home. As a result, mobile learning (m-learning) emerged as a powerful and adaptable method to education, further reinforcing the role of technology in education.

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BENEFITS OF TECHNOLOGY INTEGRATION IN EDUCATION

The incorporation of technology in education has changed the way students and educators learn, improving educational experiences and results for both. With technology becoming more common in daily life, it is crucial to integrate it into educational methods to adequately equip students for a fast-evolving world. This article explores the numerous advantages of incorporating technology into education, with specific emphasis on increased involvement, better resource availability, individualised learning, and the cultivation of crucial skills.

Enhanced Engagement and Motivation

One of the main advantages of incorporating technology is the improvement of student participation and interest. Conventional teaching techniques frequently have difficulty engaging modern students, who are used to engaging digital environments that are dynamic and interactive. Technology tools like interactive simulations, gamified learning platforms, and multimedia presentations can greatly enhance student engagement and involvement in educational tasks (López-Pérez, Pérez-López, & Rodríguez-Ariza, 2011). For instance, educational settings with gamification promote a feeling of competitiveness and success, enhancing the enjoyment of lessons. Studies suggest that increased student engagement can enhance their retention and comprehension of material, resulting in improved academic performance (Fredricks, Blumenfeld, & Paris, 2004).

Improved Access to Information

Another important advantage is the enhanced availability of information and educational materials. The abundance of materials available online and in digital libraries can be accessed anytime and from any location. This allows all students, no matter where they are from or their background, to have access to top-notch resources, promoting equal opportunities in education (Bates, 2015). Online platforms give students the ability to delve into a wide range of subjects and different viewpoints, allowing them to explore topics thoroughly and at their own speed. Moreover, technology makes it easier to obtain up-to-date information on worldwide events, enabling students to relate their learning to the world. By promoting a setting in which students have easy access to information, technology improves the overall educational journey.

Personalised Learning Experiences

Customised learning is an additional benefit of incorporating technology, meeting the needs of diverse learning methods and speeds. Educators can customise content and assessments for individual students with adaptive learning technologies (Johnson et al., 2016). For example, programs such as DreamBox and IXL use algorithms to evaluate students' skill levels and adapt the instruction accordingly, guaranteeing that every student advances at their individual speed (Miller, 2018). This individualised method caters to different ways of learning and encourages

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independence and responsibility in learning. Students are prone to staying invested when they are able to learn in a manner that connects with them, resulting in better results.

Development of Critical Skills

The incorporation of technology is also vital for cultivating key skills needed in the 21st century. In modern society, abilities like critical thinking, problem-solving, collaboration, and digital literacy are crucial for achieving success (Partnership for 21st Century Skills, 2011). Technology-filled spaces motivate students to critically evaluate information and work together efficiently, getting them ready for the challenges of contemporary society. For instance, with the help of digital tools, students can collaborate on project-based learning to tackle actual issues, improving their critical thinking skills and teamwork abilities. Additionally, as students become proficient in using digital tools, they enhance their digital literacy skills, which are becoming more crucial in academic and professional settings (Hague & Payton, 2010).

Enhanced Collaboration and Communication

Encouraging collaboration and efficient communication is another goal facilitated by the integration of technology. Online platforms like discussion forums, collaborative documents, and video conferencing tools allow students to collaborate on tasks, exchange thoughts, and offer opinions (Richardson & Mancabelli, 2011). This partnership fosters a feeling of unity and enhances interpersonal abilities, crucial for succeeding in a future career. Moreover, technology enables communication without being restricted by distance, promoting worldwide relationships and expanding students' viewpoints.

Efficient Assessment and Feedback

Technology also helps make assessment processes more efficient, giving prompt feedback to students and educators. Online quizzes, formative assessments, and learning analytics allow educators to effectively track student progress (Ertmer & Ottenbreit-Leftwich, 2010). Instant feedback enables students to recognise areas needing improvement and helps educators modify their teaching. This level of responsiveness improves learning and fosters a supportive educational setting, providing students with guidance on their academic paths.

Increased Flexibility in Learning

The flexibility in learning provided by technology integration is another important advantage. Online education platforms and resources enable students to learn at their own speed and based on their own timetables (Meo, 2013). This is especially advantageous for non-traditional students or individuals juggling numerous responsibilities. Having the opportunity to both access resources and engage in educational tasks at different places creates an inclusive learning setting that caters to a range of needs.

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In summary, incorporating technology in education provides numerous advantages that support targeted goals to improve student learning experiences. Technology is crucial in modern education, providing benefits like heightened engagement, personalised learning, and enhanced collaboration, as well as improved access to information and the development of critical skills. It is crucial for educators and institutions to incorporate technology as a key element in the learning process in order to adequately prepare students for future challenges. Despite remaining obstacles, the possibility of positive results from successful technology integration in education is substantial, offering a more engaging, encompassing, and pertinent learning experience.

IMPACT OF TECHNOLOGY INTEGRATION ON STUDENTS' ACHIEVEMENT

The integration of technology into education has significantly reshaped the landscape of teaching and learning, enhancing students' academic achievements and fostering skills critical for success in the modern world. Studies indicate that the thoughtful incorporation of technology can promote a deeper engagement with educational content, encourage active participation, and improve learning outcomes (Fredricks, Blumenfeld, & Paris, 2004; López-Pérez, Pérez-López, & Rodríguez-Ariza, 2011). This section explores the multifaceted effects of technology on students' academic performance and skill development while addressing the challenges in evaluating its true impact.

Advancements in Learning and Skill Development

Technology integration equips students with essential technical skills and fosters their cognitive development. Tools such as Computer-Assisted Instruction (CAI) and interactive platforms enable students to acquire new proficiencies while reinforcing existing knowledge (Li, 2023). For example, gamified learning environments encourage problem-solving and decision-making, preparing students for real-world challenges (Hamari, Koivisto, & Sarsa, 2014). Additionally, technology facilitates collaborative learning by enabling group projects through digital platforms, which enhance students' teamwork and communication abilities (Hague & Payton, 2010).

Research has also highlighted the role of blended instructional formats in boosting engagement and productivity. Students actively participating in technology-enriched classrooms report higher motivation and interest in their studies, which translate into improved academic outcomes (Ansari & Khan, 2020). These tools allow learners to move beyond passive reception of information, encouraging dynamic interactions that deepen their understanding of complex concepts.

Enhancing Academic Engagement and Outcomes

The infusion of technology into education has transformed how students engage with learning materials. Interactive content, such as multimedia resources and simulations, stimulates curiosity and fosters deeper comprehension (Johnson et al., 2016). The use of online platforms and digital libraries expands access to knowledge, particularly for students in underprivileged areas,

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promoting equity in education (Bates, 2015). Furthermore, personalised learning technologies, such as adaptive software, tailor content to individual needs, enabling students to learn at their own pace and boosting their academic confidence (Miller, 2018).

These advances have been particularly evident in reading programs, where digital tools have enhanced literacy skills and cultivated a love for reading. The integration of read-aloud technology and digital storytelling platforms has been shown to improve reading comprehension and retention, especially among younger learners (Ertmer & Ottenbreit-Leftwich, 2010).

Challenges in Assessing Impact

Despite these benefits, challenges remain in evaluating the true impact of technology integration on student achievement. A major limitation is the lack of baseline data for pre- and post-implementation comparisons, which restricts the ability to measure long-term effects comprehensively (Tulowitzki, Gerick, & Eickelmann, 2022). Furthermore, discrepancies in research methodologies, ranging from qualitative to quantitative approaches, complicate efforts to generalise findings (Schrum, Levin, & Grant, 2011).

Another concern is the potential for over-reliance on technology, which may inadvertently diminish the role of foundational teaching practices. For example, while technology-based assessments provide immediate feedback, they often neglect the nuances of individualised teacher support (Darling-Hammond, Hyler, & Gardner, 2017). Addressing these challenges requires longitudinal studies and targeted interventions that balance technological tools with traditional pedagogical strategies.

IMPACT OF TECHNOLOGY INTEGRATION IN EDUCATION ON TEACHERS' QUALITY

The integration of technology has changed the way teachers teach as it also significantly impacts the quality of teaching and learning process. Besides increasing teachers' productivity, it also benefits teachers in many ways as it makes teaching and learning easier and fun- filled which simultaneously attracts learners in different ways. Adapting technology in teaching somehow can also improve teachers' teaching method, professional development and provide overall insight to the classroom. It offers an effective classroom not only to teachers but also to students as it also prepares students for situations in a technology-paced world.

Effectiveness in Teaching

First, technology integration in education gives an impact in teaching effectiveness (Lachner, 2021). Teachers' drive like motivation and self- efficacy has greatly influenced teachers in using technology in the classroom. The positive attitude has led to an interactive, effective and conducive learning environment. The ability in providing rich resources has a positive impact on teachers' motivation as they can see how it actively engages students. Besides, it also becomes a key driver

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of teaching quality as it helps in improving teachers' confidence by believing their abilities and commitment to the students. At the same time, teachers can also use technology in monitoring, visualising and measuring students' performance as they can clearly see the progress and improvement in students. Undoubtedly, with positive beliefs, it encourages teachers to integrate technology more effectively, deal with a supportive environment and improve expertise in dealing with resources for successful integration (Ertmer, 2020).

Moreover, technology integration also benefits teachers in widening variety of learning materials that can be taken from the Internet. This also gives opportunity to students too in exploring learning materials without doing too much hard work. With technology advancement, teachers are able to curate a broad range of resources from the Internet that also caters different needs; learning environment and preferences (Unesco, 2023). For example, teachers can draw from a wide array of resources such as digital textbooks, interactive simulations and online video content. Besides introducing new dimensions in learning, it also empowers teachers to use platforms with various open- access resources which allow teachers to give supplementary resources in order to deepen students' understanding. Teachers can also grab the opportunity in managing resources according to students' ability to cater different learning needs which helps in developing an inclusive classroom. As teachers can access different learning styles, it makes the learning process more effective. Undeniably, it proves that technology integration leads teachers to explore and supply content more actively and meaningfully.

Challenges of Integrating Technology for Teachers

However, there are still drawbacks of adopting technology in education for teachers. Keeping pace with rapid changes in technology may give hard time to teachers as they have to constantly update themselves with those advancements (Mary Burns, 2023). Teachers are struggling in integrating technology and it causes them to have a disability in using tech- driven resources that possibly affect their teaching. Many teachers are ambitious in updating their skills to make them align with the advancement, unfortunately without support they are normally unprepared, limit their self-esteem and not ready to constantly use technology. It is significant for teachers to undergo professional development courses in ensuring their consistency in integrating technology in the classroom as it assists them in maintaining high teaching standards in using technology driven environments. Surely, with proper support like comprehensive training, it may facilitate teachers to facilitate an effective and confident technology based classroom.

Akram (2023) highlights that technology integration has inadvertently led to a significant increase in teachers' workload, as they are constantly required to manage and implement various technological tools within the classroom. For instance, teachers feel stressed when they have to juggle a variety of technological advancement as they have to continue learning, adapting and dealing with new tools. All require them to spare time beyond the traditional teaching practice. Unlike conventional tasks that rely on established techniques, technology integration needs skill updates which expand more pressures on teachers. Moreover, it also leads to a sense of technology overload without proper and adequate support and learning. Teachers often find it challenging to reconcile their primary role as educators with the increasing demand to manage and master new technologies. This added responsibility can create significant stress, and, without adequate support,

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can lead to burnout. These pressures underscore the importance of structured, ongoing support and professional development to help teachers manage the demands of technology integration more effectively and sustain a healthy balance in their roles as both instructors and tech facilitators.

In summary, integrating technology in education can greatly improve teaching quality and offer a variety of learning resources, but it can also present several challenges that can affect teachers' well-being and effectiveness. Teachers need to constantly learn and adjust to new digital tools which can create crucial pressure that leads to heavier workloads, stress, and even burnout for educators. By tackling this issue, teachers can better equip themselves to adapt to new changes that will benefit both their teaching practices and their students' learning experiences. Embracing technology integration requires teachers to be open to change and willing to develop new skills. This proactive approach not only enhances their effectiveness as educators but also creates more engaging and relevant learning environments for students.

IMPACT OF TECHNOLOGY INTEGRATION IN EDUCATION ON SCHOOL MANAGEMENT

The integration of technology in education has redefined school management, enhancing efficiency, communication, and data-driven decision-making. As educational needs evolve, technology enables seamless administration and stronger interactions among students, parents, teachers, and administrators. This section presents the historical context, current impacts, challenges, and future prospects of technology in school management, revealing both its potential and areas of concern (Cifuentes, Maxwell, & Bulu, 2011; Schrum, Levin, & Grant, 2011).

Historical Context of Technology Integration in School Management

Technology's role in educational management began in the late 20th century with basic computer applications for tasks like record-keeping and financial management (Davies & West, 2014). These early implementations prioritised administrative efficiency but gradually expanded with internet connectivity and email systems, evolving into comprehensive Student Information Systems (SIS) by the 2000s (Tulowitzki, Gerick, & Eickelmann, 2022). As such, technology shifted from auxiliary functions to central roles in school operations, facilitating digital records and robust communication frameworks.

Current Impacts on School Management

Today, technology is integral to school management, affecting administrative and operational functions alike. Modern systems such as Learning Management Systems (LMS) and SIS enable real-time communication and data access, which improves collaboration among stakeholders and enables data-informed decisions (Dexter & Richardson, 2020; Tulowitzki et al., 2022).

Efficiency in Administrative Tasks: LMS and SIS tools streamline essential processes, from record-keeping and attendance tracking to scheduling and resource management. These platforms

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allow administrators to monitor student progress, identify areas of concern, and make timely interventions (Dexter & Richardson, 2020). Cloud-based platforms further enhance data access from any location, reducing time spent on paperwork and freeing administrators for strategic planning (Davies & West, 2014).

Enhanced Communication: Digital communication tools, such as emails, messaging apps, and digital notices, enhance communication among administrators, teachers, students, and parents. This connectivity fosters transparency, as parents stay informed about their children's progress and school events. The improved engagement among community members is essential for effective school management (Hollingworth, Olsen, & Asikin-Garmager, 2018).

Data-Driven Decision-Making: Data analytics supports school management by helping administrators make informed, data-driven decisions. Predictive analytics, for example, assists in identifying at-risk students for early intervention. Additionally, data insights inform resource allocation, ensuring schools meet both academic and operational needs (Dexter & Richardson, 2020; Cifuentes et al., 2011).

Challenges of Technology Integration in School Management

While technology offers numerous benefits, it also presents challenges, particularly concerning cost, privacy, and equitable access.

High Implementation Costs: Implementing comprehensive technology solutions requires substantial financial investment, encompassing software, hardware, maintenance, and staff training. These costs can strain budgets, especially in underfunded schools, creating disparities in access to advanced technological resources (Hollingworth et al., 2018; Davies & West, 2014).

Data Privacy and Security: Schools collect sensitive student and staff data, making privacy and security paramount. With cyber threats increasing, breaches could compromise information, posing risks and legal concerns for schools (Dexter & Richardson, 2020). Privacy issues necessitate stringent security protocols to protect educational data.

Digital Divide and Inequity: The digital divide exacerbates inequities, as not all students and staff have equal access to digital tools. Students from low-income backgrounds may lack internet access at home, which impacts their academic performance. Additionally, staff often need ongoing training to adapt to new systems (Davies & West, 2014; Hollingworth et al., 2018).

Future Prospects for School Management through Technology

The future of technology in school management promises advancements in AI, machine learning, and cybersecurity, which will enhance operational efficiency and personalisation. Predictive analytics could assist in proactive interventions, identifying students' needs in advance (Cifuentes et al., 2011). Furthermore, AI-driven administrative systems may automate routine tasks, enabling administrators to focus on strategic initiatives.

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Cybersecurity advancements will also be essential, as educational data becomes more integral to school operations. Enhanced data encryption and biometric access will better protect sensitive information, fostering trust among all stakeholders (Schrum et al., 2011).

Technology integration has transformed school management, enhancing efficiency, communication, and data-driven decision-making. However, the shift poses challenges, including cost concerns, privacy issues, and inequities. Addressing these obstacles through strategic investments, cybersecurity improvements, and policies to support equitable access will enable schools to fully leverage technology. With careful planning and continuous evaluation, technology can create efficient, inclusive educational environments.

CHALLENGES AND FUTURE DIRECTIONS OF TECHNOLOGY INTEGRATION IN EDUCATION

Technology plays a crucial role in transforming the learning landscape in schools and other educational institutions. It offers unique functionalities and affordances that engage students, motivate them, and lead to improved learning outcomes. The integration of technology in education leads to lifelong skills acquisition rather than just technology use (Collins & Halverson, 2018). Public and private institutions are increasingly integrating emerging technology tools into formal curriculums, such as digital media, virtual and augmented reality, and social media platforms (Johnson et al., 2020). Teachers are becoming more open to using digital technologies, such as interactive whiteboards, overhead projectors, e-readers, and social networks, to enhance student learning.

However, challenges in technology integration include an inadequately funded system, lack of support for sustainable change, lack of professional development for educators, and traditional resistance to change. Technology resources often lead to coaching models and technical support, lacking adequate professional development opportunities. This results in schooling being constantly on the defence.

One generational challenge is the "digital divide," where all users have different exposures to technologies and skill sets (van Dijk, 2020). Familial profits can withstand these completions despite initiatives and advances in nationwide markets over the last decade (Mossberger et al., 2013). Schools and training programs play a crucial role in helping determine which students may exceed and fulfill the possible technological divides outside of university networks. Concerns about vitality and surveillance in schooling, treatment/privacy, and the lack of knowledge persist, with many parents feeling they cannot be successful over their children.

The digital divide is a significant issue affecting students from different socio-economic backgrounds (Hohlfeld et al., 2017). Teachers often feel unprepared to teach with technology, and inconsistent training leads to a lack of effective integration. To address this, it is crucial to provide ongoing training in using technology in real-world contexts (Darling-Hammond et al., 2017). Effective professional development programs should be job-embedded, ongoing, and aligned with teaching practices, school goals, and student assessments. The quality of professional

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development, the application of instructional strategies in the classroom, and student outcomes are all linked.

The digital divide also affects students from different socio-economic backgrounds, with socio-economic disparities in internet access and access to technology and resources (van Dijk, 2020). Equity in access to technology is crucial, and policies at both school and government levels must be implemented to ensure equitable access. Partnerships with local and global communities, providing low-cost or free internet access, and teacher advocacy and parent involvement are essential for policy change.

Privacy and security concerns are also significant issues, as they can impact the effectiveness of technology integration in education. The growing use of technology in education raises concerns about privacy, data management, and security issues (Buchanan et al., 2018). Districts face challenges in managing vast amounts of student data and the risks of data breaches due to poor tracking, unauthorised access, and weak security systems (Higgins, 2015). The Children's Online Privacy Protection Rule (COPPA) and the Family Educational Rights and Privacy Act (FERPA) require schools to obtain parental consent before releasing student information.

Successful technology integration models have been identified over 15 years, providing best practices for future efforts. These models emphasise collaboration among all parts of the education system, including leadership, professional development, ongoing assessment, teacher preparation, partnerships, and support from administration (Darling-Hammond et al., 2017). Teachers are not just recipients of information but actively engaged in discussion and reflection on technology integration and the current curriculum (Hsu et al., 2020).

Emerging technologies like virtual reality and artificial intelligence are expected to influence skills and expertise needed for the workforce, requiring students to develop critical thinking, collaboration, creativity, innovation, and evaluation. Educational practices should respond to these developments by placing less emphasis on standardised testing and more on interdisciplinary work (Hsu et al., 2020). Personalised learning experiences using data-driven assessment and instruction, integrated technological tools, and thematically relevant curricula that reflect cultural diversity are essential for achieving high-quality, relevant information (Luckin et al., 2016).

Ethical considerations for emerging technologies to enhance entrepreneurship, technology, and pedagogy require continuous adaptation. Schools and educational experts must adapt and update educational policy frameworks while finding ways to integrate emerging technologies into their practices (Selwyn & Aagaard, 2021).

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