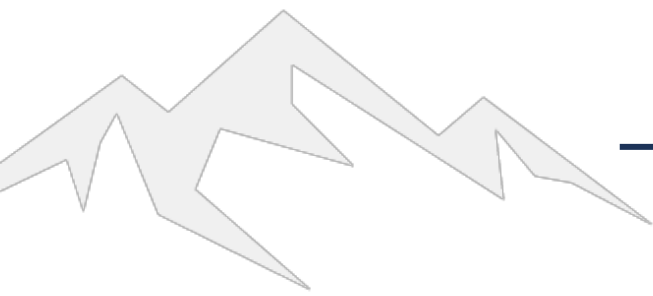




The Pros and Cons of Tech in the Classroom from Kindergarten Through High School

September 2026

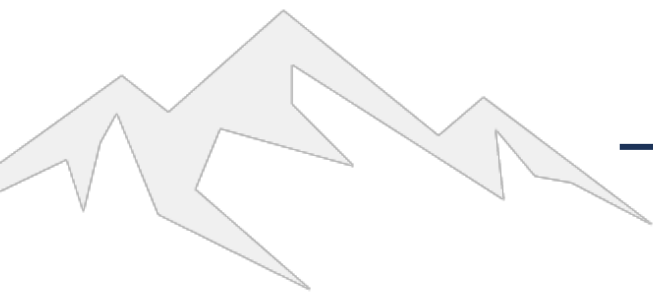


About the Author

Yazmin Navarro



As an immigrant, Yazmin Navarro was taught the importance of a great education. Since then, she has strived to ensure the success of a strong education for generations to come. As an award-winning educator and American diplomat to El Salvador, Yazmin has served both students and families in both the United States and around the world, giving her a unique perspective on education. Yazmin has worked with children and families from all walks of life, including gifted and talented students, special needs students, at-risk youth, and English language learners. She has also worked with students in out-of-school-time programs. She has been hands-on in the classroom teaching, as well as creating programs that will improve education for children. As a Department of State employee, Yazmin never forgot her roots in education and continued serving youth through a Department of State-sanctioned program while stationed abroad in El Salvador. Yazmin continues to volunteer by teaching Spanish in her local community and serving as a volunteer at her daughter's school. Yazmin was the first in both her close and extended family to not only graduate from high school but to attend college. After graduation, she pursued her college degrees. She graduated with her bachelor's degree in English in 2012 and in 2015 finished her master's in public administration. Yazmin currently resides in Johnstown with her husband, who honorably retired from the Marine Corps after faithfully serving for 20 years, and her school-aged daughter who attends public school.



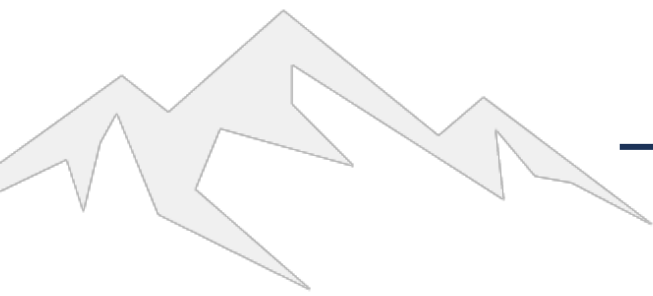
Introduction

Technology has become a central part of modern education, influencing how students learn, how teachers teach, and especially how schools operate. From kindergarten classrooms using interactive learning applications using iPads, to high schools implementing artificial intelligence, virtual laboratories, and online learning platforms, technology has transformed education at every level. While educational technology offers numerous benefits, it also presents important challenges. There are many concerns regarding student distraction, excessive screen time, educational inequality, data privacy, cybersecurity, and the decline of interpersonal skills. (1)(2)(3)(4)

Over the past several decades, technology has become deeply embedded within education. Computers, tablets, learning management systems, educational applications, and artificial intelligence tools are common in most classrooms. Educational technology, EdTech for short, has altered how students get information, complete assignments, work with their peers, and communicate with teachers. (1)(2)(3)(4)(5)

The rapid expansion of educational technology accelerated dramatically during the COVID-19 pandemic, when schools were forced to transition to remote learning. This global shift highlighted both the possibilities and limitations of digital learning. Many educators discovered innovative ways to engage students through online platforms, while others encountered challenges related to internet access, student motivation, and technology readiness. (1)(2)(3)(4)

The increasing use of technology in classrooms has generated ongoing discussions about its effectiveness. Advocates argue that technology enhances learning, personalizes instruction, and prepares students for future careers in a world that is dripping in technology. Critics argue that too much reliance on technology leads to distraction, a weakening of social skills, and makes educational inequalities worse. (1)(2)(3)(4)(5)



Educational researchers have spent decades examining the effects of technology on student learning, engagement, and academic achievement. Many studies report positive outcomes, but researchers consistently emphasize that technology itself does not automatically improve learning. Rather, outcomes depend on how technology is used, the quality of instruction, and the educational context. Another idea to keep in mind is questioning who is performing the research to ensure that there is not a bias. (1)(3)(4)

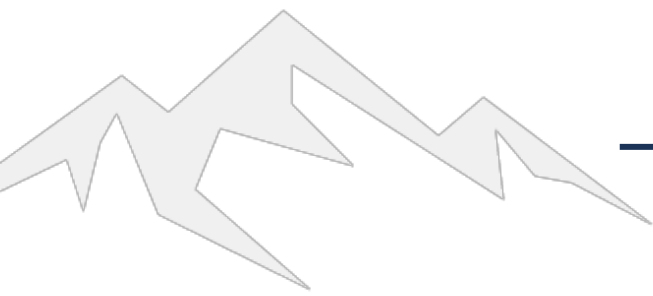
Similarly, the UNESCO Global Education Monitoring Report argues that technology should be viewed as a tool rather than a replacement for teachers. According to UNESCO, educational technology is most effective when it supports human interaction and enhances teaching rather than attempting to substitute for it. The report emphasizes that learner needs should remain at the center of educational decision-making. (1)(4)

A Brief History of Technology in Education

Technology has long been associated with educational improvement. Early educational technologies included film projectors, radios, televisions, and overhead projectors. However, these tools were primarily used to supplement the traditional instructor and education rather than transform it. (1)(4)

The introduction of personal computers in schools during the 1980s represented a major shift in education. Students began learning computer literacy skills while educators learned all about the new world of computer-assisted instruction. During the 1990s and early 2000s, the internet expanded education by providing access to endless amounts of information. (2)(3)

The development of mobile devices, cloud computing, and educational software accelerated technology integration in the classroom. Today, many schools provide students with individual laptops or tablets, allowing constant access to digital resources, while learning management systems such as



Google Classroom and others, allow communication, assessment, and collaboration outside of the physical classroom. (1)(2)(3)

According to the UNESCO Global Education Monitoring Report, technology has the potential to support teaching and learning, but its effectiveness depends heavily on how it is implemented and whether it addresses actual educational needs rather than simply introducing new, unnecessary devices into classrooms. (1)(4)

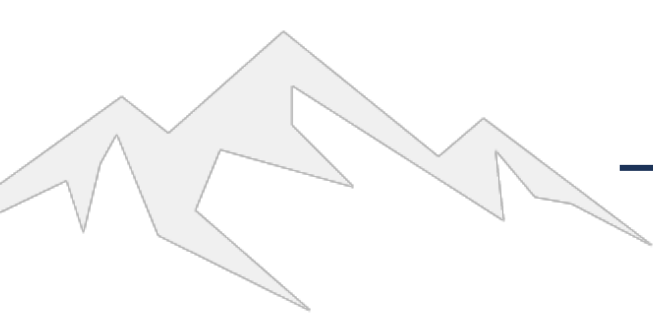
Advantages of Technology in K-12 Education

Increased Access to Information

According to research from the OECD, one of the most significant benefits of educational technology is access to information, outside of reliance on physical textbooks and library resources. Instead, students can access scholarly databases, educational videos, and interactive simulations from almost anywhere. (2)(3)

Personalized Learning Opportunities

Technology enables personalized learning experiences that support diverse student needs. Adaptive learning systems can analyze student performance and modify instruction based on individual needs. Traditional classrooms often require teachers to deliver the same instruction to all students regardless of learning pace. When integrated effectively, educational software can provide additional support to students who are struggling while allowing advanced learners to progress more quickly by personalizing learning in classrooms with different academic abilities. (2)(3)



Enhanced Student Engagement

Technology can make learning more interactive and engaging. Multimedia presentations, educational games, virtual reality experiences, and simulations encourage active participation rather than passive learning. (2)(3)

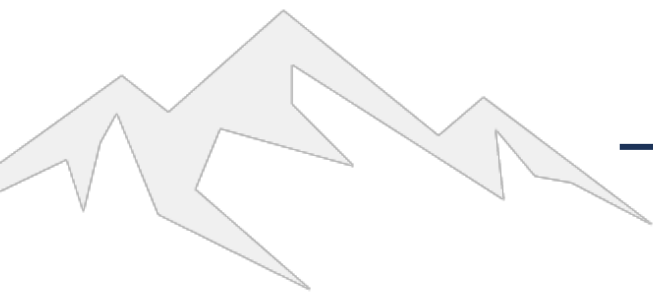
Research that examined educational technology has constantly found an increase in student motivation when technology is inserted effectively into instruction. Interactive learning environments can make abstract concepts more concrete and accessible. For example, science students can perform virtual lab experiments, geography students can explore interactive maps, and history students can visit virtual recreations of historical sites. These experiences often increase student interest and improve content retention. (2)(3)

Additional Improvements from Tech in the Classroom

While technology in the classroom can be mismanaged and harmful, there are major positive factors to consider as well, as it improves collaboration and communication between students, teachers, administrators, and parents. Also, helping students develop digital literacy, which has overtaken today's world. Students must learn how to evaluate information sources effectively online and how to protect personal information and using digital tools responsibly. (1)(2)(4)

Another important argument for technology in the classroom is that students with disabilities can get more support through the provision of assistive technologies such as text-to-speech software, speech recognition systems, screen readers, and adaptive learning tools, which help these students overcome barriers to their education. All these different technologies help students overcome learning barriers and help ensure equity in educational opportunities.

Students with visual and hearing impairments or learning and physical disabilities often benefit from technology that allows them to participate in



classroom activities. Educational technology supports inclusive education by providing many pathways for learning and communication. (3)(4)

Disadvantages of Technology in K-12 Education

While there are many advantages to having technology in the classroom, one cannot forget that there are many disadvantages to students and teachers becoming so dependent on technology. (1)(4)

Student Distraction

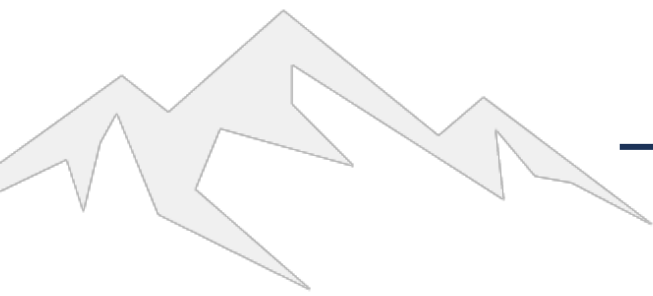
One of the biggest and most popular criticisms against technology in the classroom is the distraction it causes students and how it impacts their learning time. Devices intended for educational purposes can also provide access to social media, games, messaging applications, and entertainment platforms, even when certain safeguards are put in place to block these non-educational uses. (4)(6)

Research consistently identifies digital distraction as a significant challenge in classroom environments with heavy technology in place. Many students may struggle dividing their attention between multiple tasks, which in turn reduces focus and negatively impacts learning, memory, and comprehension. (3)(6)

Excessive Screen Time

Increased technology use raises concerns regarding screen time among children and adolescents. Students often spend many hours each day using digital devices both in school and at home. (7)(8)

Researchers have linked excessive screen exposure to eye strain, sleep disruption, reduced physical activity, and attention difficulties. Younger children are more vulnerable because their cognitive and social development depends heavily on direct interaction with people and physical environments.



Are they receiving enough real-life interaction when technology is relied on in the classroom? (7)(9)(10)

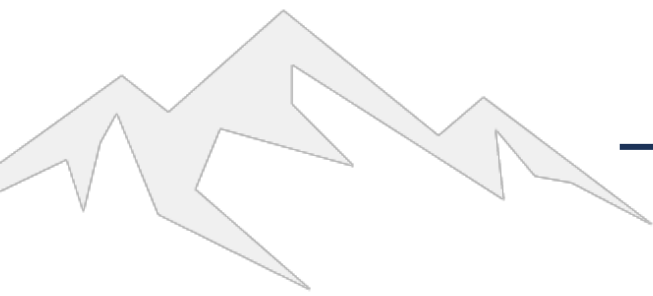
The Digital Divide

Not all students have equal access to technology because of differences in socioeconomic statuses, geographic locations, and internet connections. This digital divide became even more visible during the remote learning that arose during the COVID-19 pandemic, when some students did not have reliable internet access or suitable devices. Students from disadvantaged backgrounds often face problems with digital learning, which in turn could widen the achievement gap. UNESCO's research emphasizes that technology can either reduce or increase educational inequality depending on how access is distributed and supported. But, should we prevent some students from learning and growing with technology simply because every student cannot access it yet? (1)(4)

Privacy and Cybersecurity Risks

Educational technology platforms collect large quantities of student data. Learning management systems, assessment software, educational applications, and AI-based platforms often store personal information, academic records, and behavioral data. This collection of data raises concerns regarding privacy, cybersecurity, and data protection. Schools must guarantee that student information is protected from unauthorized access, misuse, and security breaches, which means they must constantly work to stay up to date on how to ensure this protection. (4)(5)

As educational technology becomes increasingly sophisticated, so is other technology that can be misused and cause potential problems for schools and students. Due to this, policymakers and educators need to address ethical questions regarding data collection, surveillance, and student privacy. (5)(11)



Reduced Face-to-Face Interaction

Technology can be an excellent tool when used responsibly but constant use reduces valuable interpersonal communication. Students who spend long periods of time on screens will miss out on opportunities to develop social skills through direct human interaction. (7)(8)(9)

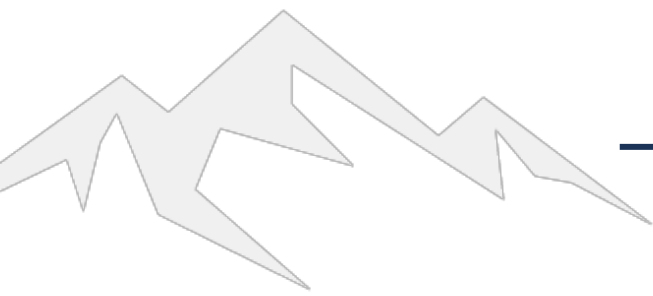
Face-to-face communication helps students develop empathy, conflict resolution skills, emotional intelligence, and effective interpersonal relationships. Excessive reliance on digital communication limits these opportunities. Step on to a school campus and observe middle and high schoolers sitting next to each other during recess and interacting only through their phones - texting back and forth but never looking up from their screens. (7)(9)

For these, and other reasons, many educational experts advocate using technology as a supplement to traditional instruction rather than as a replacement for classroom interaction. (1)(4)

Technology in Elementary School Classrooms

Technology use in elementary education focuses primarily on foundational skills development, which is interactive and supports literacy, numeracy, language acquisition, and problem-solving skills. Digital storytelling platforms and educational games can make learning more engaging for young children. (2)(3)

However, elementary educators face unique challenges when integrating technology. Young learners require substantial hands-on experience, physical activity, and social interaction. Educational technology should complement a teacher's instructional lesson rather than replace critical developmental experiences that will set the stage for how a child learns, gathers information, and interacts with teachers and peer throughout life. There are many school



districts in Colorado that start children as young as kindergarten aged to start using tablets as part of their school day. (1)(2)(4)

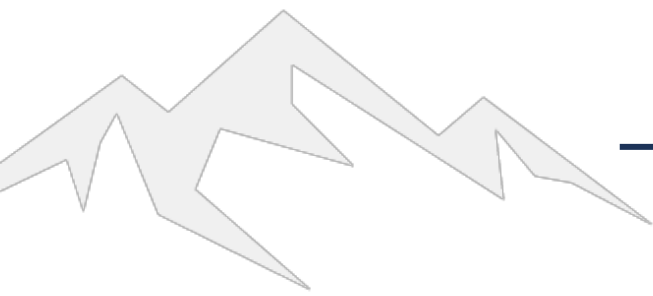
Technology in Middle and High School Classrooms

High school students constantly interact with advanced educational technologies including virtual laboratories, coding platforms, artificial intelligence applications, and online college courses. These experiences can support career readiness and prepare students for postsecondary education (2)(5)

Artificial intelligence is becoming increasingly relevant in high school education. There are now AI-powered tutoring systems, writing assistants, and personalized learning platforms that provide students with individualized instruction. According to recent research, AI can positively impact and support curriculum personalization, improve engagement, and cast a wider net to find educational resources. However, academic integrity, ethical use, and overreliance on automated systems are major concerns. (5)(11)

Older students face increased risks related to distraction, social media use, academic dishonesty, and overreliance on technology. Schools must therefore emphasize digital citizenship, ethical technology use, and critical thinking skills alongside technical competencies. Programs exist that claim to combat risks in plagiarism or AI completing students' assignments, but with the ever-changing technological landscape, an overreliance on technology will make it increasingly difficult to differentiate between a student's work and the use of AI. (5)(6)(11)

Technology-related challenges often worsen in high school. Social media distractions, online misinformation, privacy concerns, cyberbullying, and academic dishonesty can become significant issues. Students need to be actively instructed in how to use technology responsibly and how to evaluate



information and tools both critically *and* ethically to avoid so they are prepared to avoid pitfalls before they face them. (4)(5)

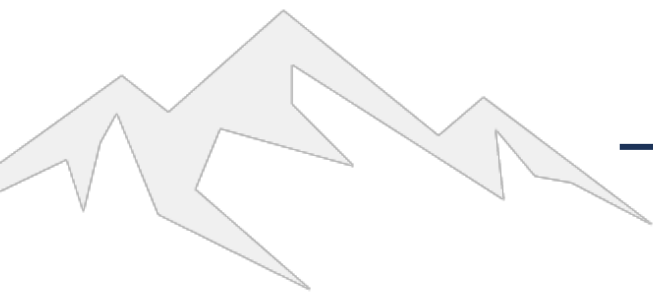
The Negative Relationship Between Mental Health and Devices in Schools

The growing use of cell phones and digital devices among children and adolescents has increased mental health risks. Studies have found links between smartphone use and symptoms of depression, anxiety, and poor sleep quality. Research also shows that teenagers who spend a long time on social media are more likely to compare themselves to others, experience cyberbullying, and develop unhealthy patterns of social validation, which will negatively affect their emotional well-being. (7)(8)(9)(10)

The negative effects of cell phone use are also evident in school environments. Smartphones provide constant access to social media, games, and messaging applications, creating distractions that interfere with learning and classroom engagement. A recent study found that teenagers use smartphones during a third of the school day, which translated to academic decline. (6)(12)

Teachers and school administrators report that cell phone distractions have become a major classroom problem. According to a survey by the Pew Research Center, 72% of U.S. high school teachers stated cellphones cause major distractions in their classrooms. Research has shown that in-class phone use lowers academic performance because students struggle concentrating and increasing multitasking, which has shown that students who divide their attention between lessons and their devices often struggle with comprehension, memory retention, and all this equates to decreased academic achievement. (7)(9)(12)

Excessive device use in schools can contribute to bigger mental health problems. The American Psychological Association and the U.S. Surgeon General warn that the frequent use of social media by adolescents affects



sleep, self-esteem, and emotional development. Less face-to-face interaction and increased dependence on digital communication limits social skill development and emotional resilience, resulting in the current push by educators and policymakers for restrictions on cell phone use during school time. (7)(8)(9)

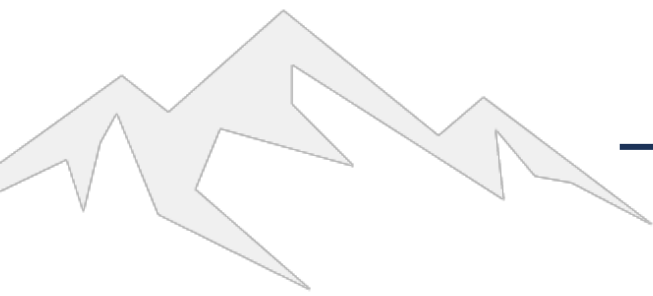
A growing number of schools are adopting cell phone use rules. In many high schools, this includes a policy that students may not have cell phones out during instruction time, but all too often, these in-classroom rules are not enforced for a variety of reasons. They can be difficult to enforce consistently because not all teachers and administrators think the same and use different judgement in rules situations with students.

The good news, though, is that there are an increasing number of school districts that do see the correlation between cell phone usage and mental health consequences among their student populations and are enforcing their campuses as cell phone-free zones. Many have reported seeing a large improvement in the mental health, academic achievement, and overall success of the students and teachers. (6)

Teacher Effectiveness and Professional Development

Teachers play a critical role in determining whether technology enhances or hinders learning. Research consistently demonstrates that educational outcomes depend more on instructional quality than on the technology itself. This serves to remind everyone that teachers are vital and that technology could never replace them. (1)(3)(4)

Effective technology integration requires educators to possess both technical and pedagogical expertise. Teachers must understand how to select appropriate tools, align technology with learning objectives, and evaluate educational outcomes. (3)(5)



Professional development is vital for the success of both teacher and student. Teachers who receive ongoing training are more likely to integrate technology effectively in their respective classrooms. Professional development programs should address instructional design, classroom management, digital assessment, and emerging technologies such as artificial intelligence, and such training opportunities should be ongoing because technology never stops changing. (5)(11)

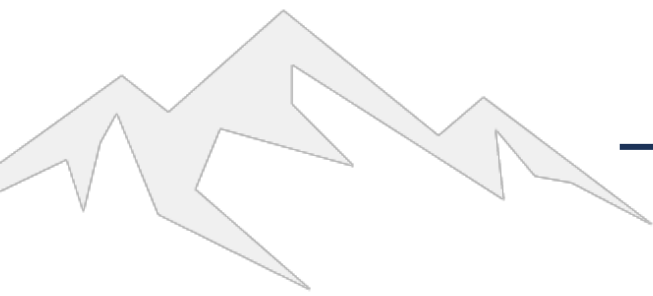
UNESCO recommends that governments invest in both technology infrastructure and teacher preparation as well as the support systems they use. Technology initiatives may not be successful if educators are not prepared to use digital tools effectively. (1)(4)

Recommendations for Schools and Policymakers

First, policymakers – generally local school board members or individual school principals – should establish clear guidelines regarding screen time, device use, and digital citizenship. Students need explicit instruction regarding ethical technology use, online safety, and information evaluation. (2)(4)(7)

Second, educational institutions should strengthen data privacy and cybersecurity protections. As technology use increases, schools must safeguard student information and maintain transparent data practices. (4)(5)

Lastly, schools should maintain a balanced approach to instruction. Face-to-face interaction, collaborative learning, physical activity, and hands-on experiences remain essential components of effective education. Ongoing communication with parents about technology policies and the reasons behind them is imperative. (1)(4)



Future Direction of Technology in Education

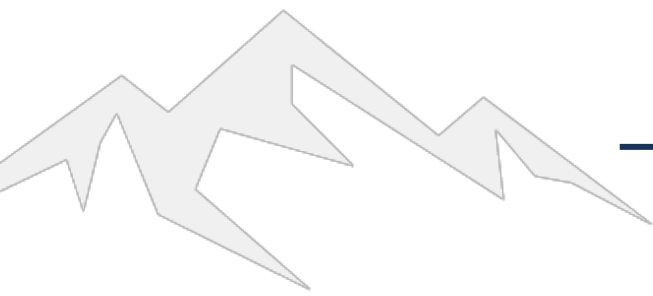
The future of educational technology will likely include expanded use of artificial intelligence, virtual reality, augmented reality, adaptive learning systems, and data analytics. The emerging concept of "Education 5.0" envisions learner-centered environments that leverage advanced technologies to remove barriers to learning and improve educational outcomes. However, researchers emphasize that technological innovation must be accompanied by ethical guidelines, policy development, and ongoing evaluation. (4)(5)(11)

Future educational systems will need to find the difficult balance between technological innovation and human connection. While technology can support learning in powerful ways, research consistently shows that effective education depends on meaningful relationships among students, teachers, parents, and communities. Technology should therefore enhance rather than replace these relationships. (1)(4)

Conclusion

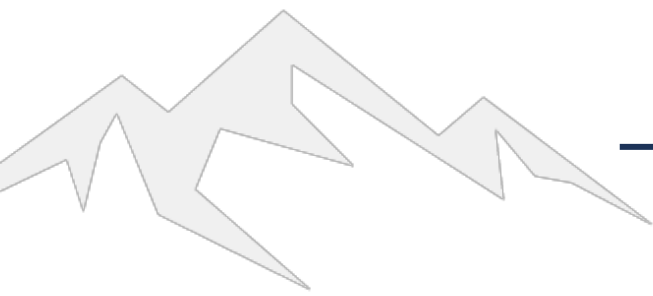
Technology has already transformed K-12 education, creating opportunities for better learning, collaboration with both students and teachers, accessibility to information and useful tools, and the development of skills. Educational technology can personalize instruction, support teacher planning, increase student engagement, support diverse learners – including students whose first language is not English and those with special needs – and prepare students for participation in an increasingly digital world. However, technology must reign in with a heavy hand because it also introduces difficulties such as distraction, excessive screen time, inequality, privacy concerns, and lack of human interaction.

The evidence is clear that technology works best when it supports strong teaching practices instead of replacing them. Access to devices alone does



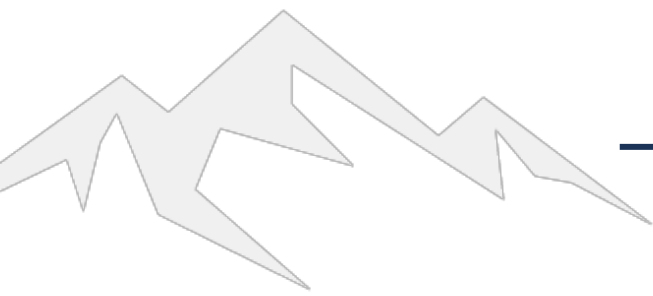
not guarantee improvement in learning. Instead, successful technology integration requires ongoing and up-to-date training of educators, equal access for all students, correct implementation, and continued evaluation to measure effectiveness.

Ultimately, technology should be viewed as a tool in education rather than a solution. When used well, it can significantly enhance educational experiences and outcomes. When used excessively or without an identified, specific educational purpose, it may decrease learning and development. The challenge for educators and policymakers is to find a balance that maximizes the benefits while minimizing the risks. Technology in the classroom will not be going away, so students are best served through the creation of clear guidelines for ethical use that prepares a new generation for the post-educational world.



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