

PHYSICAL SCIENCES

EVALUATION OF BENEFITS AND CHALLENGES OF TECHNOLOGY ON EDUCATION IN 21ST CENTURY AND WAY FORWARD

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Abstract

The generation of learners today is very different from those that existed before the internet revolution, online education, or digital learning. The learning environment is made more dynamic by technology. As technology develops, classrooms are being remodeled and reinvented in a variety of ways to meet the growing needs of contemporary digital learners. The internet has become into an essential informational resource. A child can increase their knowledge by reading one of the many children's books available online. It supports their development of independence and self-assurance as learners. Children have access to a multitude of knowledge on the internet that might spark their interest in reading, which is another benefit. The imaginations of youngsters cannot be restrained. Kids today have access to laptops, iPads, and so much more to help them make those ideas a reality. Students can still use pens and paper, but instead of drawing a picture they can now create a 3D animation. They work hard to use their ideas more creatively and to try out new things. Their potential for learning is enhanced, which will help them perform better in the future. On the other side, it is the most concerning result of kids and students using technology without adult supervision. It's shocking how much sexual content there is to be found online. Unsupervised technology access will therefore be more simpler as a result. Most websites that publish this kind of stuff have no limitations on who can view it, so kids can easily access them. Furthermore, if guardians haven't adequately taught their children about fundamental online safety, dangerous people online can easily trick youngsters into giving indecent photos, financial information, and security information. Online access also interferes with kids' and students' sleep, socializing, physical activity, teacher-student connection, and other activities. This is an analytical research on how technology affects education, along with a detailed analysis of the advantages and difficulties it presents for kids or students.

Keywords: Online, digital, smart, AI, ML, AR, VR, 3D animations

Introduction

The goal of technology is always to speed up and simplify the process of carrying out any particular mechanical or physical task. Almost all aspects of education, and notably school activities, have been mechanized by technology. However, it is now true that there is no reason for a child to master the fundamentals of math when they can use a calculator on their phone. Alternatively, why would a kid need to learn spelling or grammar when they have autocorrect software? Therefore, what started out as a good idea has resulted in the position where future generations would be unable to carry out routine cognitive tasks without technology. It's also true that youngsters who rely on technology to handle all of their educational or academic problems gradually lose their capacity for problem-solving, which is a set of characteristics that employers greatly value. Although digital technologies have been shown to improve student advancement and project collaboration, many people ignore their biological need for real-time interaction. The only way to solve this peculiar problem is to have teachers and educational institutions as a whole impose restrictions on the use of technology in education. We have evolved as social beings for many thousands of years, so we are aware of this fact and believe that we can simply overcome our genetic predisposition. Many aspects of our daily lives—as

well as the lives of our children—now depend heavily on technology. Technology may be both helpful and harmful for children when used within the boundaries of the classroom and learning environment.

Many school-age youngsters nowadays have grown up using technology devices for the first time. As a result, students frequently equate pleasure and excitement with computers, tablets, and other related technology. As a result, using technology in the classroom not only piques students' interest and excitement, but also energizes more traditional teaching methods.⁴ Today, technology is changing all aspects of life, including education. We are taking advantage of eLearning's benefits and the fruits of digitization. As a result, computers, laptops, mobile devices, and software programs are now used for teaching and learning outside of traditional classroom settings. Without a question, the technology industry's rapid development has greatly benefited the education sector. Both teachers and students found it to be more convenient. More specifically, the use of technology resulted in gradual modifications to instructional strategies. Students were able to study more effectively, enhance their academic performance, and get good grades as a result of this.⁵ Simply put, educational technology (EdTech) is the application of software programs, digital tools, and media to aid in the exchange

⁴ <https://www.celebree.com/blog/resources/the-pros-and-cons-of-technology-in-education/>, accessed on 24 Jul 2023

⁵ <https://www.tryclarifi.com/benefits-of-technology-in-education/>, accessed on 24 Jul 2023

of knowledge and educational resources. Technology innovation specialist Daniel Newman recently wrote an article for *Forbes* that claimed that educational technology had significantly improved learning. There are several benefits to utilizing technology in schooling. It is a blessing for everyone working in the field, from teachers and schools to students in the twenty-first century. Students found learning to be more enjoyable and simple because to the use of technology in the classroom.⁶ Devices, AI-based tools, and AR/VR technologies are being used by educational institutions and teachers to immerse students in learning. Lessons and homework are of greater interest to the students. They perform and receive better grades as a result.

On the other side, there is a significant negative impact of technology tools like smartphones, tablets, PCs, and laptops on pupils' academic performance. Teachers are becoming designers or architects of learning environments rather than information transmitters.⁷ By standing in the middle of students and curriculum, their main responsibility is to rearrange the components of effective learning. Recent research, however, indicates that technology has a detrimental effect on the educational process.⁸ A skilled educator who observes that texting has harmed students' capacity to write complete sentences free of fragmentation and poor punctuation.⁹ Actually, due to their constant, heavy reliance on technology, pupils have developed laziness. The issue is exacerbated in primary schools, where pupils are overloaded with technology, particularly cellphones, and as a result, their usage of grammar suffers as a result of textspeak like "4ever" instead of "forever."¹⁰ Students no longer read their favorite paperbacks in class; instead, they use smartphones, iPads, tablets, and other forms of technology. Since the last 50 years, there has been a significant decline in children's leisure reading, and technology must be to blame. While using technology has helped students learn more material in less time and has improved their ability to visualize it (using tools like PowerPoint presentations, maps, and charts, for example), an excessive reliance on technology in the classroom has a dehumanizing effect.¹¹ The

profession of teaching has been severed from the sphere of human endeavors and transformed into a technology behemoth that is gradually usurping its essence.¹² There are various sectors and degrees of education where this "leviathan," a mythical sea monster according to Jewish traditions, can be found, including pre-packaged curriculum that were not created by the instructor of a particular course.¹³ Using technology interferes with the relationships between teachers and students and creates a barrier to their simple communication. Collectivism and collaboration are two distinguishing characteristics of face-to-face instruction, whereas the absence of any sense of collectivism or community in 21st-century technology-based instruction is its greatest distinguishing characteristic.¹⁴

Our society is growing more and more dependent on technology, thus it is crucial to prepare kids for success in primary and secondary school by giving them a solid understanding of popular technological tools and their functions. It is never too early for young kids to start acquiring the knowledge and abilities they will need throughout their academic and professional careers. In this regard, early exposure to technology in the classroom is a terrific approach to start laying the groundwork for future success. Children who have access to technology can learn to research interests they have. Information wasn't as easily accessible to earlier generations, therefore kids needed to have access to conventional resources. Children and students today have access to a wealth of knowledge. When used properly and under supervision, technology can enhance learning both inside and outside of the classroom by giving students a way to research the subjects they are passionate about. For instance, a lesson on dinosaurs might be enhanced by a YouTube video or a virtual field trip to a natural history museum.¹⁵ It's interesting to note that children today are frequently referred to as "the Net Generation,"¹⁶ "Digital Natives,"¹⁷ "the Gamer Generation,"¹⁸

⁶ <https://hubvela.com/hub/technology/advantages-disadvantages/students-life/>, accessed on 24 Jul 2023

⁷ Hairon et al, (2017), The learning revolution: From pedagogues to designers of learning. *Learning: Research and Practice*, 3(3), 79-84, accessed on 24 Aug 2023

⁸ Wentworth D et al, (2014), Technology use and academic performance. *Computers & Education*, 78, 306-311, accessed on 24 Aug 2023

⁹⁹ Strain Moritz T, (2016), Perceptions of Technology Use and Its Effects on Student Writing, (Master's Thesis). Available: https://digitalcommons.brockport.edu/cgi/viewcontent.cgi?referer=https://www.google.com.eg/&httpsredir=1&article=1399&context=ehd_theses, accessed on 24 Aug 2023

¹⁰ van Dijk et al, (2016), The influence of texting language on grammar and executive functions in primary school children. *PloS One*, 11(3), accessed on 24 Aug 2023

¹¹ El-Hussein M, (2010), Defining mobile learning in the higher education landscape. *Educational Technology & Society*, 13(3), 12-21, accessed on 24 Aug 2023

¹² Kemp A et al, (2015). Technology and teaching: A conversation among faculty regarding the pros and cons of technology. *Qualitative Report*, 19(3), 1-23, accessed on 24 Aug 2023

¹³ Kearney M et al, (2012), Viewing mobile learning from a pedagogical perspective, *Association for Learning Technology Journal*, 20(3), 1-17, accessed on 24 Aug 2023

¹⁴ Croft N t al, (2010), Overcoming isolation in distance learning: Building a learning community through time and space. *Journal for Education in the Built Environment*, 5(1), 27-64, accessed on 24 Aug 2023

¹⁵ Saba Farhad, (November–December 2011), "Distance Education in the United States: Past, Present, Future", *Educational Technology*, 51 (6): 11–18. ISSN 0013-1962

¹⁶ Tapscott D et al, (1999), *Growing up Digital: the Rise of the Net Generation*. New York: McGraw-Hill. The Josephson Institute of Ethics, Character Study Reveals Predictors of Lying and Cheating, accessed on 24 Aug 2023

¹⁷ Prensky M, (2001). *Digital Natives, Digital Immigrants*. On the Horizon, 9(5), pp 1-6, , accessed on 24 Aug 2023

¹⁸ Carstens A, (2005). *Get Ready for the Gamer Generation*. *Tech Trends: Linking Research & Practice to Improve Learning*, 49(3), 22-25, accessed on 24 Aug 2023

"New Millennium Learners," etc. since they are obsessed with technology.¹⁹In actuality, technology is steadily and positively altering the educational system. While it does not at all replace traditional classroom teaching techniques, it does complement them in order to better prepare students for life in the fast-paced, technologically advanced world of the twenty-first century.²⁰The uses of technology in teaching are countless. This is a methodical and analytical study to assess how technology is affecting education and to show the advantages and difficulties for kids or students.

Benefits and Advantages of Technology in Education

Technology advancements are allowing for significant improvements in educational content, delivery, and accessibility. New technologies have enabled the exponential expansion of human knowledge throughout history. The employment of radios in education was the main topic of discussion at the start of the 20th century.²¹Since then, though, technology has been viewed as a means of enhancing learning, communication, and content comprehension. The next wave of educational innovations is bringing about a big shift. Beyond lectures and group projects, education technologies are developing to include games, simulations, and augmented reality.²²More software is being developed today that will enable pupils to create their own knowledge while receiving almost imperceptible guidance from teachers. The ability to save money is one benefit that digital technology may provide. Over a million jobs were lost in the education service sector during the Great Recession.²³Spending for education was reduced by state and local governments, which had a knock-on effect across the board. Today's educators, from colleges to primary schools, have a harder challenge than ever with fewer resources at their disposal. The possibility of budget funding returning to pre-recession levels in the near future is slim given the political environment of budget cuts. When trying to aid overworked teachers in deploying the newest assistive technology, educational technologies assume greater significance. Beyond monetary concerns, education confronts distinct resource difficulties. The duration of the school day is limited, and class time is a valuable resource. Compared to many other nations throughout the world, students in developed nations like the United States spend less time in the classroom.

Teaching is a difficult profession that involves many repetitive but time-consuming responsibilities.

Tools that make it easier to remember fundamental information free up teachers to assist children who require individualized interventions. Over the course of the school year, every additional minute spent instructing student has an impact.²⁴ Technology improvements in assessment have the potential to benefit both teachers and pupils. Without performance feedback, teachers cannot determine whether pupils have understood the lesson, and legislators cannot determine whether their reforms are effective. Since the development of the optical scan answer sheet half a century ago, assessment technology has barely, if at all, evolved. While some new assessment technologies enable accurate real-time assessment, others can assist reduce testing expenses. Testing innovations allow for low-stakes evaluation of children. Social robots may be useful as tutors and educators for both children and adults, according to recent theories. We want to investigate how social robots can be used to train young children in a second language, despite the fact that robots have been proved to be effective in teaching knowledge- and skill-based subjects. Social robots offer potential as educational instruments to enhance the acquisition of second languages (L2) since language learning depends on contextual, grounded, and social learning, in which interaction and repeated practice are key components.²⁵

Additionally, the epidemic persisted long enough to permanently transform the talent landscape for many businesses into a worldwide and hybrid one. This means that businesses can take advantage of the opportunity by considering a feasible way to get into the global talent market.²⁶So, if I were to be provocative, I'd suggest that technology will actually level the playing field. It will provide the finest opportunities to the brightest talent regardless of where they reside, thereby really unleashing a billion knowledge workers' potential. We'll look back on our recent digital interactions in the same manner as we do on our carbon emissions by the year 2027. The dangers of technology created without placing humans at the center and its detrimental impacts on our mental health and emotional wellness have been made public through social media. Humanity, closeness, depth, and empathy are things we lost from our encounters a decade ago, and they are now

¹⁹ Pedró F, (2006, May). The New Millennium Learners: Challenging our Views on ICT and Learning. Available: <https://publications.iadb.org/en/new-millennium-learners-challenging-our-views-ict-and-learning>, accessed on 25 Aug 2023

²⁰Anderson Ashton et al, (2014), "Engaging with massive online courses". Proceedings of the 23rd International Conference on World Wide Web - WWW '14. New York, New York, USA: ACM Press: 687–698, accessed on 25 Aug 2023

²¹ Reid Seerley and Daniel Day, "Radio and records in education" Review of Educational Research 12.3 (1942): 305–322, accessed on 25 Aug 2023

²² West, Darrell M. Digital Schools: How Technology Can Transform Education. Brookings Institution Press, 2012

²³Haver Analytics. "Employment Household Survey" Employment: Education Services January 1983 to January 2013, accessed on 25 Aug 2023

²⁴ Expanded Learning Time by the Numbers, Center for American Progress, April 2010, Web: <http://www.americanprogress.org/issues/education/news/2010/04/22/7716/expanded-learning-time-by-the-numbers/>, accessed on 29 Jul 2023, accessed on 25 Aug 2023

²⁵Spaulding S, Gordon G, Breazeal C (2016) Affect-aware student models for robot tutors. In: Proceedings of the 2016 international conference on autonomous agents and multiagent systems, , accessed on 25 Aug 2023

²⁶Pilgrim, Jodi; Christie Bledsoe (1 September 2011), "Learning Through Facebook: A Potential Tool for Educators", Delta Kappa Gamma, accessed on 25 Aug 2023

absent.²⁷Real dialogues will take the place of widespread influence. Interactions that bolster our sense of community. Our attention will be on the human experience in the future. It will not be a technological but a cultural paradigm change that ushers in the metaverse. Our ability to express our emotions through the use of tools like virtual and augmented reality and brain-computer interfaces will have an impact on the metaverse. There will be a need for new hardware, platforms, disciplines, and senses. In the virtual world, when feeling, trust, and safety become our most valuable commodities, we will rethink social contracts. The platform experience will be decentralized in favor of the user.²⁸We'll stroke our daughter from the other side of the abyss. Our deceased grandmother's hand will be held by us. We will cherish those special times. The focus of our relationships with others will be the human condition.

The traditional educational system, which was created about 200 years ago to address the demands of the industrial revolution, is no longer effective. The Sustainable Development Goals of the United Nations encompass the requirements of our world today. On the other hand, the World Economic Forum has a list of 21st century talents that will meet these needs. The younger generation is already motivated to work together to develop humane answers to the world's most pressing issues. The development of skills and competencies necessary to address these issues and create a better future for all children is greatly facilitated by technological advancement. AI will be used to comprehend children's individual preferences and recommend the following step in their educational journey.²⁹Additionally, AI will provide their parents, teachers, and other adult role models new perspectives. Children are already using the internet to access the best experts, enhance their education, and lessen disparities.³⁰Every youngster will be able to iterate, test, and prototype in an economical manner. They will innovate and raise global standards of living in this way.

The world will undergo a revolution brought on by the quantum internet, just as it has with the classical internet. And just as the current internet was made possible by classical networks, the quantum internet of the future will also need to be built with quantum networks.³¹Innovations in the fields of energy, medicine, material sciences, and other fields will be made possible by the quantum internet, which is anticipated to

have a significant impact on how we live. Quantum repeaters, the building blocks of the quantum internet, will be used to transform local area networks and clusters into continent-scale area networks over the course of the next five years.³²As a result, quantum networks will increasingly find applications. For instance, uncrackable security is made possible by quantum secure communications, which harness the power of physics. Super-precise clocks, GPS, and ultra-high-resolution telescopes will all be made possible by distributed quantum sensing. Additionally, clustered quantum computing and ultimately distributed quantum computing will enable the quantum internet in order to put the capabilities of quantum computing to good use. The following has a discussion of the pros and benefits of technology in education.

Faster access to information.

The ability to access a wealth of knowledge at any time is among the most significant benefits of technology in education. They have the quickest possible access to the data. Instead of visiting libraries and sifting through stacks of books, students may now get reliable information whenever they need it from a wide range of sources to prepare their assignments, projects, and homework, including websites, instructional sites, YouTube videos, eBooks, PDFs, and more.³³With the introduction of the World Wide Web (www), students are now experiencing the first-ever technology-related impact on education. With only a few clicks, students may access an endless amount of knowledge and data on their laptops, tablets, or smartphones. This makes it possible for any student to create a lesson plan or compose a paper without assistance. Thus, technology broadens pupils' knowledge and helps them become independent learners and 21st-century global citizens.³⁴

Wider variety of learning materials. Students have access to a large array of instructional resources via the internet. Among these are scientific publications, journals, research papers, instructional films, how-to manuals, educational websites, online databases, and author/educator blogs. These are really useful if you are in high school. You may compose academic papers more effectively if you include all relevant specific data, facts, and figures. You can construct a hypothesis, support an argument, or reach an appropriate conclusion for your essay by utilizing the material at your disposal.³⁵You may use technology to improve your academic achievement without putting in a lot of effort. You don't have to spend hours in the school

²⁷Clark, R. C., Mayer, R. E. (2007). *eLearning and the Science of Instruction*. San Francisco: Pfeiffer. ISBN 978-0-7879-8683-4, accessed on 25 Aug 2023

²⁸Du Boulay Benedict (6 August 2015), "Recent Meta-reviews and Meta-analyses of AIED Systems", *International Journal of Artificial Intelligence in Education*, 26 (1): 536–537. doi:10.1007/s40593-015-0060-1. ISSN 1560-4292,

²⁹ <https://www.twinscience.com/en/>, accessed on 25 Aug 2023

³⁰Courts, B. & Tucker, J. (2012). "Using Technology To Create A Dynamic Classroom Experience", *Journal of College Teaching & Learning*, 9 (2), 121-128, , accessed on 25 Aug 2023

³¹ , <https://tophat.com/glossary/e/educational-technology/>, accessed on 25 Aug 2023

³² <https://www.aliroquantum.com/>, accessed on 25 Aug 2023

³³Holstein, Kenneth; McLaren, Bruce M.; Aleven, Vincent (2018), "Student Learning Benefits of a Mixed-Reality Teacher Awareness Tool in AI-Enhanced Classrooms", *Lecture Notes in Computer Science*, Springer International Publishing,, ISBN 978-3-319-93842-4, accessed on 25 Aug 2023

³⁴Reeves, Thomas C. (12 February 1998), *The Impact of Media and Technology in Schools* (PDF) (Report). University of Georgia, Archived (PDF) from the original on 20 October 2013, , accessed on 25 Aug 2023

³⁵Van Leeuwen Anouschka et al, (December 2015), "Teacher regulation of cognitive activities during student collaboration: Effects of learning analytics", *Computers & Education*, 90: 80–94, accessed on 25 Aug 2023

library, harass teachers all the time, or borrow things from former students. You can do a paper on your own while using just credible sources and guaranteeing a great grade.

Increases the scope for distance learning.

The possibility of distance learning is a huge perk of the internet for students. Because of the internet, online lessons are now a reality! Students can learn just as effectively in a chat room or on a virtual screen. During the online session, they can exchange documents, crucial resource links, and media assets with other students. Virtual learning sessions are complemented with traditional classes in schools, which helps students learn more and develop their skills.³⁶In order to offer more tutoring to pupils, particularly the weaker ones, they enroll in online programs outside of the classroom. Furthermore, students can enroll in an online course to pursue their interest in a subject or profession that is beyond the scope of their academic program, such as data analytics. Additionally, a lot of brand-new educational institutions are emerging in the twenty-first century that only provide online courses in a variety of academic and professional areas. Some of the well-known suppliers of in-depth online courses include Coursera, edX, Udemy, etc.

Eases teaching methods.

An effortless teaching experience is one of EdTech's advantages. The teachers can easily communicate with the pupils outside of the classroom or tutor them remotely. This improves their capacity to instruct, the students' learning, and their potential to achieve higher academic standings. Furthermore, mobile and desktop programs that serve as virtual attention coaches for kids are a product of technology integration in education. They assisted teachers in organizing pupils' assignments and homework. They can monitor the status of tasks while also reminding or alerting the pupils if they are running behind schedule. Today, a lot of schools and teachers use internet tools to monitor their students' development and help them in the classroom. They can quickly determine who has poorer grades or who takes longer to finish classes. They can give them the essential instructions and assist in gradually raising their academic achievement.³⁷

Improves learners' communication skills in schools. One of the notable advantages of technology in higher education is this. Students in higher grades improve their communication skills when using various technological tools and online courses. We are aware that many students are apprehensive to interact with

their teachers in front of their peers or during class. However, during online sessions or classes, their reticence or introversion disappears. During their individual screen time, they can freely communicate via chat, audio, or video calls.³⁸Students who want to succeed in their studies and careers must have strong communication skills. Students who can communicate more effectively can express their ideas clearly and participate in worthwhile discussions. They can communicate their comprehension to teachers and learn what's on their minds. They can therefore learn more and apply it well to raise their academic achievement.

Makes studying enjoyable.

It is difficult to have young toddlers sit still and study. They get easily distracted. Older students, like younger students, struggle to keep focus and complete lengthy papers or assignments. In general, not all students find learning fun. However, to advancements in technology, anyone can now enjoy it.³⁹ Classes are more engaging for students thanks to the utilization of tablets, laptops, VR/AR technology, and touch screen boards. Teachers may find it easy to keep children's attention. Similarly, these cutting-edge tools help students at higher levels understand challenging concepts and science through immersive encounters. Making learning enjoyable for children is thus one of the key benefits of employing technology in education. Teachers could see their students' rising engagement, which was reflected in their improved academic achievement.

Helps learners to acquire new skills and knowledge.

Students benefit from the usage of technology in the classroom by increasing their knowledge and gaining new abilities. The internet and online courses make this possible! To understand more about a given subject, dedicated students can conduct internet research using a variety of information sources. With their newfound knowledge, they will be able to create academic classes and outperform other students. Education technology (EdTech) is also supporting aspiring young talents in learning professional skills that will benefit in their future development.⁴⁰The bulk of professional skills or disciplines are not included in university curriculum, such as business analytics, machine learning, data science, and digital marketing. You can complete an online course for any skill outside of class hours. It will allow you to gain in-depth understanding of the subject matter and will prepare you for a desired career or professional field.⁴¹

³⁶Hall, Ashley A.; DuFrene, Debbie D. (June 2016). "Best Practices for Launching a Flipped Classroom", *Business and Professional Communication Quarterly*. 79 (2): 234–242. doi:10.1177/2329490615606733. ISSN 2329-4906

³⁷"Global E-Learning Market 2017 to Boom \$275.10 Billion Value by 2022 at a CAGR of 7.5% – Orbis Research", Archived from the original on 27 May 2018, accessed on 25 Aug 2023

³⁸Boser U, (2013), "Are Schools Getting a Big Enough Bang for Their Education Technology Buck?" (PDF), *American Progress*, pp. 1–12. Archived (PDF) from the original on 17 May 2014, accessed on 25 Aug 2023

³⁹"Baby DVDs, Videos May Hinder, Not Help, Infants' Language Development", University of Washington Press. 7 August 2007. Archived from the original on 15 February 2015, accessed on 25 Aug 2023

⁴⁰Tanner Mirrlees; Shahid Alvi (22 October 2019). *EdTech Inc.: Selling, Automating and Globalizing Higher Education in the Digital Age*. New York: Routledge, p. 60, doi:10.4324/9780429343940. ISBN 978-0-429-34394-0, accessed on 25 Aug 2023

⁴¹D. Randy Garrison; Terry Anderson; *Definitions and Terminology Committee* (2003). *E-Learning in the 21st Century: A Framework for Research and Practice*. Routledge. ISBN 978-0-415-26346-7, accessed on 25 Aug 2023

Keeps students updated with the latest technological advancements.

One of the most significant benefits of digital learning for students is the chance to stay current on the most recent technological breakthroughs. Students will quickly embrace them, so improving your teaching approaches. Virtual classrooms, eLearning apps, and other new tools are becoming increasingly popular. If students are aware of edtech trends, they can use these tools to their advantage and develop academically.⁴² Students who keep up with educational technological changes have a better chance of excelling in their jobs. They can help businesses operate more efficiently and successfully by utilizing their knowledge of the most recent technologies and trends.

Allows students to enhance their mental well-being.

The enhancement of students' physical and mental health is one of the key advantages of digital technology in education. Different digital tools made their boring learning curricula more engaging and easier. EdTech techniques enhance students' cognitive abilities in a variety of ways. Two major factors are the use of AR and virtual learning sessions. They improve a person's capacity for reading, interpreting, learning, remembering, thinking, and applying logic. Over time, all of these have a significant impact on their academic performance and learning.⁴³ They get confidence and a nice sensation because they can earn good scores or marks thanks to the use of instructional technologies. This improves their mental health and enables them to focus more clearly while studying.⁴⁴

Makes teaching easier and more productive.

The advantages of educational technology extend to both teachers' and students' abilities to learn. Teachers benefit from the use of technology in a variety of ways, including wide-screen projectors, virtual classrooms, audio-visual presentations, and digital planners. As a result, the students' comprehension and understanding improved.⁴⁵ Furthermore, technology increases teacher productivity! The use of digital technologies increases student engagement, while providing them with more opportunities to learn.⁴⁶ Many teachers have the flexibility to adjust their teaching approaches

and use specific resources for their less fortunate students. Overall, instructional technology enhanced teacher productivity, benefiting both schools and students.⁴⁷

Helps teachers to track students' performance and progress.

The software or task organizer that teachers use to manage their students' homework is one of the best results of technology integration in education. They serve as digital alternatives to the paper planner or school diary. The assignments and tasks for the day, week, or month can all be input by the teachers. They can set deadlines for them. They receive real-time updates when the pupils begin, pause, and finish a task.⁴⁸ A dashboard that provides teachers with an overview of student performance is another feature of a thorough digital planner. They can view the number of hours spent studying, projects finished or ongoing, grades for classes already completed, and so on. They can keep tabs on each student's performance, successes, and failures. It enables them to plan their curricula appropriately for the upcoming learning session.⁴⁹

Limits external distractions as much as possible.

Contrary to what many experts claimed, technology in education really serves as a source of distraction. However, this is only guaranteed if teachers and schools know how to properly employ technology. It will be simple for kids to become distracted if they are given mobile-based learning apps. They frequently switch to social media platforms, game apps, etc.⁵⁰ As a result, students should select study aids like desktop-based digital planners that reduce distractions and improve concentration. These programs are designed to eliminate outside distractions and give kids a quiet workspace to complete their assignments.⁵¹

Improves collaboration between students and teachers. Collaboration between students and teachers has been shown to enhance when technology is used in the classroom. Online learning systems allow teachers and students to communicate outside of the classroom. Additionally, it enables one-on-one interactions between the students and the teachers.⁵² While they are at

⁴²Moret, B. (8 June 2012). "No television for babies: Why TV is bad for young children", The Washington Times. Archived from the original on 4 January 2015, accessed on 25 Aug 2023

⁴³D F O Onah et al, (2014), "Dropout Rates of Massive Open Online Courses: Behavioural Patterns". ResearchGate, accessed on 25 Aug 2023

⁴⁴Herold, Benjamin (5 February 2016). "Technology in Education: An Overview". Education Week. Archived from the original on 1 November 2016, accessed on 25 Aug 2023

⁴⁵Harris J et al, (2009), "Teachers' Technological Pedagogical Integration Reframed" (PDF), Journal of Research on Technology in Education, 41 (4): 393–416, accessed on 25 Aug 2023

⁴⁶Geng F, (2014), technologist,...discussed by @A L T members". Oxford, UK. Archived from the original on 5 August 2018,

⁴⁷Fletcher S (2013), "Machine Learning", Scientific American, 309 (2): 62–68, accessed on 25 Aug 2023

⁴⁸Cuban, Larry (2001). Oversold and Underused: Computers in the Classroom (PDF), Harvard University Press, Archived from the original (PDF) on 9 August 2017, accessed on 25 Aug 2023

⁴⁹Day R et al, (1987), "Computer-managed instruction: an alternative teaching strategy". Journal of Nursing Education, 26 (1): 30–6. doi:10.3928/0148-4834-19870101-08, accessed on 25 Aug 2023

⁵⁰Williamson Ben et al, (2020), "The datafication of teaching in Higher Education: Critical issues and perspectives", Teaching in Higher Education, 25 (4): 351–365, accessed on 25 Aug 2023

⁵¹Moore, J. L. et al, (2011). "E-Learning, online learning, and distance learning environments: Are they the same?", The Internet and Higher Education, 14 (2): 129–135. doi:10.1016/j.iheduc.2010.10.001, accessed on 25 Aug 2023

⁵²Malegam, F (13 December 2022). "How to Empower eLearning with Virtual Classrooms in WordPress?". Adobe, accessed on 25 Aug 2023

home, they can upload their assignments so that professors can access them and make the appropriate suggestions.⁵³ There will inevitably be some pupils who will speak up, some who will ask questions, some who will be scared to ask, and some who won't have the chance to be heard, which will cause chaos or confusion.⁵⁴ Contrary to popular belief, this does not occur in an online environment. Every student in the virtual classroom is connected. Each student receives a personalized response and solution from the teacher on a separate screen.⁵⁵ Online education has encouraged student relationships outside of the classroom in the twenty-first century. They can help one another and collaborate on challenging undertakings by exchanging ideas and materials.

Personalized learning experiences.

Students now have constant access to information, study tools, and resources thanks to educational technology. Anyone who found it difficult to learn or comprehend things in a traditional classroom setting might choose for additional live, online lessons. Teachers can specifically design individualized learning programs for their pupils based on their aptitudes and interests.⁵⁶ This is an additional benefit of online learning that gives teachers peace of mind because they can focus on each student individually.⁵⁷ Additionally, pupils have the opportunity to learn comfortably and easily. They are not required to observe or copy what their classmates are doing in class. Instead, students can adhere to the strict timetable established by their teacher and do the chores given to them.

Improvement in students' productivity. Students are improving their self-learning with the use of online educational resources, and this is evident in their rising academic production! In addition to providing students with individualized learning opportunities, EdTech allowed them to improve their cognitive thinking and task management abilities.⁵⁸ When children reach higher grades, they really need this. They can manage mountains of assignments and finish each one on time and without losing focus by doing so. Numerous online courses with deadlines encouraged students to become

more committed. In order to finish the courses on time, they learned to prevent any type of schedule diversions or disturbances. Additionally, information and learning resources are readily available to students.⁵⁹ In order to gain more assistance on a project, pupils can also start an online conversation or have a talk with a teacher outside of the classroom. Therefore, there is no chance of becoming bogged down in the middle of a task or assignment. Online learning resources assist students focus more intently on their work and enhance their educational opportunities, which raise their output as a whole.⁶⁰

Gamification that motivates students.

It makes sense that technology fosters creativity and innovation. Fun components were introduced by the designers of many EdTech tools and applications to better engage young learners. This is also known as "gamification," when programs offer natural responses upon completion of a learning stage, such as reward points, scores, clap noises, congrats images, gratitude notes, etc. The kids are really motivated by this and are propelled to take the next step.⁶¹ There are interactive game components in many eLearning apps, such as the ability to collect cash, gems, or other incentives. They have individual scoreboards that let pupils compete and outperform one another.⁶² In other words, gamification made learning engaging and exciting for pupils while strengthening their concentration and motivating them to perform better.

Immersive learning experiences.

Immersive learning opportunities were made available to pupils thanks to VR and AR concepts, which only served to broaden their knowledge. These technologies were utilized by educators to instruct students on difficult scientific ideas, puzzling theories, and historical locations. With textbooks, it was difficult for the students to comprehend and remember information.⁶³ Additionally, educational technology made learning fun for students. In the twenty-first century, kids and students are no longer limited to the pictures and descriptions found in textbooks. They can view movies, access websites, and conduct web searches. As

⁵³Kaplan, Andreas (2017), Rishi, Bikramjit; Bandyopadhyay, Subir (eds.), "Academia Goes Social Media, MOOC, SPOC, SMOC, and SSOC: The digital transformation of Higher Education Institutions and Universities", *Contemporary Issues in Social Media Marketing*, Routledge, accessed on 25 Aug 2023

⁵⁴rentin G. (2010). *Networked Collaborative Learning: Social Interaction and Active Learning* Archived 17 September 2018 at the Wayback Machine, Woodhead/Chandos Publishing Limited, Cambridge, UK, ISBN 978-1-84334-501-5, accessed on 25 Aug 2023

⁵⁵"Collaborative asynchronous online learning", US Patent Office, 10 March 2014, Archived from the original on 8 June 2021, accessed on 25 Aug 2023

⁵⁶J. Bransford; A. Brown; R. R. Cocking, eds. (2000), "Technology to support learning". *How people learn: Brain, mind, experience*. Washington, DC: National Academies Press. pp. 206–230, accessed on 25 Aug 2023

⁵⁷Beatty, Ian D; Gerace, William J (January 2009). "Technology-Enhanced Formative Assessment: A Research-Based Pedagogy for Teaching Science with Classroom Response Technology". *Journal of Science and Technology*, 18 (2): 146, accessed on 25 Aug 2023

⁵⁸Hwang, G. J. (2014), Definition, framework, and research issues of smart learning environments-a context-aware ubiquitous learning perspective, *Smart Learning Environments*, 1(1), 1-14, accessed on 25 Aug 2023

⁵⁹Sendall P et al, (December 2008), "Web 2.0 Matters: An Analysis of Implementing Web 2.0 in the Classroom", *Information Systems Education Journal*, 6 (64). Archived from the original on 29 November 2014, accessed on 26 Aug 2023

⁶⁰"Student Self-Assessment", unsw, Archived from the original on 13 August 2016, accessed on 26 Aug 2023

⁶¹McCue, T. J. (27 August 2014). "Online Learning Industry Poised for \$107 Billion in 2015". *Forbes*. Archived from the original on 25 August 2017, accessed on 26 Aug 2023

⁶²Spector Jonathan Michael, (16 October 2014), "Conceptualizing the emerging field of smart learning environments", *Smart Learning Environments*, 1 (1), doi:10.1186/s40561-014-0002-7, accessed on 26 Aug 2023

⁶³Al-Asfour A, (2012), "Online Teaching: Navigating Its Advantages, Disadvantages and Best Practices". *Tribal College Journal of American Indian Higher Education*, 23: 3, accessed on 26 Aug 2023

a result, they were better able to prepare thorough papers and obtain deeper understanding of a topic or concept.⁶⁴

Relieves the stress of parents and teachers.

Using digital tools, teachers are no longer required to keep a journal or to-do list. They have greatly benefited from time savings in the twenty-first century thanks to virtual lesson planners, grading software apps, and online tests. They can fill out the application completely and plan their submissions around the dates. Therefore, if they use such an app, pupils would never forget to turn in an assignment. The parents are also greatly relieved by this. Many applications help students keep track of their assignments or homework and remind them of their due dates. As a result, pupils develop self-awareness and finish their assignments on time.⁶⁵ As a result, parents do not need to peer over their kids' shoulders to make sure they are finishing their homework.⁶⁶ The learning experiences of students, particularly those in higher classes, have been enhanced by the additional eLearning choices such as online open courses, eBooks, YouTube tutorials, etc. They don't have to bother the teacher all the time to ask for help with assignments. This enhanced the bond between teachers and kids while also assisting teachers in relaxing a little.

Ensures sustainable learning. The fact that EdTech promotes sustainable learning and the environment is one of its most important advantages. Virtual classes and digital learning resources save a significant amount of paper and, consequently, forests. The use of computers to complete coursework and take exams, which can then be shared via email or cloud storage, is encouraged by teachers. In light of the fast environmental impact, many schools and educators are switching from paper books to eReaders.⁶⁷ Students of this age now understand the importance of environmental sustainability thanks to the use of technology in the classroom. The use of electronic and digital learning tools benefits both students and teachers while also preserving the environment.⁶⁸ They are able to reduce their spending on things like books, notes, boards, paper planners, educational excursions, etc.

Prepares for the digital future. Children and kids will benefit from embracing technology in the classroom today because it will get them ready for a totally digital future. The world is moving closer to a time

when technology will be used to power or influence everything. Students were familiar with contemporary technologies in the 21st century through the use of various EdTech tools like virtual classrooms, AI-assisted planners, video learning, engaged learning for TV applications, online exams, etc. They were also able to establish priorities for their use of technology thanks to it. They are able to distinguish between devices that are useful for learning and those that are utilized for entertainment, such as social media, TV apps, OTT, and game apps.⁶⁹ They will be able to draw a boundary now and utilize technology responsibly. Today, various businesses hire candidates after evaluating their technological competency, cognitive ability, and educational attainment. Students that become familiar with various technologies at a young age have an easier time getting hired by the desired organization.⁷⁰ They don't need to go somewhere for vocational training, and their parents don't need to teach them how to use computers, software, and internet communication tools.

Helps students to learn at their own pace.

The use of technology in schooling allowed the kids to progress at their own rate of learning. There are many students that have weaker memory or learning skills than others. They were unable to keep up with the lessons in the competitive classroom environment and traditional teaching methods, thus they were not appropriate for them. For them to perform better in school, they require specific attention.⁷¹ One of the main advantages of employing technology in education is that it has made it possible for such pupils to receive a more individualized education. Teachers can create personalized learning plans and schedules for students using digital tools.⁷² In accordance with their qualifications and talents, they might specify the tasks to be completed and the due dates. While many children benefited from this and saw an increase in their test scores. It also made it easier for teachers to give independent instruction to kids who had ADHD or other problems.⁷³

Technology impact student learning extensively. The advantages of technology in the classroom are becoming increasingly clear to educators across all grade levels. Education is frequently one of the last sectors to undergo significant change, clinging to outmoded strategies and procedures. But at a much faster rate than anticipated, instructors have started

⁶⁴Andone Diana, (26 November 2014), 2014 International Conference on Web and Open Access to Learning (ICWOAL), pp. 1–4, doi:10.1109/ICWOAL.2014.7009244. ISBN 978-1-4799-5739-2, accessed on 26 Aug 2023

⁶⁵Molenda, M. (2008), "Historical foundations", In M. J. Spector, M. D. Merrill, J. Merrienboer, & M. P. Driscoll (Eds.), *Handbook of Research on Educational Communications and Technology* (Third., pp. 3–20). New York, NY: Lawrence Erlbaum Associates, accessed on 26 Aug 2023

⁶⁶Asynchronous Learning: Definition, Benefits, and Example Activities". Archived from the original on 25 October 2019, accessed on 26 Aug 2023

⁶⁷What is collaborative learning?". spiral.ac. Archived from the original on 3 August 2016, accessed on 26 Aug 2023

⁶⁸Nye, D. (2007). *Technology Matters: Questions to Live With*. Cambridge MA: MIT Press, accessed on 26 Aug 2023

⁶⁹Kimme Hea Amy C, (January 2014), "Social Media in Technical Communication", *Technical Communication Quarterly*, 23 (1): 1–5, accessed on 26 Aug 2023

⁷⁰Suppes, P. (19 May 1971). *Computer Assisted Instruction at Stanford* (PDF) (Report). Archived from the original (PDF) on 17 July 2010, accessed on 26 Aug 2023

⁷¹Vie Stephanie, (3 July 2017), "Training Online Technical Communication Educators to Teach with Social Media: Best Practices and Professional Recommendations". *Technical Communication Quarterly*, 26 (3): 344–359, accessed on 26 Aug 2023

⁷²Gail S Thomas, (1 February 1988), "Connected Education, Inc", *Netweaver, Electronic Networking Association*. Archived from the original on 27 August 2008, accessed on 26 Aug 2023

⁷³<https://www.tryclarifi.com/adhd-student-planner/>, accessed on 26 Aug 2023

making significant changes to their curriculum, assessments, and even the physical layout of their classrooms as a result of the digital transformation and the advent of educational technology.⁷⁴ Due to the effects these contemporary developments are having on students' learning, they are generating significant media attention in the field of education.⁷⁵

Revolutionize in classroom set of devices and learning tools. BYOD, or bringing your own device, is becoming less common in schools, and kids are no longer required to visit the technology lab to use a computer or laptop. The number of computer sets in classrooms has increased recently, thanks in part to federal financing. The Every Student Succeeds Act provided funding for Title I schools, and numerous grants and contributions equipped classrooms around the nation with iPads and laptops for every student.⁷⁶ More over half of the gadgets in US classrooms are Google Chromebooks. In educational establishments, more than three million Chromebooks were utilized in 2014.⁷⁷ The demand for more attention to be paid to programs that impart digital citizenship skills grows along with that number. The prevalent internet world of today offers fascinating opportunities, but they also need for pupils to be properly educated on personal responsibility and cyber safety.

Augmented Reality / Virtual Reality / Mixed Reality. The days of instructing children to remain silent at their desks are long gone. Learning is becoming more dynamic and collaborative thanks to educational technologies. Examples of transformational technology include augmented, virtual, and mixed reality, which improve teacher training while also producing immersive lessons that are enjoyable and engaging for students. The outside world can enter the classroom through virtual reality, and vice versa. With the help of apps like Unimersiv, students can go back in time to ancient Greece, while Cospaces enables them to showcase their virtual works to a global audience.⁷⁸ Virtual reality has the potential to improve audience attention, technological literacy, and visual literacy, according to Kathy Schrock, an independent educational technologist and adjunct professor at Wilkes University online.⁷⁹ The concept of merging AR, VR, and MR is eagerly awaited. Consider the privately held business Magic Leap as an example.⁸⁰ Magic Leap is already valued at \$4.55 billion, despite the fact that company has-

n't really sold anything yet. This illustrates the seemingly limitless potential for technology to transform education.⁸¹

Redesigned Learning spaces. You probably won't find rows of desks facing the front of the room if you walk into most classrooms in the country. Since then, educators have come to the realization that their classrooms must reflect the workplace, which has motivated them to design collaboratively conducive environments to support student learning. The adoption of technology has aided their effort. Instead of chalkboards and individual desks, classrooms in the twenty-first century use SMARTboards.⁸² In the twenty-first century, students create media instead of just consuming it; they go on virtual field trips rather than just reading from a text. The newly constructed learning environment is replete with integrated technology, indicating that students are not just using it but also comprehending how to use it to accomplish a certain objective. Even outside of the traditional classroom, some of these learning places exist. Because they recognize the value of producing and collaborating all the time, not just when classes are in session, colleges and universities are developing more informal campus learning spaces.

Internet of Things (IoT). Although IoT is nothing new, it must rank top on our list due to technological developments. When discussing IoT in the past, many educators tended to concentrate on topics like energy-efficient schools and universities. The advantages are enormous; hypothetically, IoT may make it possible for a teacher to share a student's test results with their parents in real-time, including them in any potential problems the student might encounter in the classroom or at home. The real-time procedure can automatically keep track of when (task) homework is finished, what the completion time stamp is, and even gather information on how long it takes the students to finish the assignment. With the crucial data, teachers can better assess whether their strategies are effective, whether the tasks are challenging, and whether or not students are staying up late to complete them.⁸³ This is an important realization because it would improve upcoming educational digital transformation trends. It can also give pupils a boost as they prepare to do their schoolwork at home.⁸⁴

Artificial Intelligence (AI). Higher education has already benefited from the usage of AI. Deaken

⁷⁴ <https://www.brookings.edu/articles/promises-and-pitfalls-of-online-education/>, accessed on 26 Aug 2023

⁷⁵ <https://www.forbes.com/sites/danielnewman/2017/07/18/top-6-digital-transformation-trends-in-education/?sh=37ae58902a9a>, accessed on 26 Aug 2023

⁷⁶ Hickey Ryan, (12 May 2014), "The history of online education", Peterson's, Archived from the original on 19 March 2018, accessed on 26 Aug 2023

⁷⁷ <https://www.cnbc.com/2015/12/03/googles-chromebooks-make-up-half-of-us-classroom-devices.html>, accessed on 26 Aug 2023

⁷⁸ <https://www.thetechedvocate.org/20-top-virtual-reality-apps-that-are-changing-education/>, accessed on 26 Aug 2023

⁷⁹ <https://www.eschoolnews.com/featured/2017/01/02/hot-edtech-trends-2017/>, accessed on 26 Aug 2023

⁸⁰ Hiltz S, (1990), "Evaluating the Virtual Classroom". In Harasim, L. (ed.) *Online Education: Perspectives on a New Environment*. New York: Praeger, pp. 133–169, accessed on 26 Aug 2023

⁸¹ <https://campustechnology.com/Articles/2017/01/18/11-Ed-Tech-Trends-to-Watch-in-2017.aspx?Page=1>, accessed on 26 Aug 2023

⁸² <https://www.benq.com/en-in/business/resource/trends/steps-and-checklists-to-build-a-blended-learning-classroom.html>, accessed on 26 Aug 2023

⁸³ <https://elearningindustry.com/digital-trends-in-2019-shape-education-5>, accessed on 26 Aug 2023

⁸⁴ Hossain, K. A., Evaluation of Influence of Internet of Things (IoT) Technologies and Devices in 21 Century, *Scientific Research Journal* 11 (7), Jul 2023, accessed on 26 Aug 2023

University in Australia employed IBM Watson to develop a virtual student advice service that was accessible every day of the week, round-the-clock.⁸⁵ More than 30,000 queries were answered by Watson's virtual advisors in the first trimester, freeing up the real advisors to handle more complex problems. Chatbots are one more application for AI. Because chatbots have Natural Language Progression, a feature found in Siri, they can assist students with paperwork like financial aid or bill payments and answer questions about homework, which relieves the workload of the people who would typically perform these duties. Personalized learning, which is covered in more detail below, assessing the quality of the curriculum and content, and enabling one-on-one tutoring through the use of Intelligent Tutoring Systems, are other uses of AI in education. Technology merely seeks to enhance teachers, not to replace them.⁸⁶

Personalized Learning. Personalized learning methods are more common than ever today. From opportunities for a student to learn, such as public, private, charter, and virtual schools. Today, education may be customized to each person. As less direct instruction from the teacher is used and more learning is done through discovery, blended learning places more responsibility on the shoulders of the student.⁸⁷ By choosing factors like where and how quickly they go through content, students can take control of some aspects of their learning through blended learning, for instance.⁸⁸ Adaptive learning is similar to blended learning in that it also gives students the option to choose their learning's timetable and direction. In order to change the learning experience, adaptive learning technology uses data on student behavior as they respond to questions. This data is then used to deliver immediate feedback.⁸⁹ Adaptive educational tools SEQUENCE Make split-second judgments based on ongoing, real-time analysis of student data.⁹⁰ In reaction to how a student is doing, it automatically adjusts what follows next in a sequence, whether it is altered content or a different order of skills. Osmosis, a different learning tool, was developed by doctors for doctors and has completely changed the way medical students study.⁹¹ Today, Os-

mosis maximizes learning and retention using evidence-based educational principles like questions, flashcards, and videos, pictures connected with memory anchors, adaptive spaced repetition, collaborative learning, and gamification. In the present, personalization is transforming education into a 'choose-your-own-adventure' kind of learning.

Capitalizing on student interest and engagement. Personalized learning is now possible, allowing institutions or individual students to tailor instruction to their specific requirements. With less teacher participation and a greater emphasis on the discovery method of learning, known as blended learning a notion may place more responsibility on the student. With the use of a new interactive method called blended learning, students can show how they can influence the aesthetics of their education by selecting choices in line with their degree of intuition and cognitive ability. The same is true for adaptive learning, in which students must make important choices regarding the job to be finished within a certain amount of time and the direction to go.⁹² Adaptive learning entails gathering information on how students behave as they address and solve issues and then providing feedback. Another educational technique that has emerged is called Osmosis; it was developed by doctors for the use of doctors and is very beneficial to medical students. It focuses on concepts supported by evidence and uses gamification, adaptive spaced repetition, movies, flashcard questions, and Osmosis to maximize learning and retention.⁹³ The motivation of a futuristic learning specter is such customization.

Gamification. When video games are used as a teaching tool in classrooms, playing and learning collide. Learning challenging material becomes more engaging and participatory thanks to gaming technologies.⁹⁴ As technology develops, it is being quickly applied to improve instructional games across all subject areas. These virtual game worlds offer a singular opportunity to apply new knowledge and make mission-critical decisions, while identifying obstacles, taking into account multiple perspectives, and practicing vari-

⁸⁵ <https://campustechnology.com/Articles/2017/01/18/11-Ed-Tech-Trends-to-Watch-in-2017.aspx?Page=2>, accessed on 27 Aug 2023

⁸⁶ Hossain K. A., Evaluation of Influence of Artificial Intelligence (AI) on Technologies in 21st Century, Journal of Electronics and Communication Engineering Research, Quest Journal, Jul 2023, accessed on 27 Aug 2023

⁸⁷ Baker, Celia (4 January 2013). "Blended learning: Teachers plus computers equal success". Desert News, Archived from the original on 23 October 2013. Retrieved 30 January 2014, accessed on 27 Aug 2023

⁸⁸ Bates A, (2005), Technology, e-Learning and Distance Education, London: Routledge, accessed on 27 Aug 2023

⁸⁹ <https://onlinedegrees.sandiego.edu/what-is-educational-technology-definition-examples-impact/https://www.adaptemy.com/>, accessed on 27 Aug

⁹⁰ Hossain K. A., Analysis of development trend of ship designing software and future of ship design, American Journal of Engineering Research (AJER), Vol 12, Issue 6, June 2023, ISSN 2120-0847

Hossain K. A., Tale of Container Ship, Journal of Software Engineering and Simulation, Quest Journals 9 (7), page: 48-61, Jul 2023, accessed on 27 Aug 2023

⁹¹ <http://virtuallyinspired.org/portfolio/osmosis/>, accessed on 27 Aug 2023

⁹² Harasim, L., Hiltz, S., Teles, L. and Turoff, M. (1995), Learning Networks: A Field Guide to Teaching and Learning Online. Cambridge, MA: MIT Press, accessed on 27 Aug 2023

⁹³ <https://www.usnews.com/higher-education/online-education/articles/2017-05-03/study-online-learning-enrollment-rising-fastest-at-private-nonprofit-schools>, accessed on 27 Aug 2023

⁹⁴ Craft, Anna (July 2012), "Childhood in a digital age: creative challenges for educational futures" (PDF), London Review of Education, 10 (2): 173–190. doi:10.1080/14748460.2012.691282, accessed on 27 Aug 2023

ous responses, says Susan Aldridge, senior vice president of online learning at Drexel University.⁹⁵ Since these games are made to offer rapid feedback, students are inherently compelled to play them again while honing their skills. Although exciting students with previously unimaginable opportunities are new technology and learning approaches necessitate ongoing IT assistance.⁹⁶ We must take into account the current paradigm for technology instruction and shift toward a team-based approach as educational institutions continue to jump on the bandwagon and adopt these digital transformation trends. Response time to needs must increase along with rising student expectations.

Technology provides credibility for the teacher.

Students of today have never lived in a world without cutting-edge technology. A new website didn't need to load over a sluggish dial-up modem in 45 minutes. The pleasures of an AOL chat room will never be fully appreciated. Technology-savvy educators provide their expertise a level of authority that is applicable to instruction across a wide range of subject areas.⁹⁷ A single technology instrument has the potential to have a significant impact on today's students. Not so long ago, students were required to carry their bulky textbooks to class each day. Nowadays, the majority of those textbooks is accessible via computers and is available online. Organizational platforms supplement e-books and other technologically accessible tools to make learning more efficient and streamlined.⁹⁸

Technology automates the boring stuff.

Technology in the classroom is crucial for instructors as well. Today's engagement tools have the potential to partially automate the grading process. Software systems make it simpler to monitor each student's progress, quickly spotting any learning gaps. There will be more time for actual teaching and less time spent at home reviewing work if more of the repetitive tasks that teachers perform every day are automated.⁹⁹ The quantity of information that students of any age recall when they are in a learning environment centered on a lecture format can be as low as 5%. For a lot of pupils, the classroom experience consisted of a "expert" using their podium to lecture to the class. Collaboration has been made possible in the classroom through technology. Up to 80% of the knowledge that students study can be retained by them if they learn in a collaborative setting.¹⁰⁰ Additionally, when interactive practice is

used in the classroom, some students' levels of information retention can reach 95%.

Technology make ease to learn core vocational skills. Almost everyone today has access to the internet. When technology is used in the classroom, students get to learn in a secure setting how to limit personal information. They can pick up the right writing manners for communicating online. Presentations are made by them. In the twenty-first century, writers style their documents following standards. They gain knowledge about conducting fresh subject research and appropriately citing the information they gather. Today's students have the chance to acquire all of these essential abilities before they even begin the job search process. They are all essential for the modern workplace.¹⁰¹ When students walk into their classrooms each day, they ought to be able to look forward. Going back in time could bring some nostalgia, but it won't prepare kids for the difficulties of a technologically advanced society. While we can undoubtedly benefit from the past's lessons, we also need to be prepared for what the future may hold once its shroud is lifted.¹⁰²

Technology ensures all the needed data into one location.

Technology offers a variety of platforms and apps that enable teachers to combine and utilize all relevant student data. This could cover anything from their attendance record to their level of math competency. Once acquired, this data can be utilized to pinpoint areas that can benefit from an intervention. Additionally, it can assist teachers in grouping children who could benefit more from learning together than separately.¹⁰³ Even while there are still strict routines in schools, technology has somewhat softened their rigidity. Students can work at a pace that suits them thanks to technology. It is simpler to modify curriculum requirements or programs to better match individual needs and advance learning.¹⁰⁴ If a student finds that the stimulation of a classroom is too much for them, it can also be employed for remote learning opportunities.

Technology provides an opportunity to learn different ways. When technology is used in the classroom, the learning process is more in the students' hands. Students have the ability to use their innate curiosity to discover their interests, skills, and talents. Additionally, technology gives pupils the chance to explore new things that may not have been possible in the past. They can then figure out for themselves which

⁹⁵ <https://campustechnology.com/Articles/2017/01/18/11-Ed-Tech-Trends-to-Watch-in-2017.aspx?Page=3>, accessed on 27 Aug 2023

⁹⁶ Hossain K. A., Evaluation of Influence of Artificial Intelligence (AI) on Technologies in 21st Century, Journal of Electronics and Communication Engineering Research, Quest Journal, Jul 2023, accessed on 27 Aug 2023

⁹⁷ Hall Ashley A, (June 2016). "Best Practices for Launching a Flipped Classroom", Business and Professional Communication Quarterly, 79 (2): 234–242, accessed on 27 Aug 2023

⁹⁸ Technology in Schools: Weighing The Pros And Cons". Huffington Post. 25 May 2011. Archived from the original on 23 April 2014, accessed on 27 Aug 2023

⁹⁹ Sean, Allan (25 September 2020). "How Covid-19 brought the University of Toronto Class of '24 Together Online". Brooke Godfrey. Archived from the original on 9 August 2021, accessed on 27 Aug 2023

¹⁰⁰ Kaplan, Andreas (6 April 2021). Higher Education at the Crossroads of Disruption: the University of the 21st Century. Emerald Publishing Limited, ISBN 978-1-80071-504-2, Archived from the original on 29 January 2021, accessed on 27 Aug 2023

¹⁰¹ Hossain K A (2015) Leadership qualities for 21st century leaders, Journal of Management, Social Science and Humanities, Published on 19 May 2015, accessed on 27 Aug 2023

¹⁰² Skinner B F, (1954), "The science of learning and the art of teaching", Harvard Educational Review, 24: 86–97,

¹⁰³ Irby Beverly et al, (2013), Handbook of Educational Theories Charlotte, NC: IAP. p. 105. ISBN 978-1-61735-866-1, accessed on 27 Aug 2023

¹⁰⁴ Hergenhahn B R, (2008), An Introduction to the History of Psychology. Belmont, CA: Wadsworth Cengage Learning, p. 627, ISBN 978-0-495-50621-8, accessed on 27 Aug 2023

learning methods really help them retain new information.¹⁰⁵Did pupils who were at school get out of bed eager to spend six to eight hours in class? Or did they fear the event since they had been idle for the majority of the day? The use of technology in the classroom can increase student motivation. Most children find some use of technology enjoyable. It enables engaged students to stay focused on the lectures and motivates less engaged students to discover something enjoyable.¹⁰⁶An improved level of motivation in the classroom is one of technology's finest benefits.

Technology is more affordable to do than many people may realize.

The expense of using technology in the classroom is modest. The cost of a Google Chromebook, which allows students to access all of their books, is less than the cost of a set of textbooks. Student Chromebooks with instructional designs can be purchased from educational wholesalers for as little as US\$ 189. Retail price for the Dell Chromebook 11 3100 Series is US\$199.¹⁰⁷Many schools could help to subsidize these fees so children may have access to the computer in the classroom, if not take it home every day as well. Some families might not be able to afford the cost of such a computer on their own.¹⁰⁸

Technology improves their problem-solving skills.

Children and students learn how to use current technology for study purposes through technology, and they commonly employ this skill in their daily lives. To successfully navigate problems in education and other areas throughout their life in the twenty-first century, they need learn it at a young age.¹⁰⁹There are numerous advantages to problem-solving skills instruction for kids. It teaches children how to stay out of fights at home and at school.¹¹⁰They may become more empathetic and acquire other advantageous traits as a result.¹¹¹For academic performance and preparedness for school, these abilities are crucial. In this contemporary day, social media platforms and applications have significantly changed society.¹¹²Their capacity to interact with people in their social circle is improved by these social networking websites and applications. They can gain more self-assurance and get ready for upcoming social marketing possibilities thanks to social media.

Through social networking sites, kids and children can perform many necessary tasks online. They can connect with friends and family, meet new people, share photos, and have discussions.¹¹³By enabling middle school and high school students to collaborate on homework and group projects, social media also improves learning opportunities.

Builds independence and empowerment.

Early education is now much more accessible than it was in previous generations because to online informational resources. Due to the abundance of internet resources, they can conduct research without going to a physical library.¹¹⁴That does not mean we are no longer in need of books. In reality, the internet is a tool that increases access to books and reliable information. Thanks to developments in technology, children can now finish the process! Without technology, who knows how far they would have come? Along with making and doing, it also refers to the sensation of authority and independence.¹¹⁵They can communicate in ways that words simply cannot. Children are more inclined to conduct additional investigation and develop novel lines of thought when they can find the answers to their queries. This approach can support youngsters' growth in terms of independence, academic self-assurance, and enthusiasm in new things.¹¹⁶

Disadvantages and Challenges of Technology in Education

The modern classroom's learning environment has advanced dramatically during the previous 25 years. Many of the benefits that we have seen in this setting can be attributed to the advent of new technology options for students. Rather than having a single computer for a class to use or a laboratory environment for the entire school contained in one room, we may now support children in learning at their table or desk with resources given directly to them.¹¹⁷We've been able to enhance knowledge availability in the classroom through technology since the creation of the Internet in 1989. If you grew up in the 1980s, you definitely remember having the A/V cart come to your class so you could watch educational videos and possibly eat a snack. Stu-

¹⁰⁵Termos, Mohamad (2012). "Does the Classroom Performance System (CPS) Increase Students' Chances for Getting a Good Grade in College Core Courses and Increase Retention?" *International Journal of Technologies in Learning*, 19 (1): 45–56. doi:10.18848/2327-0144/cgp/v19i01/49144, accessed on 27 Aug 2023

¹⁰⁶Rosenberg Richard, (2004), *The Social Impact of Computers*. Amsterdam: Elsevier Academic Press. ISBN 978-0-12-597121-8, accessed on 27 Aug 2023

¹⁰⁷ <https://www.globalsources.com/manufacturers/dell-chromebook-3100-2-in-1-11.6-inch-touch.html?>, accessed on 27 Aug 2023

¹⁰⁸Strauss, Valerie (22 September 2012). "Three fears about blended learning", *The Washington Post*, Archived from the original on 16 July 2017, accessed on 28 Aug 2023

¹⁰⁹ <https://bau.edu/blog/technology-impact-on-learning/>, accessed on 24 Jul 2023

¹¹⁰Putnam R, (2000), *Bowling Alone: The Collapse and Revival of American Community*. New York: Simon and Schuster, accessed on 28 Aug 2023

¹¹¹ <https://elearningindustry.com/how-important-is-technology-in-education>, accessed on 24 Jul 2023

¹¹²Cassidy, Margaret (2004). *Book Ends: The Changing Media Environment of American Classrooms*. Cresskill, NJ: Hampton Press, Inc. p. 224. ISBN 978-1-57273-492-0, accessed on 28 Aug 2023

¹¹³Buckleitner Warren, (12 June 2008), "So Young, and So Gadgeted", *The New York Times*. Archived from the original on 23 December 2016, accessed on 28 Aug 2023

¹¹⁴Spitzer M, (2014), *Information technology in education: Risks and side effects*. *Trends in Neuroscience and Education*, 3(3-4), 81-85, accessed on 28 Aug 2023

¹¹⁵Wallace, K. (2009, June 17), *High-Tech Cheating on the Rise at Schools*, *Cbsnews*. Available: <https://www.cbsnews.com/news/high-tech-cheating-on-the-rise-at-schools/>, accessed on 28 Aug 2023

¹¹⁶Roblyer M D, (2003), *Integrating Educational Technology into Teaching*, (3rd ed). Upper Saddle River, NJ: Merrill Prentice Hall, accessed on 28 Aug 2023

¹¹⁷Algerioy A. M., (1999), *The impact of multimedia on the collection of first-grade students in secondary mathematics in Riyadh Journal of King Saud University - Languages and Translation*, 24 (2), 75-82, accessed on 28 Aug 2023

dents can now play interactive learning games, competes with other students, and have their educational statistics tracked in real-time data to determine where their focus should be. While bringing technology to children in the classroom can clearly improve the learning environment, ensuring that all kids have equitable access to it is also critical for ensuring that everyone has the same possibilities for success. As a result, every school district, teacher, and parent should evaluate the benefits and cons of employing technology in the classroom on a regular basis.¹¹⁸

Nearly 90% of teachers agreed that technology helped them reinforce courses and had a favorable impact on students' performance, according to a built-in report. Other research revealed that after embracing technology and digital tools, the majority of middle-school children increased their test scores or grades. Despite this positive scenario, there are obstacles to using technology in education. Due to excessive screen time, educational technology might have a negative impact on pupils' ability to concentrate. Additionally, there are many questions about how well teachers use technology or tools like AR, VR, and AI. Several schools were unable to purchase the technology due to a shortage of funding. A few obstacles must be overcome for teachers and students to succeed in the age of educational technology. Here is a list of the main difficulties they encounter when implementing educational technology. Inadequate security measures can provide young children access to inappropriate content or information via computers. Lessons in "netiquette," or proper usage of the internet, can help to inculcate good web judgment and habits at a young age. Website blocks, internet filters, and strict monitoring can all help to prevent youngsters from being exposed to such. According to studies, the connections that technology makes possible through social networks are causing an increase in the number of people in society to feel alone and alienated. Young children may not connect with their peers as much if they spend more time using electronics, which can hinder their social and emotional development. In order to reduce this risk, "technology time" needs to be moderated so that kids can socialize with their relatives and friends. Many technology-based games and activities are "pre-made," enabling kids to finish tasks without having to use their imaginations and creative problem-solving skills. However, there are just as many games that serve as enjoyable solitary or group activities while encouraging the growth of creativity and problem-solving abilities. The latter option plus a wide range of other educational resources, such as manipulative or painting supplies, can guarantee that your kids are making use of their playtime in a healthy and productive way.¹¹⁹

The limitations of instructional technology should also be taken into account, notwithstanding its many

benefits. The most obvious drawback is that computers can't address every issue we have. The human brain is capable of many various types of thought, and there are some things that computers are unable to do, such as generate novel and unique thoughts. The internet's occasionally erroneous or misleading information is another drawback of technology in education. The internet offers many opportunities for people to exaggerate their achievements and mislead others about what they know in order to claim credit for something they did not do or were ignorant of. Always check the accuracy of any information you find online before relying on it. Additionally, while they should be focusing on their job or studies, students who take online classes can get sidetracked by their phones or other electronic gadgets. They may become distracted as a result and perform their work incorrectly. The last drawback of technology in education is that some students might not want to enroll in online courses since they don't feel like they are actually learning. Some people prefer to attend classes in person because it allows them to get to know their classmates better and see how much everyone else knows about a certain subject. However, there are many various sorts of online courses you can take if you wish to take classes online, including distance learning, live virtual classrooms, online video conferencing, etc. The following has a discussion of the drawbacks and difficulties of technology in education.

Faster but less memorable learning. Even while the rapid advancement of technology may appear to be advantageous, teachers with experience are actually leery of it. Learning aids like gadgets and applications can accelerate learning faster than the human mind can. Skimming by students can cause them to miss out on texture and depth. To think logically and clearly requires time. In the absence of such, engagement may drastically decline. Experts advise that in order to slow down the pace of media consumption and give ourselves more time for reflection, we need change the way videos are displayed. According to studies on the brain, the mere act of writing by hand has calming and stimulating effects that aid in memory and learning. Although typing is quick, it is monotonous because each keystroke is essentially the same.¹²⁰ Writing by hand is more difficult, involved, and time-consuming. This makes it simpler for your brain to create more "hooks" for ideas to latch onto.¹²¹

Technology can be distracting. The biggest problem with technology is the potential for pupil distraction. Researchers recently discovered that teachers who have tablets or other tablet-based gadgets in their classrooms are more likely to encounter distractions there. Technology-distracted students disregarded the subject altogether and refused to pay attention in class. According to experts, technology use in schools

¹¹⁸ <https://futureofworking.com/10-advantages-and-disadvantages-of-technology-in-education/>, accessed on 28 Aug 2023

¹¹⁹ <https://elearningindustry.com/the-limitations-of-educational-technology>, accessed on 28 Aug 2023

¹²⁰ Alhusban A. M., (2016), The Impact of Modern Technological Tools on Students' Writing Skills in English as a Second Language, *US-China Education Review*, 6 (7), 438-443, accessed on 28 Aug 2023

¹²¹ <https://topadvantagesof.com/disadvantages-of-technology-in-education/>, accessed on 28 Aug 2023

should be kept to a minimum because it may both distract students and create more distractions.¹²² Things like laptops and iPads in the classroom will undoubtedly cause students to become distracted. This is particularly true if the program does not restrict access to apps that are unrelated to classes, tests, and other educational pursuits.¹²³ In order to ensure that technology is used in classrooms to support learning and not, for instance, to play games or use social media for amusement, there needs to be a means to restrict its use. A few misbehaving students will inevitably try to utilize technology for purposes other than those for which it was intended. Concerning technology, high school kids may be more knowledgeable than their teachers. By visiting a proxy site that provides them with content from other websites without them actually visiting those websites, students can access websites that are not permitted.¹²⁴ By encrypting their browsing data with a virtual private network (VPN), students can circumvent a school firewall and ensure that no one can monitor their online activities.

Less direct social interaction. Another cause for concern is how technology appears to be reducing social interaction. The amount of conversation between kids and their teachers and peers decreases when they utilize technology. Online teaching and learning lack face-to-face interaction. Teachers need to ensure that activities like oral presentations, recitations, and group work occur frequently in the classroom in order to remedy this. It's important to remember that we want to assist people in developing into well-rounded adults.¹²⁵ The school may be a chance for pupils who spend too much time on video games or social media to take a vacation. It is the responsibility of the professors to recognize when kids spend too much time staring at their devices. Students should be pushed or encouraged to communicate and show some life when they aren't utilizing technology.¹²⁶

Less personalized attention. Teachers are supposed to treat all of their students equally and provide them the same amount of attention under the present educational system. This disregards the possibility that

certain kids may require significantly more or less specialized treatment. Thanks to technological advancements, students can now learn when and how they choose. However, when personal ties are ruined in the process, it might not be a good thing.¹²⁷

Integrating tech is often time-consuming.

Although students may believe that technology may help teachers accomplish their to-do lists faster, this isn't necessarily the case. Teachers and students may find it difficult to keep up with the rapid changes in technology. While they are still being evaluated by academics, teachers frequently need to acquire new ideas. There are constantly updates and adjustments, which just makes things worse.¹²⁸ According to experts, we should focus our time on the things that matter most rather than useless technologies. You might believe that technology is the key to improving education, but this isn't always the case. Teachers will always be required to mentor and guide students.¹²⁹ Technology that enables direct face-to-face interaction and communication with teachers is the greatest technology.

Misleading information. Although the internet offers a wealth of knowledge, not all of it is reliable. Even if it seems to come from a reliable source, you can't always believe what you read online. Nowadays, websites prioritize greater ranks over providing users with the information they require. Even if the information on a website is fake, many do it to attract more visitors.¹³⁰

The presence of technology can be distracting to students. Children who play video games may display addictive habits. They are fascinated with the entertainment they are provided with more than anything else. If the educational setting uses reward-based activities to promote learning, the child may be more focused on what they gain from the program or app than what they are learning. Correct responses can indicate knowledge, but information retention may be lower than expected.¹³¹ To guarantee that healthy outcomes are feasible when utilizing technology in the classroom, teachers must establish and maintain healthy boundaries.¹³²

¹²²Reeves, Thomas C. (12 February 1998), The Impact of Media and Technology in Schools (PDF) (Report). University of Georgia, Archived (PDF) from the original on 20 October 2013, accessed on 28 Aug 2023

¹²³ Ascione, L. (2018). Do other countries value classroom technology equally? Available: <https://www.eschoolnews.com/2018/12/04/do-other-countries-value-classroom-technology-equally/> (July 2, 2019), accessed on 28 Aug 2023

¹²⁴Kaplan, Andreas (2017). Rishi, Bikramjit; Bandyopadhyay, Subir (eds.), "Academia Goes Social Media, MOOC, SPOC, SMOC, and SSOC: The digital transformation of Higher Education Institutions and Universities", Contemporary Issues in Social Media Marketing. Routledge, doi:10.4324/9781315563312-2, accessed on 28 Aug 2023

¹²⁵ Bahloul M, (2012), Lights! Camera! Action and the Brain: The Use of Film in Education. Newcastle upon Tyne: Cambridge Scholars Publishing, accessed on 28 Aug 2023

¹²⁶ Carter S P. et al, (2017). Should Professors Ban Laptops? EducationNext, 17(4), 68-74, accessed on 28 Aug 2023

¹²⁷Carstens A et al, (2005), Get Ready for the Gamer Generation. Tech Trends: Linking Research & Practice to Improve Learning, 49(3), 22-25,

¹²⁸Biocchi Michael, "Games in the Classroom", Gaming in the Classroom, Archived from the original on 15 August 2011, accessed on 28 Aug 2023

¹²⁹Al-Asfour, A (2012), "Online Teaching: Navigating Its Advantages, Disadvantages and Best Practices", Tribal College Journal of American Indian Higher Education. 23: 3, accessed on 28 Aug 2023

¹³⁰ Cazan A et al, (2016), Computer anxiety and attitudes towards the computer and the internet with Romanian high-school and university students. Computers in Human Behavior, 55, 258-267, accessed on 28 Aug 2023

¹³¹ Christensen, K. S. (1999). A Comparison of Student Performance in Human Development Classes Using Three Different Modes of Delivery: Online, Face-to-Face, and Combined. Department of Education: Drake University, accessed on 28 Aug 2023

¹³²Collaborative asynchronous online learning, US Patent Office, 10 March 2014, Archived from the original on 8 June 2021, accessed on 28 Aug 2023

Technology can make it easier to cheat.

Remember the TV series and movies where kids would sneak into a teacher's classroom, grab the test's solution manual, and scribble everything down on their wrist, shoe, or piece of paper? A student can now text that information to themselves.¹³³ Anyone with a phone can obtain such information from them. Email can also be used to send this information. When a precise assessment of a student's knowledge is required to assess the student's overall progress, strict standards surrounding the use of technology during quizzes or examinations must be in place.¹³⁴

Some students to disconnect from the classroom. Cooperating with someone via the Internet is a distinct experience than interacting with others online. Being behind a screen provides you with anonymity that a face-to-face conversation can not provide. Although using technology to collaborate with others is an important skill, teachers cannot make it the only option in the classroom.¹³⁵ So that a youngster can still improve their life even when they are offline, we must promote social connections that accurately transmit thoughts, sentiments, or emotions.

Some students not know the difference between reliable and unreliable resources. On the internet nowadays, there is a lot of stuff that looks to be factual but is actually fake or exaggerated. According to a research published in New York Magazine, less than 60% of web traffic today is genuinely generated by human-based searches or content interaction. Bots that pose as humans contribute for up to half of all YouTube traffic each year. The individuals themselves may not be genuine, and the content may occasionally be fake.¹³⁶ Teachers must show students how to obtain reliable information, verify its truth, and use it correctly.¹³⁷

Technology is a resource that not all families can afford. Affordability is an issue in today's environment, whether technology is used at home or in the classroom. Some households cannot afford computers for their children to use for homework. Some school districts lack the funds to pay their staff's annual wages, let alone purchase current teaching technologies. When

we stress the use of technology in the classroom, we severely penalize individuals on the bottom end of the pay scale.¹³⁸ Greater access for students means they can access lessons more frequently and learn more, which increases their exposure to material and raises their chances of success.¹³⁹

Some technologies could replace the teacher in some classrooms.

The effectiveness of interactive learning sessions has increased to the point that software or apps can instruct students without a teacher being physically present. ABC Mouse, which gives simple instructions to pupils as early as so they can begin learning when they are ready, is one of the best examples of this possible drawback. Technology shifts the teacher's role from one of active participation to one of observation.¹⁴⁰ New tech automates the learning process while adapting to changing student needs.

There are privacy concerns to consider with technology in the classroom.

Each year, identity theft affects about 15 million people in some form. The criminal enterprise costs the economy more than \$16 billion annually. Due to this problem, about US\$ 100 billion in damages have occurred since 2011. It is spreading more widely in part because more people now have more access to technology. Every day, when we use technology in the classroom, we put our kids' identities in danger.¹⁴¹ There is no way to ensure that all hazards are eliminated unless the equipment is never connected to the internet, even when apps, PCs, mobile devices, and operating systems have cutting-edge privacy safeguards that lessen the possibility of identity theft. A lot of the benefits of having technology in the classroom in the first place are lost if we take this action.¹⁴²

Technology in the classroom could create medical problems for some kids.

Eye strain occurs when you gaze at a computer screen for an extended period of time. This condition's symptoms include back pain, eye pain, neck pain, weariness, blurred vision, and difficulty paying attention. Early myopia is an issue that can occur from prolonged continuous computer use, and it affects more than 60% of adults over the age

¹³³Trentin G. (2010). Networked Collaborative Learning: Social Interaction and Active Learning Archived 17 September 2018 at the Wayback Machine, Woodhead/Chandos Publishing Limited, Cambridge, UK, ISBN 978-1-84334-501-5, accessed on 28 Aug 2023

¹³⁴Croft N. et al, (2010). Overcoming isolation in distance learning: Building a learning community through time and space. *Journal for Education in the Built Environment*, 5(1), 27-64, accessed on 28 Aug 2023

¹³⁵Culén A et al, (2012), Tweens with the iPad classroom – Cool but not really helpful. *International Conference on e-learning and e-technologies in education (ICEEE)*, (pp. 1-6). Technical University of Lodz, Poland, accessed on 28 Aug 2023

¹³⁶Dansieh S. A., (2011), SMS Texting and Its Potential Impacts on Students' Written Communication Skills. *International Journal of English Linguistics*, 1(2), 222-229, accessed on 28 Aug 2023

¹³⁷Crane B., "Using Web 2.0 Tools in the K-12 Classroom". Neal-Schuman Publishers, Inc., 2009, accessed on 28 Aug 2023

¹³⁸Denoël, E. et al, (2017), Drivers of Student Performance: Insights from Europe. McKinsey & Company, accessed on 28 Aug 2023

¹³⁹Redecker Christine, (2009), "Review of Learning 2.0 Practices: Study on the Impact of Web 2.0 Innovations on Education and Training in Europe". JRC Scientific and Technical Reports (EUR 23664 EN – 2009), Archived from the original on 7 December 2016, accessed on 28 Aug 2023

¹⁴⁰El-Hussein M et al, (2010), Defining mobile learning in the higher education landscape. *Educational Technology & Society*, 13(3), 12-21, accessed on 28 Aug 2023

¹⁴¹Epper R et al, (2001), Teaching Faculty How to Use Technology. USA: American Council on Education. Oryx Press, accessed on 28 Aug 2023

¹⁴²Seely Brown et al, (2008), "Minds on Fire: Open Education, the Long Tail, and Learning 2.0" (PDF). *Educause Review* (January/February 2008): 16–32. Archived from the original (PDF) on 16 July 2014, accessed on 28 Aug 2023

of 12. Because this health issue can have a cumulative effect on certain people, the amount of time they spend on their phone, tablet, or television may also have an impact on their eye health.¹⁴³

Some kids/students often lose track of time in the classroom. Children can easily adjust to new situations, but what is normal for them is frequently determined by what they encounter in school. Since teachers and schools spend as much time with kids as their parents do throughout the day, if not more, the classroom has an impact on every student's life. While promoting computer use may serve to increase learning opportunities, it can also result in a more sedentary way of life.¹⁴⁴ Children who spend too much time sitting down during the day experience the same health problems as adults who don't get enough exercise. With prolonged sitting, there may be concerns with metabolism, ADHD, muscle ache, obesity, and hyperactivity.¹⁴⁵ Because of this, wherever possible, any school that integrates technology into the classroom should simultaneously encourage students to engage in at least 30 minutes of moderate physical activity.

Many classrooms place limits on technology access. There are restrictions on the usage of things under the premise of protecting children because schools are aware of the possible negative effects that technology may have in the classroom. Although site blocks and firewalls can stop the majority of harmful content from reaching children's eyes, it is not uncommon to see this problem escalated by limiting computer use to word processing and simple research. Assignments that require students to utilize technology on their own, in a library, or through a loan program are brought home by the students, absolving the parents of this duty.¹⁴⁶ Is it really creating a learning environment for kids if we impose restrictions on them rather than educating them on how to make sensible decisions?¹⁴⁷

Technology can create dependencies for information recall. What is a pupil to do if they are unable to recollect a piece of information right away? The majority of people would claim that they would use a

virtual assistant like Alexa or search online for the information they need.¹⁴⁸ Although having access to a wealth of resources is fantastic, their availability can sometimes lead to reliance. The following generation of students might not be able to operate unless there is technology available for them to access if we do not teach kids how to retain information independently without the help of a computer or smart device.¹⁴⁹

Technology can be distracting to students.

Access to technology can be just as addictive as using drugs, drinking, and other vices. Approximately 100 times every day, the average American checks their smart-phone. Even if there are no notifications for them to check on, that action still takes place. Instead than focusing on the learning process, students could try to access other parts of the online experience.¹⁵⁰ This problem can only be solved by setting up clear guidelines and expectations, which will then allow technology to offer an important learning opportunity.¹⁵¹

Technology can disconnect students from face-to-face relationships. The experience of engaging with people online and in person are extremely different. People start to lose control over their speech and behavior when they believe that they can be anonymous. Some people even avoid face-to-face interaction altogether in favor of a screen, words, and emojis.¹⁵² For this reason, technology ought to be utilized in the classroom. It cannot be the only part of a student's learning process.¹⁵³

Technology can make it easier to cheat.

Technology makes it simpler for people to communicate with one another, which is unquestionably beneficial. The ease of communication also increases the likelihood of cheating. If the teacher is not keeping an eye on student computer use, all it takes is one group email blast to distribute the results of a quiz

¹⁴³ Eyyam R et al, (2014), Impact of use of technology in mathematics lessons on student achievement and attitudes. *Social Behavior and Personality: An International Journal*, 42(1), 31S-42S, accessed on 28 Aug 2023

¹⁴⁴ Flanagan J. L. et al, (2008), *Technology: The Positive and Negative Effects on Student Achievement*. NY: University of New York, accessed on 28 Aug 2023

¹⁴⁵ Friess Erin et al, (October 2018), "Cultivating a Sense of Belonging: Using Twitter to Establish a Community in an Introductory Technical Communication Classroom", *Technical Communication Quarterly*, 27 (4): 343–361, accessed on 28 Aug 2023

¹⁴⁶ Fried, C. B., (2008), In-class laptop use and its effects on student learning, *Computers & Education*, 50(3), 906–914, accessed on 28 Aug 2023

¹⁴⁷ Verzosa Hurley et al, (January 2014), "The Rhetoric of Reach: Preparing Students for Technical Communication in the Age of Social Media", *Technical Communication Quarterly*, 23 (1): 55–68, accessed on 28 Aug 2023

¹⁴⁸ Kimme Hea et al, (January 2014), "Social Media in Technical Communication", *Technical Communication Quarterly*, 23 (1): 1–5. doi:10.1080/10572252.2014.850841, ISSN 1057-2252, S2CID 219641115, accessed on 28 Aug 2023

¹⁴⁹ Bowdon, Melody A. (1 January 2014), "Tweeting an Ethos: Emergency Messaging, Social Media, and Teaching Technical Communication", *Technical Communication Quarterly*, 23 (1): 35–54. doi:10.1080/10572252.2014.850853. ISSN 1057-2252, accessed on 28 Aug 2023

¹⁵⁰ Granata K, (2019), Tech May Be to Blame for Decline in Students' Reading for Pleasure: *Education World*. Available: https://www.educationworld.com/a_news/technology-proves-negatively-effect-reading-skills,

¹⁵¹ Vie, Stephanie (3 July 2017), "Training Online Technical Communication Educators to Teach with Social Media: Best Practices and Professional Recommendations", *Technical Communication Quarterly*, 26 (3): 344–359. doi:10.1080/10572252.2017.1339487. ISSN 1057-2252, accessed on 28 Aug 2023

¹⁵² <https://www.smartprix.com/bytes/a-guide-to-emojis-types-of-emojis-what-do-they-mean-how-to-use-them/>, accessed on 29 Aug 2023

¹⁵³ Häßler B et al, (2015). Tablet use in schools: A critical review of the evidence for learning outcomes. *Journal of Computer Assisted Learning*, 32(2), 139–156, accessed on 29 Aug 2023

or test. A simple solution to this problem is to give students assignments that call for a unique viewpoint.¹⁵⁴ Encouraging thought instead of memorization typically reduces the urge to cheat.

Technology could put some students at a disadvantage.

In the US, 1 in 5 families do not consistently have enough food on the table for their children. The notion of utilizing contemporary technology in their life is incidental. It's preferable to have a pantry full of necessary groceries than a brand-new iPhone in your pocket. For technology to be a useful teaching tool, schools must give everyone equal access. Barriers to access must be eliminated for free resources, such as library computers. This problem can only be solved by sharing.¹⁵⁵

Technology could cause students to use unreliable resources for learning.

Today, there is a ton of useful information available online. There is also a ton of information that is deceptive or outright untrue.¹⁵⁶ Students must learn how to distinguish reliable news sources from those that can be considered to be "fake news." Drawing conclusions on dubious material might make pupils less competitive while trying to establish themselves in society.¹⁵⁷

Technology can make curriculum planning more difficult or expensive.

The contemporary techniques that make instructors more organized nowadays are not all widely used. It can take just as much effort to learn how to utilize a new tool as it does to pass the challenging courses required acquiring a teaching degree or certification.¹⁵⁸ Although other school districts might not cover the costs of these resources either, they are expected to be present in the classroom. Therefore, the expenses are paid for directly out of the teacher's salary.

Technology can replace the teacher. There are numerous software learning aids that incorporate teaching elements inside the program itself. The same is true of apps. Students can communicate with a preprogrammed online teacher as they finish studying lessons by using a program like ABC Mouse. This forces the teacher into the position of manager or observer.¹⁵⁹ Although technology in the classroom has the potential to

replace a lot of what teachers already do, they may never completely disappear.¹⁶⁰ Thus, developing new technology may be the way that education develops in the future rather than creating a tailored curriculum.

Technology can create issues of privacy.

Nowadays, identity theft is a significant issue. 16.3 billion dollars were allegedly stolen from 15.4 million Americans in 2016. According to research from Javelin Strategy and Research, from 2011 to 2016, identity thieves took more than US\$107 billion from victims. Every day, exposing students to cutting-edge technology puts their privacy at danger.¹⁶¹ There is no way to totally eliminate the hazards associated with this field, despite the fact that the majority of apps and software have stringent privacy protections in place.

Technology could create medical issues for some students.

Eye strain can result from staring at a tablet, smartphone, or computer screen for extended periods of time. When this happens, symptoms including eye discomfort, weariness, and even blurred vision may appear. It might also result in "Computer Vision Syndrome," a more serious ailment. According to CBS News reporting, youngsters who use computers frequently run the risk of developing myopia early in life. Around 60% of individuals with 12 years of age or older, they have myopia.¹⁶²

Technology may cause children to lose track of time.

Uniquely equipped to adjust to shifting environments are children. Even though what they observe is harmful, they believe it to be normal. That extends beyond only their vision.¹⁶³ When using a screen-equipped gadget, kids frequently become disoriented and lose track of time. This results in extended durations of sitting, which raises the risk of obesity, hyperactivity, and other problems.¹⁶⁴ As the youngster loses connection with their circadian cycle, it can also affect how they sleep.

Technology is often limited. The use of technology in the classroom is frequently restricted to simple research or word processing needs. Because to governmental or personal constraints, many of the myriad uses of contemporary technology are either prohibited or only partially accepted. This reduces the usefulness of

¹⁵⁴ Johnson M et al, (1999), Technology as a change agent for the teaching process. *Theory into Practice*, 38(1), 24-30, accessed on 29 Aug 2023

¹⁵⁵ LeBlanc A G et al, (2015), Correlates of Total Sedentary Time and Screen Time in 9–11 Year-Old Children around the World: The International Study of Childhood Obesity, Lifestyle and the Environment, *PLoS ONE*, 10 (6), accessed on 29 Aug 2023

¹⁵⁶ Şad S et al, (2014), Preservice teachers' perceptions about using mobile phones and laptops in education as mobile learning tools, *British Journal of Educational Technology*, 45(4), 606-618, accessed on 29 Aug 2023

¹⁵⁷ Kaplan, Andreas (6 April 2021). *Higher Education at the Crossroads of Disruption*: the University of the 21st Century. ISBN 978-1-80071-504-2, accessed on 29 Aug 2023

¹⁵⁸ Lowerison G et al, (2006). Student perceived effectiveness of computer technology use in post-secondary classrooms. *Computers & Education*, 47(4), 465-489, accessed on 29 Aug 2023

¹⁵⁹ Nneji B. U. et al, (2014), Technologies in education and the dehumanization and imperialization of pedagogy: The African perspective. *Bulgarian Journal of Science and Education Policy*, 8(1), 86-105, accessed on 29 Aug 2023

¹⁶⁰ <https://www.dejaoffice.com/blog/2020/10/28/7-disadvantages-of-technology-in-education/>, accessed on 29 Aug 2023

¹⁶¹ Baker, Celia (4 January 2013). "Blended learning: Teachers plus computers equal success", *Desert News*, Archived from the original on 23 October 2013, accessed on 29 Aug 2023

¹⁶² Nye D. E. et al, (2006), *Technology Matters: Questions to Live with*, The MIT Press, accessed on 29 Aug 2023

¹⁶³ Purcell K et al, (2013), *The Impact of Digital Tools on Student Writing and How Writing is taught in Schools*: Pew Research Center. Available: <https://www.pewinternet.org/2013/07/16/theimpact-of-digital-tools-on-student-writing-and-how-writing-is-taught>, accessed on 29 Aug 2023

¹⁶⁴ Unesco (5 March 2020). "Distance learning solutions". Archived from the original on 31 March 2020, accessed on 29 Aug 2023

technology and adversely affects students' prospects for learning.¹⁶⁵

Technology can create dependence. What do students do initially when they are asked a question but don't have an immediate response? Do they make an effort to retrieve the knowledge from memory? Or do they use a search engine like Google or Siri to locate the answer for them? Technology can give users access to enormous amounts of data, but it can also lead to a dependency on that access on a personal level.¹⁶⁶ Students who are accustomed to utilizing technology could find it offensive to read from a physical book. Even going outside for recess or taking part in family activities could cause them to object.¹⁶⁷

Technology Can Help Student in Many Ways in 21st century

Technology helps students access to information and resources. Students now have fast access to a wealth of knowledge and resources thanks to technology. Students can study a variety of topics, conduct research, and access instructional materials that might not be available in conventional textbooks thanks to the internet and digital tools.¹⁶⁸ There are numerous real-world instances of how students can use technology to improve their education. Students can access a variety of academic and research materials, including e-books, scholarly papers, journals, and multimedia content that might help their study, through digital libraries or online databases. Learning management systems (LMS) and educational platforms offer a central area where teachers can share resources and where students may access information. These platforms can house interactive courses, digital textbooks, multimedia content, and assignments. Open Educational Resources (OER) are modern, online, publicly accessible educational resources. Teachers can use platforms for open educational resources (OER) to obtain textbooks, lesson plans, videos, and other materials that fit the curriculum and give students access to more sources of information.

Technology connects the classroom experience to the real world. By removing the physical boundaries in the classroom, technology enables educators to provide students with a means of making connections between the curriculum and the actual world as well as those academic areas that can genuinely enhance the learning experience.¹⁶⁹ For instance, a geology professor gives her pupils a virtual tour of Grand Canyon National Park. A history instructor takes his students on a tour of the White House's rooms and past. In order to increase

students' access to knowledge and real-world perspectives, technology can also provide virtual guest speaker sessions that enable them to meet with experts and professionals from many sectors through video conferencing. Students use technology in every part of their lives outside of the classroom. Technology can enhance the learning experience in the classroom. Here are some entertaining ways to include technology in lessons. Students can use educational gaming websites or apps that provide interactive quizzes, puzzles, and challenges connected to the subject matter in the twenty-first century with the aid of technology.¹⁷⁰

Technology can prepare students for the modern workplace. Students require more than just a working understanding of the latest technology tools in order to succeed in the workplace of the twenty-first century. The tools and abilities that they will probably need in the modern job must be introduced to them. Institutions may guarantee that their students are prepared for the workforce in multiple ways by incorporating these technologies into the normal curriculum and continuing activities.¹⁷¹ In the workplace, a great need exists for digital literacy abilities.¹⁷² Students learn how to use productivity tools, cooperate online, and communicate clearly on digital platforms by integrating technology into the classroom. Students can now access, manage, and analyze vast volumes of data thanks to technology. In order to make wise judgments, employees frequently need to gather information and carry out study. Students are prepared for these activities by using classroom technology to become familiar with information management tools and practices. Students that are exposed to technology learn about a range of digital resources and platforms. Because 21st-century industries frequently require employees to learn and adapt to new technologies and software, this experience helps students become flexible and adaptable in their use of various technologies.

Technology encourages collaboration, communication, creativity and Innovation. Students can use technology to produce prototypes, design projects, make multimedia presentations, and convey their thoughts in novel ways. Many companies place a high value on these abilities because they require innovative thinking and creative problem-solving. There are several different functionalities that encourage collaboration in educational technologies. For instance, students can hold virtual meetings with peers from any location thanks to video conferencing applications like Zoom, Microsoft Teams, Slack, and Skype. Students may readily share and edit projects with each other using

¹⁶⁵Technology in Schools: Weighing The Pros And Cons". Huffington Post. 25 May 2011. Archived from the original on 23 April 2014, accessed on 29 Aug 2023

¹⁶⁶Rosenberg, Richard (2004), The Social Impact of Computers. Amsterdam: Elsevier Academic Press. p. 219, ISBN 978-0-12-597121-8, accessed on 29 Aug 2023

¹⁶⁷As Schools Close Over Coronavirus, Protect Kids' Privacy in Online Learning", Human Rights Watch. 27 March 2020. Archived from the original on 10 April 2020, accessed on 29 Aug 2023

¹⁶⁸ <https://explorance.com/blog/7-reasons-students-need-technology-classroom/#>, accessed on 24 Feb 2023

¹⁶⁹Kemp Nenagh et al, (1 January 2014), "Face-to-face or face-to-screen?, Undergraduates' opinions and test performance in classroom vs. online learning", *Frontiers in Psychology*. 5: 1278, accessed on 30 Aug 2023

¹⁷⁰Clark, R C et al, (2007), *eLearning and the Science of Instruction*, San Francisco: Pfeiffer. ISBN 978-0787986834, accessed on 30 Aug 2023

¹⁷¹Kronholz J., (2011), "Getting at-risk teens to graduation", *Education Next*, Vol. 11, no. 4, accessed on 30 Aug 2023

¹⁷² Richards J. C. et al, (2010). *Longman Dictionary of Language Teaching and Applied Linguistics* (4th ed). London: Pearson, accessed on 30 Aug 2023

free online storage options like Google Drive, which promotes better overall teamwork in both the academic and professional worlds.¹⁷³ This mirrors the teamwork and communication skills required in any workplace in 21st century.

Technology allows global awareness and cultural exchange. Students can connect with peers and experts from around the world thanks to technology. Students can broaden their perspectives on a variety of subjects, acquire global awareness, learn about other cultures, and participate in virtual exchange programs through video conferencing, online collaborations, and other means.¹⁷⁴ No two kids learn in the same manner, but with the correct resources, instructors may accommodate differences in learning experiences and methods. In the twenty-first century, a platform for student insight solutions like Explorance Blue can assist in determining student needs based on real-time feedback. By enabling teachers to interact and connect with every student, regardless of where they are, what they do, what their culture or beliefs are, or what obstacles they are facing, Explorance Blue fosters student learning.¹⁷⁵

Technology teaches students to become digital citizen. Most pupils are now digital citizens thanks to the abundance of social media platforms. Students may learn how to be responsible in the digital world and with their online behavior by utilizing technology in the classroom, though. Students can practice speaking, searching for information, and interacting with other digital citizens in the classroom, which serves as a microcosm of the larger digital realm.¹⁷⁶ To get student feedback, run class surveys, or lead class discussions, you can use online polling tools or survey platforms. This promotes involvement and lets pupils voice their opinions. By employing instructional coding platforms or applications, it also aids in introducing kids to coding and programming activities.¹⁷⁷ Through lessons that are based on games, students can learn the fundamentals of coding and afterwards use their knowledge to make straightforward programs or animations.

Technology helps students to become smart citizen. Effective teachers use technology to improve their lessons and more effectively engage their students. However, it's crucial to make sure that children are instructed on how to find information efficiently,

evaluate sources critically, and use technology ethically. Teachers play a critical role in assisting students in navigating the digital world and mastering information literacy.¹⁷⁸ It aids in orienting and teaching students about cutting-edge technology such as artificial intelligence (AI), machine learning (ML), big data, augmented reality (AR), virtual reality (VR), etc. In order to build immersive and interactive learning experiences, students can now investigate AI, ML, AR, and VR technologies. Students can visit historical landmarks, study virtual species, or visualize challenging topics in a three-dimensional environment using AR/VR tools. In the twenty-first century, students can use applications or tools that leverage AI/ML to learn and receive information while seated from any location in the world.

Technology Create Problem for Student in Many Way in 21st century

Deterioration of students' competencies in reading, writing and arithmetic. These are the three fundamental abilities that every student must possess.¹⁷⁹ In general, classroom technology raises students' academic achievement and increases their drive to complete their assignments. The proficiency of students in reading, writing, and mathematics—three skills that are unquestionably important to them—seems to be negatively impacted by their heavy reliance on computers.¹⁸⁰ Similar to how they do with physical books and magazines, students do not learn as much from Google Books. Similarly, claims that technology makes our thoughts "shallow" and that kids who read linear materials have a stronger recall and a better understanding than those who read online. The transition from paper to screen affects more than simply how we read and explore written material.¹⁸¹ It also affects how much time and effort we put into it, as well as how immersed we are in it. When we use the internet, we enter a setting that encourages superficial learning, hasty and disorganized thinking, and brief reading.¹⁸² Technology in the classroom has a significant impact on students' writing abilities, particularly in terms of spelling and punctuation, grammatical precision, proofreading, critical thinking, and respect for coherence and linearity. Students who are constantly exposed to short forms find it difficult to put forth effort in their writing, and

¹⁷³Dalsgaard Christian, "Social software: E-learning beyond learning management systems", eurodl.org, University of Aarhus. Archived from the original on 20 May 2013, accessed on 31 Aug 2023

¹⁷⁴Technology Uses in Education, Nsba.org. 9 December 2011. Archived from the original on 6 July 2013, accessed on 31 Aug 2023

¹⁷⁵Warschauer M et al, (2010). "New technology and digital worlds: analyzing evidence of equity in access, use and outcomes". Review of Research in Education. 34 (1): 179–225, accessed on 31 Aug 2023

¹⁷⁶Deschaine Mark et al, (2017), "Increasing Student Engagement in Online Educational Leadership Courses" (PDF). Journal of Educators Online: 6. Archived (PDF) from the original on 31 December 2018, accessed on 31 Aug 2023

¹⁷⁷Izadpanah, S., (2016), The perception of EFL high school students in using of computer technology in the process of

learning: Merits and demerits. Advances in Language and Literary Studies, 7(3), 146- 156, accessed on 31 Aug 2023

¹⁷⁸Su Jiahong et al, (24 May 2023), "Teaching artificial intelligence in K–12 classrooms: a scoping review". Interactive Learning Environments: 1–20, accessed on 31 Aug 2023

¹⁷⁹Bishop J., (2013), The flipped classroom: A survey of the research. 120th ASEE National Conference Proceedings, 30, pp. 1-8. Atlanta, GA, accessed on 31 Aug 2023

¹⁸⁰Al-Hariri M, (2017), Impact of students' use of technology on their learning achievements in physiology courses at the University of Dammam, Journal of Taibah University Medical Sciences, 12(1), 82-85, accessed on 31 Aug 2023

¹⁸¹Clarke B., (2014), An updated literature review on the use of tablets in education. Tablets for Schools, UK: Family Kids & Youth, accessed on 31 Aug 2023

¹⁸²Carr, N. (2011). The Shallows: What the Internet Is Doing to Our Brains. New York: W. W. Norton & Company, accessed on 31 Aug 2023

they find it difficult to discern between formal and informal writing styles because to the short forms that are regularly employed in texting.¹⁸³ The use of technology in the teaching of math and arithmetic comes with a bewildering array of potential hazards. Since calculators are typically numerical devices, kids could not develop a strong conceptual understanding. Their understanding of mathematics will likely be more procedural, which could hinder their ability to solve problems. The employment of tech devices in the twenty-first century may also impede the development of their structural understanding of mathematics. A calculator may also provide inaccurate information and cause confusion when learning notation due to the way it is designed.¹⁸⁴ Due to kids' excessive usage of calculators, the UK government declared its plan to outlaw them in primary schools in 2012.¹⁸⁵

Dehumanization of education. Many educational settings are dehumanized by technology, which also distorts the dynamic between professors and pupils. For example, at higher education institutions and online courses, lecturers deliver their lectures from a distance and students are obliged to interact with computers rather than people. The end result is a teacher who knows very little or nothing about their pupils, and students who don't seem to have a deep relationship with their teacher. These days, technology draws students away from their physical surroundings. They genuinely shut out the outside world. College students today are accustomed to a world of electronic traces from online activities like instant messaging, blogging, and web browsing.¹⁸⁶ Dependence on technology in the classroom also results in a lack of rapport between teachers and students and/or among students themselves, which undermines one of the fundamental goals of education by undermining the social ties required in teaching.¹⁸⁷ In the twenty-first century, there is scarcely any time for teachers to have an impact on their students if they spend a lot of time using technology in the classrooms. Students also miss out on the chance to build healthy relationships with one another.¹⁸⁸

Isolation of students in a digital and virtual world. Students are separated from all forms of social interaction by technology. According to the psychoanalytic theory, solitude is a coping mechanism used by people when they find themselves in a dangerous or unpleasant situation. Because of this, kids who use technology regularly begin to avoid any social interactions that would cause them to feel disconnected and instead grow to feel safe and secure while "wired" to their devices. The phrase 'friendsickness' was first used by Paul & Brier in 2001 to describe the loneliness college-bound youngsters experience after leaving their old pals behind.¹⁸⁹ They make it seem as though technology fills the gap in connections and gives those young pupils the sense that their friendships are still strong.¹⁹⁰ argues that "The observation that a computer is placed in an individual's room rather than a family room and that a child uses a computer alone without any other family members' presence amplifies concerns about social isolation and harmful influences on children's social development." calls attention to the danger of technology-enhanced isolation and the potentially dangerous impact it may have on the children's social development. In 2011, Turkle draws attention to the dichotomous influence of technology, which can drive a person's perception of company and loneliness to opposite ends of the spectrum. She says, "We can find 'companion' online with ease, but the strain of performance wears us out."¹⁹¹ Despite our ongoing connection, we hardly ever pay attention to one another. The dehumanizing impact of technology plays a significant role in this sense of isolation, which frequently leads to a sense of loneliness. In 2013, Karsenti and Fievez bring up the instance of Quebec pupils who were distracted by the overuse of tablets in 21st-century education.¹⁹² In an effort to make the courses more interesting, educators frequently use technology-based games and entertainment, which isolates kids and may ultimately result in less effective learning.¹⁹³ Even while doing straightforward tasks like gap filling and matching, distractions can be added to the technical issues that come with tablet use by young

¹⁸³ Bronowicki, K. A. (2014). Technology's adverse effects on students' writing: An emphasis on formal writing is needed in an academic curriculum. Master's Thesis: State University of New York, accessed on 31 Aug 2023 Available: https://digitalcommons.brockport.edu/cgi/viewcontent.cgi?referer=https://www.google.com.eg/&httpsredir=1&article=1399&context=ehd_theses, accessed on 31 Aug 2023

¹⁸⁴ Zheng T., (1998), Impacts of using calculators in learning mathematics, The 3rd Asian Technology Conference on Mathematics (ATCM'98), 1-10. Available: <http://www.any2any.org/EP/1998/ATCMP015/paper.pdf>, accessed on 31 Aug 2023

¹⁸⁵ Stacey, O. (2014, November). Subtracting calculators from maths tests doesn't add up. Available: <https://thenferblog.org/2014/11/12/subtracting-calculators-from-maths-tests-doesnt-add-up/>, accessed on 31 Aug 2023

¹⁸⁶ Spitzer M., (2014), Information technology in education: Risks and side effects. Trends in Neuroscience and Education, 3(3-4), 81-85, accessed on 31 Aug 2023

¹⁸⁷ Nneji, B. U. (2014). Technologies in education and the dehumanization and imperialization of pedagogy: The African perspective. Bulgarian Journal of Science and Education Policy, 8(1), 86-105, accessed on 31 Aug 2023

¹⁸⁸ Nicholas, C., et al, (2010), Overcoming isolation in distance learning: Building a learning community through time and space. Journal for Education in the Built Environment, 5(1), 27-64, accessed on 31 Aug 2023

¹⁸⁹ Paul, E. et al, (2001), Friendsickness in the Transition to College: Precollege Predictors and College Adjustment Correlates. Journal of Counseling and Development, 79(1), 77-89, accessed on 31 Aug 2023

¹⁹⁰ Lee S. J. (2009). Online Communication and Adolescent social Ties: Who Benefits more from Internet Use? Journal of Computer-Mediated Communication, 14(3), 509-531, accessed on 31 Aug 2023

¹⁹¹ Turkle S., (2011), Alone Together: Why we Expect more from Technology and less from Each Other. New York: Basic Books, accessed on 31 Aug 2023

¹⁹² Karsenti, T., & Fievez, A. (2013), The iPad in education: Uses, benefits and challenges. A survey of 6,057 students and 302 teachers in Quebec, Canada, Montreal: CRIFPE, accessed on 31 Aug 2023

¹⁹³ Iserbyt, P. C. (2014). Learning basic life support (BLS) with tablet PCs in reciprocal learning at school: Are videos superior to pictures? A randomized controlled trial, Resuscitation, 85, 809-813, accessed on 31 Aug 2023

pupils, especially if technical support is not readily available to address such issues quickly.¹⁹⁴

Technology creates and deepening social inequalities.

The gap between students who have access to technology and those who do not is widening, which is a sign of social inequality. Between the rich and the poor, technology widens the income gap significantly. The infrastructure of schools in wealthy and underdeveloped nations clearly differs significantly. While practically all technology tools (PCs, laptops, tablets, projectors, and Internet connectivity) are available in classrooms in affluent nations, this is not the case in underdeveloped nations.¹⁹⁵ As a result, graduates from schools in underdeveloped nations often lack the fundamental technology skills needed to compete in the global labor market, such as PC literacy. There is frequently a digital divide even in affluent nations due to the stark differences in student achievement across kids from various social origins.¹⁹⁶ Although they may have access to technology in the classroom, low-income children are unable to purchase any gadgets for their homes, which is seen in their academic performance when compared to that of their wealthy friends. The National Telecommunications and Information Administration (NTIA) reported that Americans who live in towns are 50% more likely to have access to the Internet than Americans who live in rural areas.¹⁹⁷ The following quote from Sarah Phinney, the coordinator of remote education at Porterville Adult School in Central California, demonstrates the effects of this digital divide: In my seven years of working with this group [at Porterville Adult School], I have discovered that a large percentage of the students we serve, particularly those who speak English as a second language, are computer illiterate and fall on the lean side of the split.¹⁹⁸ If this is the outcome of the digital divide in the US, it must be much worse and more widespread in other nations where the divide is greater, as is the case in LDCs or

developing nations where private schools and universities have a better, more functional technological environment than state schools and universities, which is reflected in the significantly different levels of graduates from both types of education in the twenty-first century.¹⁹⁹

Emotional and behavioral issues. Children sometimes have a strong desire to be like their heroes or friends. When they can't get together or carry out what they see on TV, it may frighten them or make them feel inadequate and inferior.²⁰⁰ FOMO, or the toxic combo of worry and inadequateness, starts to take hold. Online communities can serve as breeding grounds for hatred. Children in the twenty-first century have a chance to experience emotional trauma because of the internet.²⁰¹ Social media and technology can be used by kids and teenagers to bully other youngsters without ever really meeting them. In the twenty-first century, this behavior is frequently referred to as cyberbullying.²⁰² Even with younger students, it is typical.²⁰³

Reduced sleep quality. Kids now have access to digital content 24/7 because to portable gadgets like smartphones and tablets. It suggests that rather than resting, some people would stay up all night responding to SMS and messages.²⁰⁴ Children require a lot of sleep because both physical and mental health depends on it.²⁰⁵ A restful night's sleep aids growth, enhances heart health, affects weight, lengthens attention span, and even aids in academic performance. Two of the downsides of technology include misuse and a lack of understanding of how much technology is "too much." In the twenty-first century, make sure that parents watch over and restrict their kids' use of technology.²⁰⁶

Reduced physical activity. Excessive use of technology by children can be harmful to their health. People who spend more time passively using their phones, playing video games, or watching TV engage in less overall physical activity. The increased use of

¹⁹⁴ Culén A, et al, (2012), Tweens with the iPad classroom – Cool but not really helpful, International Conference on e-learning and e-technologies in education (ICEEE), (pp. 1-6). Technical University of Lodz, Poland, accessed on 31 Aug 2023

¹⁹⁵ Kemp Nenagh et al, (1 January 2014), Face-to-face or face-to-screen?, Undergraduates' opinions and test performance in classroom vs. online learning", *Frontiers in Psychology*, 5: 1278. doi:10.3389/fpsyg.2014.01278, accessed on 31 Aug 2023

¹⁹⁶ Van Dijk, J, (2011), The digital divide as a complex and dynamic phenomenon, *The Information Society: An International Journal*, 19(4), 315-326, accessed on 31 Aug 2023

¹⁹⁷ Steele-Carlin S., (June 2017), Caught in the digital divide, *Education World*, Available: http://www.education-world.com/a_tech/tech041.shtml, accessed on 31 Aug 2023

¹⁹⁸ Tapscott D. (1999), *Growing up Digital: the Rise of the Net Generation*. New York: McGraw-Hill,

¹⁹⁹ Warschauer M., (2011), Dissecting the "digital divide": A case study in Egypt. *The Information Society: An International Journal*, 297-304, accessed on 31 Aug 2023

²⁰⁰ Wallace, K. (2009, June 17), High-Tech Cheating on the Rise at Schools, *Cbsnews*. Available: <https://www.cbsnews.com/news/high-tech-cheating-on-the-rise-at-schools/>, accessed on 31 Aug 2023

²⁰¹ Rideout, V.; Vanderwater, E.; Wartella, E. (2003), *Zero to six: Electronic media in the lives of infants, toddlers, and preschoolers (Report)*, Menlo Park, California: The Henry J. Kaiser Family Foundation. Archived from the original on 24 December 2014, accessed on 31 Aug 2023

²⁰² Kester, Liesbeth; Kirschner, Paul; Corbalan, Gemma (May 2007), "Designing support to facilitate learning in powerful electronic learning environments", *Computers in Human Behavior*, 23 (3): 1047–1054, accessed on 31 Aug 2023

²⁰³ Craft Anna, (July 2012), "Childhood in a digital age: creative challenges for educational futures" (PDF). *London Review of Education*, 10 (2): 173–190, accessed on 31 Aug 2023

²⁰⁴ Vonberg, J. (2015, December 8), The loneliness of the long distance learner, *The Guardian*, Available: <https://www.theguardian.com/higher-education-network/2015/dec/08/you-work-in-a-vacuum-the-loneliness-of-the-long-distance-learner>, accessed on 31 Aug 2023

²⁰⁵ Cuesta-Cambra, Ubaldo; Niño-González, José-Ignacio; Rodríguez-Terceño, José, (1 July 2017), "The Cognitive Processing of an Educational App with EEG and 'Eye Tracking'", *Comunicar*, 25 (52): 41–50. doi:10.3916/c52-2017-04, accessed on 03 Sep 2023

²⁰⁶ "Guiding Principles for Use of Technology with Early Learners", Office of Educational Technology, Archived from the original on 6 November 2018, accessed on 03 Sep 2023

technology promotes an unhealthy lifestyle.²⁰⁷ It has the potential to cause a slew of health issues, including obesity, coronary heart disease, and type 2 diabetics. Children who spend more time watching devices spend less time outside or engaged in physical activity.²⁰⁸ They may consume more mindlessly while watching TV or playing video games.²⁰⁹ As a result, it's critical to understand basic techniques for motivating youngsters to eat without using technology. While parents can promote a healthier lifestyle by promoting outdoor activities, limiting screen time, and providing healthy snacks, doctors or certified dietitians can counsel children on healthy eating habits and physical activity, as well as monitor growth and development.²¹⁰ By carefully managing their weight, children can achieve optimal health and avoid long-term health concerns in the twenty-first century.²¹¹

Weakened social skills. Children of the new generation use Facebook to chat, browse websites, and play online games. The constant use of technology can impede the growth of fundamental social skills.²¹² The ability to interpret and use facial emotions, take turns in conversations, and maintain eye contact are all examples of social skills. It's not that time spent online is bad. However, spending too much time online might rupture the link between parents and children and hinder children's social skill development.²¹³ Therefore, while technology can be a good thing for kids, too much exposure can be bad for them in the twenty-first century. If students limit their time spent on screens, these are less likely to happen. Follow the pediatrician's recommendations and your best judgment for a child's balanced day. Monitor their screen time, exercise, and social interaction. Parenting successfully requires harmony, moderation, and oversight.²¹⁴

New experiences can feel and seem scary.

The brain like what it is accustomed with, therefore we frequently feel secure in situations that are comfortable to us. It follows that many of the problems our society faces can be attributed to technology. We

frequently feel cautious or terrified of technology because of how quickly growth and innovation occur and how foreign it might seem to us. Technology encourages new experiences therefore it is actually quite normal to be afraid of the unknown and uneasy with new things.²¹⁵ There have been individuals advising against technology for as long as there has been technology. Technology has forced us to adjust to new and uncharted realms, from radios and TVs to the internet and social media.²¹⁶ How much time do students spend every day using screens? Most people might be surprised by the average screen time, broken down by age. For work, education, and leisure, people spend a significant amount of time each day in front of smartphones, laptops, tablets, and other technology.²¹⁷ The majority of individuals experience some guilt because of how much time they spend each day staring at screens.²¹⁸

Some Suggested and Recommendation

Technology is used extensively in education nowadays. The global adoption of contemporary technology has significantly altered how pupils study and teachers impart information. The amount of technology being used in a school's classrooms is frequently used to gauge how successful the institution is.²¹⁹ Thus, technology has so far played a significant role in students' social and academic lives, which inevitably leads to intense anxiety about the consequences of its use. The research and moral application of assisting learning and enhancing performance through the development, application, and management of suitable technical procedures and resources is what the Association for Educational Communications and Technology (AECT) defines as educational technology. Therefore, the definition of technology encompasses not only 'TECHNOLOGY' (such as computers or the internet), but also the application of scientific knowledge to enhance learning.²²⁰ No one disputes the fact that in the twenty-first century it is nearly impossible to ban technology from the classroom.²²¹ We still have the ability

²⁰⁷ Biocchi Michael, "Games in the Classroom", Gaming in the Classroom. Archived from the original on 15 August 2011, accessed on 03 Sep 2023

²⁰⁸ Schindler, Laura A.; Burkholder, Gary J.; Morad, Osama A.; Marsh, Craig (December 2017). "Computer-based technology and student engagement: a critical review of the literature", *International Journal of Educational Technology in Higher Education*, 14 (1): 25. doi:10.1186/s41239-017-0063-0. ISSN 2365-9440, accessed on 03 Sep 2023

²⁰⁹ "Technology in the Preschool Classroom", study.com, Archived from the original on 6 November 2018, accessed on 03 Sep 2023

²¹⁰ Publications, "The Rise of Cyber-Schools", *The New Atlantis*, Archived from the original on 25 February 2013

²¹¹ Viorica-Torii, C., & Carmen, A. (2013), The impact of educational technology on the learning styles of students. *Procedia-Social and Behavioral Sciences*, 83, 851-855, accessed on 03 Sep 2023

²¹² Steele-Carlin S, (2017, June), Caught in the digital divide, *Education World*, Available: http://www.education-world.com/a_tech/tech041.shtml, accessed on 03 Sep 2023

²¹³ Stacey, O. (2014, November). Subtracting calculators from maths tests doesn't add up. Available: <https://thenferblog.org/2014/11/12/subtracting-calculators-from-maths-tests-doesnt-add-up/>, accessed on 03 Sep 2023

²¹⁴ <https://www.cyberwise.org/post/positive-and-negative-effects-of-technology-on-children>, accessed on 26 Aug 2023

²¹⁵ "Technology in Schools: The Ongoing Challenge of Access Adequacy and Equity" (PDF), *NEA Education Policy and Practice Department*, Archived from the original (PDF) on 25 October 2019, accessed on 03 Sep 2023

²¹⁶ <https://www.cyberwise.org/post/from-social-media-to-smartphones-how-technology-affects-our-mental-health>, accessed on 31 Aug 2023

²¹⁷ Kronholz, J., (2011), "Getting at-risk teens to graduation", *Education Next*, Vol. 11, no. 4, ProQuest 1237831598,

²¹⁸ <https://www.igi-global.com/article/learning-object-models-learning-service/1666>, accessed on 03 Sep 2023

²¹⁹ Stacey, O. (2014, November). Subtracting calculators from maths tests doesn't add up. Available: <https://thenferblog.org/2014/11/12/subtracting-calculators-from-maths-tests-doesnt-add-up/>, accessed on 03 Sep 2023

²²⁰ https://www.researchgate.net/post/Confusion_over_the_Concept_of_Educational_Technology, accessed on 11 Sep 2023

²²¹ Shiao, Dennis. "Why Virtual Classrooms Are Excellent Learning Venues", *INXPO*, Archived from the original on 5 November 2013, accessed on 03 Sep 2023

to reduce its harmful consequences, though. Technology users are advised by UNICEF (2017) to "harness the good" and "limit the harm."²²²The following is a collection of advice on how to manage technology in a way that won't endanger pupils in the twenty-first century.²²³

- Ensuring that students engage with one another even when they are fully engrossed in their digital world.²²⁴Technologies for student tracking should incorporate visualization capabilities that make it simple for teachers to assess students' progress.

- Technology need to be employed to aid in teaching and learning. Creating activities that inevitably encourage teamwork and communication.²²⁵

- Comparing and exchanging (blog posts, school assignments, etc.) to demonstrate how technology can unite students from around the world.²²⁶

- Encouraging technologically competent students to create interactive materials that will improve the course.²²⁷The use of technology for instruction rather than for administrative activities should be the focus of professional development initiatives.

- Offer teacher preparation programs emphasizing constructivism and student-centered learning. It is crucial to include instructors in the decision-making process when implementing new technologies in the classroom.²²⁸

- When attempting to ensure the proper use of technology, teacher training may also serve as a launching point.²²⁹In fact, the more training teachers acquire, the more effectively they will use technology and the less adverse consequences it will have.²³⁰

- Technology-based tools wouldn't be useful unless they were used in conjunction with strong instructional strategies.²³¹

- Unexpectedly, adding technology to the classroom won't have the desired positive impact unless objectives are well defined and exercises are well-designed.²³²Teachers in the twenty-first century typically recognize the advantages of educational technologies, but they frequently find it difficult to integrate new technologies into their lessons in an efficient and effective way. Technological integration poses serious difficulties for teachers at all levels of school systems, from purchasing new technological equipment to adapting curricula and teaching methods to include new educational resources.²³³

- The dominant force influencing the educational landscape in the twenty-first century is probably technology. The teaching and learning process, as well as educational administration, management, and evaluation, should all make use of the proper technology.²³⁴

- Educational systems must now make sure that integrating ICT programs into the curriculum is supported by efficient programs for instructors' Continuing Professional Development (CPD), which incorporates technology-based learning. Parents should be made aware of the fact that technology is not always a blessing and that it is now their own responsibility to control their children's strong desire to utilize technology at all times and places.²³⁵

- Actually, computers were created for calculations and simulations, not management, and today we see that they are used in every part of life. So we will be useful if we have the mindset and mentality to use and benefit from technology.²³⁶

²²² UNICEF Report (2017). The State of the World's Children 2017: Children in a Digital World. Available: https://www.unicef.org/publications/files/SOWC_2017_ENG_WEB.pdf (June 14, 2019), accessed on 03 Sep 2023

²²³ Wilkins, K. (2014, May). How New Technologies Affect Student-Teacher Relationships. British Council Voices Magazine, Available: <https://www.britishcouncil.org/voices-magazine/new-technologies-affect-studentteacher-relationships>, accessed on 03 Sep 2023

²²⁴ Wentworth D. et al, (2014), Technology use and academic performance, Computers & Education, 78, 306-311, accessed on 03 Sep 2023

²²⁵ Warschauer M., (2011), Dissecting the "digital divide": A case study in Egypt. The Information Society: An International Journal, 297-304, accessed on 03 Sep 2023

²²⁶ Serbyt, P. C., (2014), Learning basic life support (BLS) with tablet PCs in reciprocal learning at school: Are videos superior to pictures? A randomized controlled trial, Resuscitation, 85, 809-813, accessed on 03 Sep 2023

²²⁷ Bishop J. et al, (2013), The flipped classroom: A survey of the research. 120th ASEE National Conference Proceedings, 30, pp. 1-8. Atlanta, GA, accessed on 03 Sep 2023

²²⁸ Hu H et al, (2014), iPads for STEM teachers: A case study on perceived usefulness, perceived proficiency, intention to adopt, and integration in K-12 instruction. Journal of Educational Technology Development and Exchange, 7, 49-66, accessed on 10 Sep 2023

²²⁹ Tremblay, Eric (2010), "Educating the Mobile Generation – using personal cell phones as audience response systems in post-secondary science teaching", Journal of Computers in Mathematics and Science Teaching, 29 (2): 217–

227, Archived from the original on 31 October 2010, accessed on 04 Sep 2023

²³⁰ Cleaver S, (2014), Technology in the Classroom: Helpful or Harmful? Retrieved from <http://www.education.com/magazine/article/effective-technology-teaching-child/>, accessed on 11 Sep 2023

²³¹ Laurillard, D. (2002). Rethinking University Teaching: A Conversational Framework for the Effective Use of Educational Technology (2nd ed.), London: Routledge, accessed on 03 Sep 2023

²³² McFarlane, A. (1997). What Are We and How Did We Get Here? Information Technology and Authentic Learning: Realizing the Potential of Computers in the Primary Classroom. London: Routledge, accessed on 03 Sep 2023

²³³ Hofer M et al, (2012), TPACK development in teacher education: A longitudinal study of preservice teachers in a secondary M.A.Ed. program. Journal of Research on Technology in Education, 45, 83–106, accessed on 11 Sep 2023

²³⁴ U. S. Department of Education, Office of Educational Technology, (2010), Transforming American education: Learning powered by technology, National Educational Technology Plan 2010, Retrieved March, 20, 2015, from <http://nces.ed.gov/pubs2007/2007020.pdf>, accessed on 11 Sep 2023

²³⁵ Turkle S, (2011), Alone Together: Why we expect more from Technology and less from Each Other. New York: Basic Books, accessed on 03 Sep 2023

²³⁶ Althoff T et al, (2015). Donor retention in online crowdfunding communities: A case study of DonorsChoose.org. Proceedings of the 24th International Conference on World Wide Web, 34-44, accessed on 11 Sep 2023

➤ TPK involves more than just acquaintance with technologies and knowledge of practical pedagogical or academic procedures; it also calls for an understanding of how specific technologies can support specific pedagogical strategies or techniques. Understanding how technologies can support particular domain-specific pedagogies is also a requirement for technological pedagogical content knowledge (TPACK).²³⁷

Conclusion

For today's student, technology brings new learning opportunities. Today's kids exhibit three essential types of intelligence: emotional, creative, and instructional. The latter alternative is given more attention in the conventional classroom setting, which frequently promotes lecture-based instruction. The same is done via standardized tests and other ranking systems. Students today have access to technology, which allows those who flourish outside of the traditional learning environment to still reach their full potential. With the help of technology, kids may express their curiosity in a variety of ways. Because they have access to technology, they can experiment without feeling embarrassed. Students are given the opportunity to go through trial-and-error as they choose to see through this process. However, a new approach to the learning process aids in their increased learning capacity. Students can now easily and conveniently access data and study resources thanks to technology. As is well known, students must visit the library before beginning any research project in order to borrow a few books to read, gain access to an encyclopedia, and even watch microfilm in order to have enough materials to complete their assignment. Thanks to technology, a student can get all the materials they require for a project from a single source. Students can perform a few searches on Google or any other search engine to obtain their supporting resources and information instead of wasting all that time looking for anything special or waiting for their library to order it. The education industry has been reluctant to adapt digital trends even after technological advancement, instead of educating the youth to advance technology. Let's face it: the education industry isn't typically the one to accept new technologies quickly. That is the only explanation for why educational development has continued while being hesitant and slow. New courses are now being offered in schools and colleges, and the sector will soon change.

The education industry has historically been the last to implement significant reforms while clinging to outdated teaching methods. However, teachers are introducing new cutting-edge elements as a result of the digital change in education. In this post, we'll look at and briefly discuss a few of the education-related changes and trends that are expected to have a significant impact in 2019. Students are losing interest in traditional teaching techniques over time, thus eLearning and digital transformation will be essential to pique

their attention. Our entire educational system will advance as more and more digital and smart trends become popular. Beyond monetary concerns, education confronts distinct resource difficulties. The duration of the school day is limited, and class time is a valuable resource. Compared to many other countries across the world, American students spend less time in the classroom. Teaching is a difficult profession that involves many repetitive but time-consuming responsibilities. Tools that make it easier to remember fundamental information free up teachers to assist children who require individualized interventions. Over the course of the school year, every additional minute spent instructing students has an impact. Technology improvements in assessment have the potential to benefit both teachers and pupils. Without performance feedback, teachers cannot determine whether pupils have understood the lesson, and legislators cannot determine whether their reforms are effective. Since the development of the optical scan answer sheet half a century ago, assessment technology has barely, if at all, evolved. While some new assessment technologies enable accurate real-time assessment, others can assist reduce testing expenses. Testing innovations allow for low-stakes evaluation of children.

Since the previous 60 years, technology has permeated the classroom and irrevocably changed how people learn and teach. One of the most crucial skills students should learn for the 21st century is technology. It is a new literacy that makes it easier to access a variety of knowledge sources. Whether for or against, this movement towards digital integration in the classroom will be continued further and each new breakthrough will be breed more alluring one. Students today are sometimes referred to as "the Net Generation," "Digital Natives," "the Gamer Generation," "New Millennium Learners," etc. since they are so obsessed with technology. This obsession with technology needs to be controlled; otherwise, there would be many risks and severe consequences. Despite the fact that many of our students think they are learning effectively when utilizing technology, several unfavorable and non-educative attitudes are common among them. No one can realistically fathom learning without technology, and no one can currently comprehend how an educational environment might achieve desired objectives and ends without actually utilizing technology. However, if steps are not taken to restrict the detrimental changes it can bring about to education, the use—more specifically, the excessive use of technology may run counter to many educational objectives. The importance of this essay is found in the way it has highlighted the potential drawbacks of employing technology in the classroom and offered a number of workable alternatives that could perhaps help mitigate these drawbacks.

²³⁷ Brantley-Dias L, (2013), Goldilocks and TPACK: Is the Construct "Just Right?" *Journal of Research on Technology in Education*, 46, 103–128, accessed on 11 Sep 2023