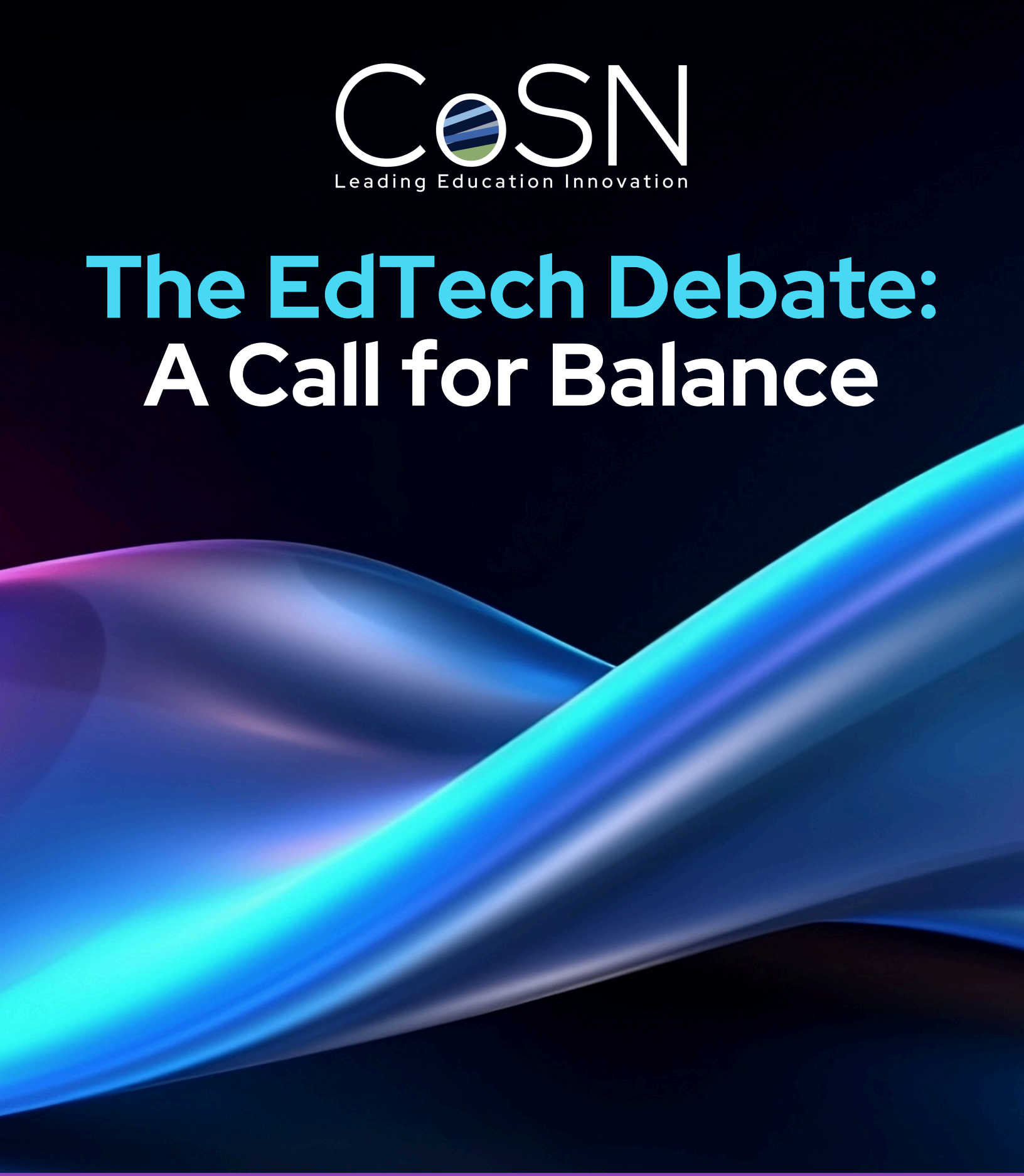
CoSN
Leading Education Innovation

The EdTech Debate: A Call for Balance



Member Brief: Exclusive to CoSN Members

The EdTech Debate: A Call for Balance

This Brief is designed exclusively for CoSN members and their teams. Please do not share beyond your own organization. See the end of this document for more information about CoSN.

Issue Recap

The role of educational technology in K-12 classrooms has become a lightning rod for debate. Critics cite concerns about stagnant test scores, increased screen time, and the perceived inefficacy of digital tools in driving meaningful academic improvements. These arguments are often bolstered by anecdotal evidence or studies with narrow scopes, fueling calls for reduced investment in EdTech.

However, data and experience suggest that these critiques tell only part of the story. When implemented with intention and supported by teacher training, EdTech tools have demonstrated their ability to foster personalized learning, improve accessibility for students with disabilities, and support equity in education. In today's digital-first world, preparing students for success demands a nuanced understanding of how technology can enhance—not hinder—teaching and learning.

This brief offers CoSN members the resources they need to navigate this complex landscape. It provides evidence-based responses to common criticisms, highlights successful integration strategies, and reinforces the importance of a balanced, informed approach to EdTech.

Clarifying the Core Debate

Skepticism about EdTech often stems from a perceived lack of clear returns on investment, especially when using metrics like standardized test scores as the sole measure of success.

Critics often point to studies suggesting that EdTech has not significantly improved student achievement. For instance, a 2023 Stanford Report highlights that certain educational technologies may limit assessment methods and potentially misinterpret learning outcomes. Critics may also cite reports that show negligible gains or even declines when technology is poorly integrated. However, such assessments rarely consider the quality of implementation, teacher preparation, or the selection of research-based digital resources. They often overlook the ability for EdTech to serve as assistive technologies that provide critical support to students with learning variances, helping them access

communication tools, text-to-speech features, and other resources that would be otherwise unattainable.

The Importance of Purposeful, Evidence-Based Use of EdTech

EdTech's value emerges when educators select tools intentionally to meet clear instructional objectives. Research from J-PAL in 2019 (a global poverty research center at MIT) concluded that while mere computer access does not automatically improve test scores, targeted educational software aligned to curriculum goals can significantly enhance learning outcomes—particularly in math. Conclusions from this report include:

● Access to Technology: Expanding access to computers and the internet does increase students' use of computers and enhances their digital proficiency.

● Skill-Specific Educational Software: Software designed to target specific skills and allow students to learn at their own pace has demonstrated significant potential in boosting learning outcomes, particularly in mathematics.

● Technology-Based Nudges: Small, targeted interventions, such as sending text message reminders, can have measurable, though modest, positive effects on various education-related outcomes. These approaches are often both impactful and cost-effective.

● Blended Learning Models: Combining online and in-person instruction can be as effective as traditional in-person-only teaching. This suggests that blended learning offers a cost-efficient alternative for delivering instruction.

Similarly, research by Irving (2006) highlights the potential of educational technology to transform assessment practices. Two key approaches are identified: Assessment OF Learning, which involves computer-based testing and data management systems for accountability purposes, and Assessment FOR Learning, which uses connected classroom technologies to provide immediate feedback and support formative assessment. Irving shows that connected classrooms encourage students to actively engage in learning, improving their attitudes and motivation. With immediate feedback and a focus on conceptual understanding, EdTech can help shift the student experience in subjects like science and mathematics from rote memorization of facts to a deeper comprehension of relationships between concepts. These findings underscore the importance of teacher skill and thoughtful implementation in leveraging EdTech to benefit student learning and enhance engagement.

Understanding the effectiveness of EdTech tools requires reliable and valid methods for measuring technology integration. Recent research highlights three robust instruments— Stages of Adoption of Technology, CBAM Level of Use, and ACOT stages—that form a combined measure with strong reliability (.84) and high construct validity. These tools, which take only 2-3 minutes to complete, provide practical and consistent ways to evaluate integration efforts. As the researchers note, "It is this relationship between integration and achievement that the authors believe may determine the fate of educational technology. It is imperative that the picture we reveal of this relationship be accurate and above reproach" (Hancock, et al., 2007,

p.20) By employing validated assessment tools, educators and decision-makers can ensure that EdTech implementations are not only intentional but also accurately evaluated for their impact on student achievement.

John Hattie recently discussed how EdTech could be used to unlock the true potential of every student. His research on educational practices underscores that the effectiveness of EdTech hinges on its ability to complement, rather than replace, high-quality teaching.

Hattie advocates for EdTech tools that enhance student agency and engagement by providing features such as immediate feedback, personalized learning pathways, and interactive experiences. These features, when aligned with evidence-based pedagogy, allow students to monitor their own progress, fostering self-assessment and ownership of their learning—a central tenet of Hattie's Visible Learning framework. At the same time, Hattie emphasizes that technology should empower teachers by offering insights into student needs, enabling more tailored and impactful instruction. For instance, adaptive learning platforms can create customized learning experiences, while student response systems provide real-time feedback that informs both learners and educators. However, Hattie cautions against viewing EdTech as a "silver bullet" for education, stressing that the quality of teaching and student engagement remains the most significant determinant of success. EdTech, therefore, should be seen as a tool to enhance teaching and learning processes, not a replacement for the critical human element in education.

The Value Add of Technology on Teaching (VATT) Framework underscores the critical importance of intentionality in evaluating the effectiveness of EdTech implementations. This framework helps educators and decision-makers identify how specific technologies align with evidence-based pedagogical practices, ensuring that technology is not used for its own sake but to enhance teaching and learning outcomes. By focusing on three key areas—enhancing instructional practices, supporting diverse learning needs, and fostering deeper student engagement—the VATT Framework provides a structured approach to assess whether a tool or strategy adds measurable value to the educational process. For instance, the framework encourages the use of data to determine whether technology supports differentiated instruction, aids in the development of 21st-century skills, or provides immediate feedback to both students and teachers. This evidence-based approach enables schools and districts to implement EdTech tools strategically, avoiding common pitfalls like mismatched technology and curriculum or lack of teacher training.

Ultimately, frameworks like VATT help ensure that investments in EdTech are purposeful and effective, leading to meaningful learning gains and equitable access to educational opportunities.

The effectiveness of EdTech depends largely on its purposeful integration into the curriculum. Research indicates that while mere access to technology does not automatically enhance learning, targeted applications can lead to significant improvements. For example, even as far back as 2013, a meta-analysis by Cheung and Slavin found that educational technology applications produced a positive, though small, effect on mathematics achievement in K-12 classrooms. This underscores the need for intentional selection and use of technology tools that align with instructional goals.

Beyond Traditional Metrics: Expanding How We Define "Success"

EdTech's potential cannot be judged solely by standardized test outcomes. The modern workforce and civic landscape demand digital literacy, critical thinking, collaboration, and problem-solving in technology-rich environments. Technology-enabled collaborative platforms, adaptive simulations, and multimedia resources foster these competencies.

Educators can leverage augmented reality (AR), virtual reality (VR), and other digital tools to deepen understanding, enabling students to experiment, visualize complex concepts, and engage with experts and peers worldwide. For instance, research on flipped classroom approaches, which combine video-based learning outside the classroom with interactive group activities inside, has demonstrated positive impacts on student achievement and attitudes. These methods encourage active learning and engagement, which are not always reflected in traditional assessments (Bishop & Verleger, 2013).

The Need for Digital Literacy in K-12 Education

Digital literacy has become as fundamental to 21st-century education as reading, writing, and mathematics. Schools must intentionally teach students how to navigate, evaluate, and communicate in digital spaces, ensuring they are equipped to participate responsibly and effectively in an increasingly interconnected world. Studies highlight the importance of explicit digital literacy instruction in developing skills such as evaluating online sources, understanding data privacy, and practicing ethical digital citizenship. Without these competencies, students' risk being ill-prepared for the challenges of misinformation, cyber threats, and digital communication in their personal, academic, and professional lives.

Equipping students with robust digital literacy skills ensures they graduate as informed, responsible citizens capable of critical thinking and collaboration in a technology-driven society.

The Purpose of Education in a Technology-Driven Economy

The purpose of education extends beyond academic achievement to preparing students for successful careers and meaningful participation in society. In 2025 and beyond, nearly every job will require a baseline proficiency with technology, from managing digital tools in the workplace

to leveraging automation and AI systems effectively. The World Economic Forum's Future of Jobs Report 2023 notes that technological literacy is a top skill employers demand, alongside problem-solving and adaptability. Careers in healthcare, engineering, education, and even creative industries increasingly rely on digital tools such as data visualization, remote collaboration platforms, and industry-specific software. By integrating EdTech thoughtfully into curricula, schools can bridge the gap between classroom learning and workplace expectations, ensuring students are not only consumers of technology but also skilled users capable of driving innovation in their fields.

Assistive Technology and Accessibility

Perhaps the most glaring oversight of technology's critics is the transformative role of assistive technologies. For students who are visually or hearing impaired, or who have communication challenges such as autism, digital tools can level the playing field. Features like closed captioning, screen readers, and alternative communication devices are not mere "extras" but essential tools that open doors. According to CAST's Universal Design for Learning (UDL) guidelines, providing multiple means of representation and expression is critical. Technology is often the most efficient and effective means to do this, ensuring that all students can engage with content equitably.

The Role of Professional Development and Implementation Strategy

Even the best tools fail if educators are not trained to use them effectively. Many schools still rely on outdated professional development models that do not meet the complex, evolving needs of today's teachers, who are learners in their own right. A report by EdSurge highlights that over 64% of educators were dissatisfied with the EdTech training they received, with only 15% believing they had received satisfactory training in EdTech.

Dissatisfaction with training programs goes beyond a distaste for the material. Professional development on burgeoning educational technologies may seem intrusive and unnecessary to some teachers. Educator buy-in is critical for a new organization-wide initiative. Veteran teachers, especially, have witnessed a revolving door of new reforms and programs throughout their careers. Professional development cannot expect its participants to learn and implement a new reform with efficacy without first generating earnest enthusiasm from its participants. Even if the educator is bought in, though, and even if the professional development effectively teaches how to use the new product or service, that educator still may run into problems of coherence and ineffective implementation. On top of facilitating the professional development opportunity, administrators must have a clear, consistent, understanding of how new technologies are implemented in the classroom. No EdTech resource can be useful if it is not part of a larger coherent strategy for teaching and learning.

Organizations like Learning Forward emphasize that high-quality, ongoing, and job- embedded professional learning is essential. Teachers need dedicated time to learn how to integrate technology, choose appropriate tools, and design lessons that maximize student engagement and minimize off-task behavior. Without systemic support and thoughtful implementation, even the most promising EdTech can falter and may not yield the desired educational outcomes.

Another barrier to effective EdTech integration lies in teacher pre-service preparation programs, many of which have not kept pace with the rapid advancements in educational technology. Research indicates that a majority of teacher education programs lack robust curricula focused on EdTech pedagogies, leaving new educators ill-equipped to leverage digital tools effectively in the classroom. For instance, a study published in Education and Information Technologies found that pre-service teachers often feel unprepared to integrate technology into their teaching practices due to insufficient training during their education programs. These programs often emphasize traditional instructional strategies and fail to provide hands-on experiences with technology that align with modern teaching standards. As a result, many teachers enter the profession without the foundational skills needed to integrate EdTech in meaningful ways, compounding the challenges of on-the- job professional development. Addressing this gap requires a reimagining of pre-service teacher education to include comprehensive training in digital literacy, instructional design, and the use of emerging technologies to foster student-centered learning.

The Balance: Blended Learning

Blended learning models, which combine traditional instruction with digital resources, have shown promise in enhancing student learning when implemented thoughtfully. However, concerns about distractions and multitasking persist, necessitating clear strategies to ensure technology is used responsibly and effectively. Teaching digital citizenship and self- regulation skills is vital, helping students understand how to balance technology use and avoid distractions is critical for ensuring that students use technology to enhance, rather than detract from, their learning. As highlighted by Baydar (2002), "[E]ducational leaders need to be role models for students, teachers, and parents in using technological leadership effectively and correctly" (p. 44). By integrating ethical guidelines into curricula, addressing challenges such as cyberbullying and technology addiction, and promoting informed technology practices, leaders help students maximize the benefits of blended learning while minimizing its potential harms.

One essential component of blended learning is its ability to enhance the role of teachers rather than replace them. Technology in a blended model serves as a tool to amplify the teacher's ability to deliver personalized instruction, monitor progress, and engage students. Adaptive

learning platforms analyze individual student performance in real time, providing teachers with actionable insights to customize their instruction. Similarly, tools like learning management systems simplify classroom management, freeing up teachers to focus on instructional strategies and student engagement. A meta-analysis by Tamim et al. (2011) highlights that technology has a moderate positive impact on learning outcomes when it is used to foster collaboration and interactivity, key elements of a successful blended learning approach.

Interactive technologies such as digital whiteboards, augmented reality (AR), and virtual reality (VR) applications also enhance blended learning by offering engaging, multimodal content that supports differentiated instruction. For instance, AR apps in science classrooms allow students to visualize complex concepts like molecular structures or the human body, while VR experiences can simulate historical events or distant environments, providing immersive, hands-on learning opportunities. Teachers use these tools not only to enrich the content but also to encourage student exploration and creativity, making lessons more interactive and impactful.

Ultimately, blended learning is most effective when technology complements high-quality teaching, enabling teachers to focus their expertise where it is most needed. Intelligent tutoring systems not only provide personalized support to students but also equip teachers with dashboards that highlight knowledge gaps, allowing for strategic interventions. This balance ensures that technology enhances, rather than diminishes, the teacher's role in the classroom. With thoughtful implementation and a focus on responsible use, blended learning can harness the strengths of both digital and traditional methods to create a dynamic and equitable learning environment.

Moving Forward with a Balanced Approach

The integration of EdTech is still evolving, and continuous improvement is necessary. Removing technology from classrooms is not the solution; instead, focusing on refining implementation strategies, enhancing teacher training, and ensuring equitable access will help maximize the benefits of EdTech. It's important to recognize that technology, when used thoughtfully, can address educational challenges and prepare students for future demands.

We are still in the early stages of widespread EdTech implementation. Just as no one expected paper and pencil to prove their ROI in test scores alone, we should not judge digital tools solely by immediate, simplistic measures. The path forward involves iterative improvement—continually refining technology selection, training educators, involving families, and using data responsibly. Removing or restricting technology outright risks deepening the digital divide, leaving underserved communities without the tools to succeed in a digital world. Instead, we must refine our approaches, improve teacher training, establish robust implementation frameworks, and commit to continuous improvement.

A meaningful digital transformation in education extends beyond immediate academic outcomes and requires a holistic approach that considers the broader impact of technology on school ecosystems. The article "Impacts of Digital Technologies on Education and Factors Influencing Schools' Digital Capacity and Transformation: A Literature Review" underscores that successful EdTech integration involves more than simply deploying tools—it requires fostering systemic capacity within schools to enhance educational practices comprehensively. This means aligning technology with evidence- based pedagogical strategies, investing in professional development, and addressing infrastructure and equity gaps. Schools must take iterative steps to refine their use of technology, ensuring it supports collaboration, innovation, and personalized learning. By embracing a strategic and holistic approach, educational institutions can maximize the benefits of EdTech, fostering environments where both teachers and students thrive in the digital age.

Screens and Cognitive Development

Our call for balance is, indeed, reflective of both the benefits AND risks associated with screen use. A balanced approach for education recognizes that excessive time on personal devices may hinder a child's cognitive and socio-emotional development.

Unstructured digital media use (e.g. social media, YouTube browsing), when frequent and long-lasting, has been correlated with "diminished functional and structural connectivity of top-down cognitive control structures" (Marciano el al., 2025). Media companies will incentivize users to maintain engagement with their platforms. These incentives (e.g. Instagram "Likes," algorithmic content generation) activates cognitive reward systems in ways that are impossible to replicate in offline spaces. When these reward systems are underdeveloped at early ages, compulsive personal habits may manifest away from the screen.

Social media, specifically, has been shown to have significant effects on social and emotional processing, especially in adolescence. Social media, in this instance, will refer to platforms designed for interpersonal connection (Instagram, Facebook, Snapchat, etc.), not necessarily content platforms (YouTube, TikTok, etc.). The aforementioned reward systems on social media platforms may elicit significant positive and negative emotional reactions from young people (Somerville, 2013). Adolescents, without digital literacy skills, are at risk for limited socio-emotional resilience when confronted with the immediate feedback processes of social media platforms.

Research in this area is still evolving, but clearly demonstrates a need for educators and families to remain cautious when allowing children unrestricted access to digital platforms. They must also recognize the difference between unfettered media access and thoughtful, intentional screen use for academic development.

Conclusion

For CoSN members addressing community skepticism, it's crucial to convey that the value of EdTech lies in its intentional and informed use. Research supports that, when implemented effectively, EdTech can enhance instruction, promote equity, and equip students with essential skills for the digital era. Engaging in open, nuanced dialogues will help stakeholders understand that the focus should be on how technology is used to support learning objectives, rather than on the technology itself.

By emphasizing evidence-based practices and the importance of strategic implementation, CoSN members can advocate for the thoughtful integration of technology in education, ensuring it serves as a tool to enhance teaching and learning.

Collaborators

Douglas Couture, Director of Technology Systems and Programs, South Windsor Public Schools

Jennifer Fry - Chief Technology Officer, Delaware City Schools

Stacy Hawthorne, Ed.D., - EdTech Leaders Alliance, Executive Director Molly Marquardt - Elmhurst District #205, Learning Technology Supervisor Kimberly McClain, Ed.D. - Cincinnati Public Schools, Instructional Designer

Ashley May - Spring Branch Independent School District, Director of Digital Resources & Media Center Support

Nick Stoyas - Elmhurst District #205, Director of Instructional Technology

References

Baydar, F. (2022). The Role of Educational Leaders in the Development of Students' Technology Use and Digital Citizenship. Malaysian Online Journal of Educational Technology, 10(1), 32–46. http://dx.doi.org/10.52380/mojet.2022.10.1.367

Hancock, R., Knezek, G., & Christensen, R. (2007). Cross-Validating Measures of Technology Integration: A First Step toward Examining Potential Relationships between Technology Integration and Student Achievement (Vol. 24, Issue 1, pp. 15–21).

Irving, K. E. (2006). The Impact of Educational Technology on Student Achievement: Assessment "of" and "for" Learning. Science Educator, 15(1), 13–20.

About CoSN

CoSN, the world-class professional association for K-12 EdTech leaders, stands at the forefront of education innovation. We are driven by a mission to equip current and aspiring K-12 education technology leaders, their teams, and school districts with the community, knowledge, and professional development they need to cultivate engaging learning environments. Our vision is rooted in a future where every learner reaches their unique potential, guided by our community.

This Brief is designed exclusively for CoSN members and their teams.
Please do not share beyond your own organization.