

Smartphones as a determinant of adolescent developmental crisis and a reinterpretation of the role of educational television. The American experience perspective¹

<https://doi.org/10.34766/r2kjqh34>

© Authors (copyright) • Quarterly Journal Fides et Ratio (publishing rights) • Open Access CC BY-NC-ND 4.0.

Krzysztof Łuszczek^a ✉

^a Krzysztof Łuszczek, <https://orcid.org/0000-0003-1862-5028>, Institute of Pedagogy, University of Szczecin, Poland

✉ Corresponding author: krzysztof.luszczek@usz.edu.pl

Abstract: This article is an analysis of the evolution of the American education ecosystem in the face of the rapid diffusion of mobile technology and the COVID-19 pandemic. The main aim of the paper is to explore the dichotomy between the destructive impact of smartphones on adolescent wellbeing and the revitalisation of educational television as an inclusive teaching tool. The first part of the text analyses the phenomenon of a “smartphone-based childhood”. Citing a number of post-pandemic studies, the author points to a correlation between unrestricted access to social media and a growing mental health crisis, atrophy of social relationships and cognitive fragmentation of students. Smartphones, defined as powerful vectors of distraction, have forced US lawmakers to impose strict restrictions on their use in schools in order to restore the effectiveness of learning processes. They have clearly failed as educational tools. The second part of the article focuses on the post-pandemic redefinition of the role of technology in education. The experience of lockdown in the field of education, alongside the crisis in the achievement of educational goals, has been a catalyst for innovation. The author analyses the process of moving from ad-hoc e-learning towards advanced hybrid models that integrate artificial intelligence (AI) to personalise teaching and change the role of teachers. Special attention was given to the renaissance of educational television. Thanks to its high inclusivity (97% coverage) and the implementation of new technological standards (ATSC 3.0, EduCast), television has become a key instrument to stop digital exclusion, offering stability in regions with poor network infrastructure. The author also refers to the landmark structural changes in 2025-2026, including the abolition of the Corporation for Public Broadcasting (CPB). This process, ending the era of centralised public media in the USA, has forced a shift towards regional models and strategic public sector partnerships with streaming platforms (e.g. NASA and Netflix). The article argues that contemporary educational television, while evolving into an AI-enhanced interactive tool, remains a necessary, albeit evolving, foundation of the American educational infrastructure.

Keywords: COVID 19 pandemic, educational television, media education, smartphone, USA

Introduction

The contemporary educational paradigm is being reshaped by general-purpose technologies whose rapid spread into everyday home life challenges established patterns of human adaptation. For the younger generation of the second decade of the twenty-first century, smartphone use has become a defining experience.

On the one hand, smartphones function as powerful cognitive tools that broaden access to information and educational resources. On the other hand, according to the perspectives advanced by Haidt

(2024) and Turkle (2015), it has become a vector of “continuous partial attention” and the disintegration of social structures. The transition from the traditional model of childhood centered on free play to a model of “smartphone-based childhood” has been associated with a growing mental health crisis manifested in sleep deprivation, anxiety, and body dysmorphic disorder, among other conditions.

These developments have been further compounded by the post-pandemic implications of information and communication technologies (ICT)

¹ Article in Polish language: https://stowarzyszeniefidesetratio.pl/fer/66p_Lusz.pdf

in education. In the United States, the rapid acceleration of educational digitalization driven by the COVID-19 pandemic exposed deep infrastructural inequalities and contributed to a decline in cognitive competencies across multiple age groups. In this context, the resurgence of educational television, particularly through the Public Broadcasting Service (PBS), and the implementation of new digital broadcasting standards deserve special attention.

One of the key challenges facing contemporary education is balancing technological innovation with students' emotional well-being and preserving schools as spaces for meaningful social interaction.

1. The significance of smartphones for educational effectiveness and students' psychological well-being

Contemporary processes of technological diffusion are characterized by unprecedented speed and intensity. Haidt (2024) argues that whereas the adoption of radio and television in households took decades, modern technologies become integrated into domestic environments within only a few months. This perspective aligns with Suleyman's concept of general-purpose technologies. According to Suleyman and Bhaskar (2023), twenty-four such technologies can be identified throughout human history, ranging from fire and the wheel to artificial intelligence. The crucial distinction, however, lies in the pace of their diffusion. Historically, the adoption of transformative technologies unfolded over centuries; today, it occurs within remarkably short timeframes. As a result, a single generation may experience several major technological revolutions during its lifetime, raising important questions about the adaptive capacities of the human mind and body (*ibidem*).

This transformation can be illustrated by the technological leap that occurred between the late nineteenth and early twentieth centuries, when a single lifetime witnessed the transition from horse-drawn transportation to air travel, as well as from traditional correspondence to electronic communication. Nevertheless, the most profound changes in social

organization have occurred over the past two decades. In 2016, only ten years after the commercial launch of the iPhone, smartphone penetration among American teenagers reached 80 percent. By 2022, nearly half of this population (46%) reported being online almost constantly (Vogels, Gelles-Watnick, & Massarat, 2022). Turkle (2015) describes this phenomenon as a state of "continuous partial attention," signaling a fundamental shift in human consciousness and interpersonal relationships.

The development of mobile technologies has effectively blurred the traditional boundaries between students' social lives and educational environments. Data from the Common Sense Census indicate that the age at which children enter the mobile ecosystem continues to decline. Currently, 51% of American children aged 0–8 own a personal mobile device, most commonly a tablet, though increasingly a smartphone. As children enter adolescence, these devices become constant companions. By the end of 2024, 46% of teenagers reported being online "almost constantly," nearly double the 24% recorded in 2015 (Mann, Calvin, Lenhart, & Robb, 2025). These devices have both clear advantages and significant drawbacks. While they provide powerful opportunities for interactive learning, personalized instruction, and emergency communication, they also serve as major sources of distraction in educational settings, contribute to cognitive fragmentation, and are increasingly associated with the growing mental health crisis among young people.

Haidt (2024) identifies the years 2010–2015 as a critical turning point, describing them as the "birth of the smartphone-based childhood," which gradually displaced the traditional model of childhood centered on free play. This transformation coincided with the consolidation of the social media ecosystem, most notably through Facebook's acquisition of Instagram in 2012. The emergence of a social environment shaped by mobile technology and a culture of self-presentation fueled an explosive expansion of Instagram's user base, which grew from 10 million to 90 million users within just a few months.

Research on social media use suggests that Instagram may have a particularly negative effect on the well-being of adolescent girls. The correlation between

exposure to idealized images of peers and increased levels of frustration and depressive symptoms is well documented and is often linked to body dysmorphic concerns and diminished self-esteem (Twenge et al., 2018). At the same time, among adolescent boys, a dominant trend has been the migration of social and leisure activities into virtual environments through online gaming, platforms such as Reddit, and the consumption of pornography (Haidt, 2024). These developments contribute to a diminished capacity for forming deep interpersonal relationships in the real world and undermine the ability to be fully present in social interactions (Turkle, 2015).

It is particularly noteworthy that social media platforms have evolved into channels for the transmission not so much of information as of powerful emotions, fostering anxiety about the future and a pervasive sense of existential uncertainty among young people. Statistical evidence reveals a striking paradox: despite improvements in key macroeconomic indicators in the United States between 2010 and 2015, rates of depression and anxiety among adolescents rose sharply during the same period (Twenge, 2017; Twenge, Joiner, Rogers, & Martin, 2018). This suggests that technological factors and shifts in patterns of socialization may exert a greater influence on mental health than traditional economic determinants.

Findings from British correlational studies confirm a significant association between extensive mobile device use among children and adolescents and the prevalence of depressive symptoms, anxiety disorders, and sleep deprivation. This relationship is particularly pronounced among individuals reporting the highest levels of screen time. The scale of the problem is further reflected in respondents' own attitudes, as a substantial proportion of those surveyed expressed a desire to reduce the amount of time they spend using smartphones. A particularly important indicator is the finding that one in eight participants reported needing external support to regulate their digital habits. Failure to address this issue may contribute to the progression of serious mental health problems among younger generations (Carter, Ahmed, Cassidy, Pearson, Calcia, Mackie, Kalk, 2024; Carter, Payne, Rees, Sohn, Brown, Kalk, 2024).

Children's growing dependence on smartphones has led to significant disruptions in cognitive functioning. Teachers increasingly find themselves competing with mobile devices for students' attention—a contest in which the educational system is at a distinct disadvantage. When launching its 2024 initiative to remove mobile phones from school environments, the Los Angeles school board emphasized that these devices distract students from learning, contribute to anxiety, and facilitate cyberbullying. Moreover, smartphones are not only highly effective at capturing the attention of children; they are equally successful in diverting the attention of adults (Blume & Karabatur, 2024).

The presence of smartphones in schools is far from passive. Research data indicate that teenagers spend an average of 66 to 72 minutes per school day actively using their phones during class time, primarily for social media, messaging platforms, and entertainment applications (Mann, Calvin, Lenhart, & Robb, 2025). Effective teaching fundamentally depends on a teacher's ability to capture and sustain students' attention. Smartphones make it more difficult for teachers to maintain students' attention because notifications, vibrations, and screen activity frequently interrupt concentration. Studies conducted in 2025 further suggest that the mere presence of a smartphone—whether on a desk or even in a student's pocket—can impair cognitive performance, as the brain must devote mental resources to attentional inhibition in order to resist the device's potential distractions (Chen, 2025; Twenge, 2025).

The impact of smartphones extends beyond students' learning experiences and increasingly affects teachers' professional effectiveness. Educators frequently report having to compete with mobile devices for students' attention, a challenge that contributes significantly to occupational stress and burnout. Survey findings indicate that 76% of teachers support policies prohibiting phone use during instructional time, citing constant disruptions and the burden of monitoring device use as major obstacles to effective teaching. Evidence further suggests that such restrictions lead to a marked increase in student engagement and participation during lessons (Mecom & Lehtinen-Vela, 2024).

The debate over the presence of communication devices in American schools has been ongoing for several decades. Initial efforts to introduce regulatory measures emerged during the 1980s. However, concerns arising from the rapid expansion of the Internet in the 1990s ultimately led to the enactment of the Children's Internet Protection Act in 2000. The legislation requires educational institutions receiving public funding to implement appropriate filtering technologies on school computers and to block access to obscene and pornographic content (Children's Internet Protection Act, 2026).

The debate over the presence of smartphones in American schools has evolved through several distinct phases, often shaped by tragic events that captured national attention. The shooting at Columbine High School in 1999 served as a catalyst for a narrative emphasizing the utilitarian value of mobile phones. At the time, proponents highlighted their role as critical tools for emergency communication, enabling the rapid transmission of distress signals and facilitating contact with first responders. At the same time, however, growing smartphone use among students sparked concerns about cyberbullying, which becomes significantly easier to perpetrate when children have constant access to mobile devices during the school day (Faguy, Blasey, & Morris, 2024). Addressing the issue of children's and adolescents' mental health at the Center for Digital Thriving at the Harvard Graduate School of Education, U.S. Surgeon General Vivek Murthy identified social media as one of the most significant threats to healthy psychological development. He described the issue as a "pivotal issue in public health," underscoring its importance as a major societal and educational challenge (Mineo, 2023).

Findings from a 2023 study conducted by the Pew Research Center provide empirical evidence of a negative relationship between the presence of smartphones in school environments and the effectiveness of educational processes. As many as 71% of surveyed educators reported that mobile technologies create a persistent source of student distraction. The study highlighted the substantial cognitive resources consumed by these devices, which significantly reduce students' ability to concentrate

on instructional content. This challenge is further reflected in classroom management, with 33% of high school teachers reporting difficulties enforcing restrictions on smartphone use. Such policies vary considerably across states and even among individual school districts. Florida became the first state to introduce a statewide ban or significant restrictions on student phone use in schools in 2023 (Pew Research Center, 2024). According to data from the U.S. Department of Education, some form of limitation on smartphone use was already in place in 76% of American schools during the 2021–2022 academic year (Burr, Kemp, & Wang, 2024).

Transitioning to phone-free school environments presents substantial logistical and operational challenges. One of the primary obstacles remains parental concern about communication during emergencies. Parental opinions on the issue are far from uniform. Many argue that they should be able to contact their children during the school day, whereas school safety experts contend that personal mobile phones may actually hinder effective responses in emergency situations (Citizen Portal, 2025). Students, too, often show little understanding of the rationale behind such restrictions. School administrators across the United States report that students frequently attempt to circumvent phone-use policies through a variety of strategies. In Phoenix and surrounding areas, for example, principals reported that students surrendered "burner phones"—inexpensive prepaid devices—while concealing their smartphones. Others used school-issued laptops to access cloud-based versions of social media platforms (Warnock, 2025). These examples demonstrate that smartphone bans cannot operate in isolation. To be effective, they must be accompanied by a school culture that prioritizes social connection and provides meaningful alternatives to digital stimulation.

In response to mounting evidence of the educational and psychological harms associated with excessive smartphone use, policymakers across the United States have increasingly embraced stricter regulatory measures. By October 2025, at least 34 states and the District of Columbia had either required or encouraged school districts to adopt policies restricting or prohibiting smartphone use in K–12 classrooms

(Prothero, 2025). These measures are intended to restore conditions conducive to effective teaching and learning. When combined with comprehensive digital citizenship education and the provision of well-designed educational technology (EdTech) tools, such policies offer a pathway toward a more balanced and sustainable educational ecosystem. Within this emerging framework, the role of the smartphone in students' lives is being fundamentally redefined. Rather than functioning as a constant social companion, it is increasingly viewed as a specialized tool to be used purposefully and under the guidance of qualified educators. The long-term success of these initiatives will depend on their capacity to reduce socio-economic inequalities, ensure operational safety, and restore the school environment as a secure space for deep, student-centered learning.

Evidence published between 2024 and 2026 suggests that unrestricted smartphone use in schools may negatively affect both educational outcomes and American students' psychological well-being. Although these devices possess certain potential as instructional tools—particularly in STEM education and special education—their widespread presence in schools currently contributes to attentional disruption and the erosion of learners' emotional balance.

2. Post-pandemic implications of technology use in education

The COVID-19 pandemic forced schools to introduce rapid organizational and structural changes. Educational institutions were compelled to introduce large-scale modifications to the organization of teaching and learning with little delay. Many of the emergency measures adopted during this period subsequently evolved into permanent components of educational policy and instructional practice.

One of the central challenges involved the reorientation of educational models toward the elimination of direct interpersonal interactions within school environments. Under crisis conditions, information and communication technologies (ICT) were widely perceived as the optimal means of maintaining the continuity of educational processes. Although the

concept of distance learning (e-learning) evolved alongside the expansion of the global Internet, it is important to recognize the earlier experiences accumulated by the American educational system over several decades in this field. Educational television had long been employed as a response to the postwar demographic boom and the need to democratize access to knowledge. The implementation of these solutions was driven primarily by infrastructural and communication barriers affecting regions characterized by lower levels of urbanization and less developed telecommunications networks.

Over time, however, educators and policymakers began to experiment with innovative instructional solutions whose implementation required substantial financial investment. A representative example was the Midwest Program on Airborne Television Instruction (MPATI), developed by the Westinghouse Corporation, which had previously acquired experience in designing comparable systems. Educational content was transmitted through specially modified aircraft. MPATI constituted a unique experiment in educational broadcasting aimed at overcoming the limitations of terrestrial signal coverage. The pilot program was launched in the state of Indiana in 1959 and was subsequently expanded to include Illinois, Kentucky, Ohio, Michigan, and Wisconsin. The use of a fleet of Douglas DC-6 aircraft provided a broadcasting radius of approximately 220 miles, enabling the transmission of an average of twenty instructional lessons per day (Tracey & Stefaniak, 2014).

Projects of this kind, developed long before the emergence of the global Internet, highlighted two fundamental challenges that must be addressed in distance education: the need for appropriately designed pedagogical strategies and the technical difficulties associated with content transmission.

The implementation of the distance-learning paradigm and the necessity of adapting to large-scale online education during the COVID-19 pandemic created unprecedented challenges for the principal stakeholders of the educational process: students, their parents or guardians, and teachers. Educators, in particular, were required to reconfigure instructional strategies, create new spaces for social interaction, and facilitate educational experiences within digital

environments. At the same time, they expressed legitimate concerns regarding the effectiveness of these efforts and the extent to which educational objectives could be successfully achieved under such conditions (Moser, Wei, Brenner, 2021).

During the pandemic, the Internet ceased to be merely a supplementary educational resource and became an essential part of educational infrastructure. However, recognizing the importance of digital connectivity did not automatically translate into a widespread ability to use digital technologies effectively for educational purposes. The crisis exposed the persistence of digital exclusion in ways that many had assumed were no longer relevant. More than half of lower-income households struggled to afford broadband Internet access. This obstacle, combined with inadequate access to appropriate devices, constituted the first major infrastructural barrier to effective distance learning. Research conducted by the Pew Research Center revealed that, one year after the onset of the crisis, 10% of American adults felt overwhelmed when using computers and smartphones for educational purposes, while 26% reported needing assistance in setting up new devices and adapting them to educational tasks (Tyson, Lipka, & Deane, 2025).

Research indicates a correlation between the introduction of lockdown measures, the transition to distance learning, and a decline in students' academic performance across a range of competency areas. Although some studies suggest that no substantial deterioration in learning outcomes occurred, the evidence as a whole points to a very different conclusion (Domingue, Dell, Lang, Silverman, Yeatman, & Hough, 2022). According to data from the National Assessment of Educational Progress (NAEP), fourth-grade students in 2022 were, on average, twenty-four weeks behind in mathematics and nine weeks behind in reading achievement. Numerous efforts have been undertaken to mitigate these learning losses; however, the outcomes of such initiatives have varied considerably. Some scholars and educational practitioners argue that the educational system may require many years to fully recover from the disruptions caused by the COVID-19 pandemic (NAEP, 2022).

The implementation of distance-learning models contributed to the widening of existing educational disparities. This phenomenon was particularly evident among students with special educational needs, who, under conditions of social isolation and limited access to direct specialist support, faced greater obstacles in both knowledge acquisition and the achievement of therapeutic and educational objectives (Averett, 2021).

The closure of school buildings resulted in more than a mere interruption of classroom instruction. It also severed essential social networks for millions of children and adolescents, contributing to a documented increase in mental health crises among young people (GAO, 2022). Consequently, the implementation of systematic psychological support was widely recognized as necessary in order to reduce the risk of the behavioral and emotional consequences associated with the COVID-19 pandemic. Such measures were considered essential for facilitating students' readjustment to in-person learning and optimizing their functioning within school environments following a prolonged period of social isolation (Kuhfeld, Soland, Lewis, Ruzek, Johnson, 2022). The numerous tensions and challenges experienced during this period led many teachers, students, and parents to express a strong desire for the restoration of traditional face-to-face schooling as soon as the public health emergency had subsided (Arnett, 2021).

Despite such declarations, the pandemic permanently transformed the educational system. In the post-pandemic era, hybrid and flexible models of instruction have become increasingly common. The most significant trend in educational technology has been the rapid integration of artificial intelligence (AI) into the everyday teaching and learning process. What initially functioned as a supplementary tool has evolved into a sophisticated solution for personalized learning and administrative efficiency. Survey data indicate that the use of AI in classroom environments has increased sixfold since 2023. This growth is largely driven by the belief that artificial intelligence can substantially reduce teachers' administrative workload. Approximately 68% of American educators report that these tools save them up to five hours of work per week. In practice, AI applications in education are concentrated in four principal areas: self-directed

learning, the automation of teachers' routine tasks, the development of literacy skills, and educational guidance and counseling. By 2025, approximately twenty-eight states had issued detailed guidelines governing the use of artificial intelligence in K–12 education, with particular emphasis on student data protection and the ethical use of AI technologies (Iasevoli, 2025).

AI-powered platforms identify students' specific strengths, weaknesses, and learning styles, enabling curriculum content and instructional strategies to be tailored to individual needs. This shift toward adaptive learning represents a departure from the traditional "one-size-fits-all" model and instead emphasizes real-time intervention designed to ensure continuous student engagement and support. One of the most significant practical consequences of these technologies is the transformation of the teacher's role. Rather than serving primarily as a source of information, teachers increasingly function as facilitators and mentors of the learning process. By delegating repetitive tasks—such as lesson planning, grading assistance, or drafting routine emails—to AI-driven software, educators can devote more attention to higher-order educational activities, including moderating classroom discussions and providing targeted individual support to students with special educational needs (Hamilton & Swanston, 2024).

The growing integration of AI systems into educational policy in the United States may contribute to the wider adoption of the flipped classroom model, which has traditionally been used primarily in higher education. Within this approach, students engage with instructional materials online before class and subsequently work with those materials collaboratively during classroom sessions. Research suggests that AI-supported flipped classrooms enhance student motivation, improve learners' AI literacy and competency, and foster more personalized educational experiences (Kaur, 2025).

However, the growing integration of artificial intelligence into children's educational environments also generates significant challenges and tensions that require proactive policy responses. Failure to address these issues at an early stage may lead to unintended consequences comparable to those as-

sociated with the expansion of the Internet at the turn of the twenty-first century, albeit potentially on a much larger scale. The rapid deployment of AI-powered educational technologies has outpaced existing regulatory frameworks, creating an urgent need to modernize legal provisions governing the collection, processing, and protection of student data. These reforms are intended to safeguard children from the commercialization of personal information while strengthening parental oversight. The updated provisions of the Children's Online Privacy Protection Act, commonly referred to as COPPA 2.0, represent the most substantial revision of children's online privacy regulations since 2013. The final rule entered into force in 2025, establishing stricter requirements for data minimization, parental consent, and limitations on the use of children's personal information for commercial purposes (Children's Online Privacy Protection Rule, 2025).

The growing dependence on technology has also raised concerns about mental health and the effectiveness of the teaching–learning process. Teachers report signs of stress, fatigue, and declining academic performance associated with prolonged screen exposure and the constant stream of notifications. Approximately 72% of parents of K–12 students state that their children spend more time in front of screens than they did before the outbreak of the pandemic, while 39% of parents no longer enforce screen-time limits as strictly as they once did (Tyson, Lipka, & Deane, 2025). In response, schools have introduced "technology-free hours" and digital citizenship lessons to help students achieve a balance between digital life and face-to-face interaction as well as physical activity (Northwest Council for Computer Education, 2025).

The experiences associated with remote learning during the COVID-19 pandemic provide an excellent example of the risks involved in a crisis-driven transition to digital technology within a system characterized by deep inequalities. The challenges that emerged—from digital exclusion to the psychological effects of social isolation—were not isolated incidents but rather interconnected manifestations of the fragility of the American educational infrastructure. The pandemic has permanently changed

both educational practice and perceptions of how learning should be organized. Teachers have become more proficient in the use of digital technologies, and the infrastructure supporting them is more robust than at any previous point in history. However, the persistent and widening achievement gaps between affluent and low-income school districts underscore the system's continuing vulnerabilities. This situation highlights the need for greater systemic coordination and the maintenance of hybrid educational solutions.

3. The revitalization of educational television in the pandemic era

According to Rauf (2020), amid the multitude of technological solutions that emerged at the onset of the pandemic, a seemingly outdated medium played a crucial role—television. Broadcasters affiliated with the PBS network reconfigured their programming schedules in cooperation with administrators of local educational institutions. This process involved auditing archival resources for their alignment with existing educational standards and adapting content to curricular requirements. An initiative that initially emerged in seven states quickly expanded to all fifty. PBS viewed its role not only as a distributor of educational content but also as a provider of security and stability for children and families.

Apart from its role during the public health emergency, television also proved to be a dependable channel for delivering educational content. A key argument in favor of its use was the existence of technological barriers: during the initial phase of the pandemic, approximately 14% of households with children lacked access to broadband Internet (Maciag, 2020). In contrast to network infrastructure, television broadcasting reached 97% of the population of the United States, making it an inherently inclusive tool. This was especially important for low-income families, for whom television helped mitigate the effects of digital exclusion. Empirical data confirm the effectiveness of this form of content delivery: 57% of respondents from low-income groups described educational television programs as “very helpful.” The medium played a significant role in maintaining

the continuity of cognitive processes and supporting children's intellectual development during periods of social isolation (Katz & Rideout, 2021).

Analysis of the activities undertaken by public television broadcasters reveals a plurality of strategies designed to support educational processes, shaped by the legislative and curricular specificities of individual states. California adopted a model based on the rigorous alignment of content with official state educational standards. A key feature of content production was the strict age-based segmentation of audiences, intended to ensure that educational materials were appropriately matched to students' cognitive abilities (Los Angeles Unified School District, 2020). In Virginia, the strategy focused on the pedagogical dimension of broadcasting. Programs were designed with particular attention to the teacher's role as a facilitator and moderator of the learning process. Kansas implemented a participatory model by directly involving practicing teachers in the development of programming schedules. This team created an integrated educational offering tailored to three key age groups. Ohio distinguished itself through the effectiveness of its initiatives, leading to their institutionalization after the end of the pandemic. One example of the lasting impact of these efforts is the “Camp in a Box” project, a system of educational resources based on PBS materials. An unintended consequence of educational broadcasting during the pandemic was the shift in emphasis from the production of new content toward the use of archival materials (Negera, 2022). Although national frameworks provided general educational standards, the actual implementation of curricula was frequently adapted at the state and local levels through collaboration with departments of education. This cooperation resulted in the creation of original educational content featuring local teachers, thereby providing students with familiar educational contexts during a period of extreme social isolation.

Sesame Workshop, a pioneer in educational television and producer of Sesame Street, launched the “Caring for Each Other” initiative as a form of direct support for children. In hour-long special episodes, medical experts and beloved characters answered questions posed directly by children and

parents. The program conveyed scientific information about the virus in language accessible to children, reducing fear associated with abstract concepts such as “pandemic” or “infection.” More importantly, it affirmed children’s right to experience difficult emotions. Well-known Sesame Street characters, such as Elmo, expressed their own frustration with prolonged periods of staying at home. As a result, families gained a shared language for discussing mental health (Mills, 2024).

PBS created an online repository of educational materials, PBS LearningMedia. Within a few weeks of the announcement of lockdowns, the number of users increased fourfold. The commercial sector also responded to the educational challenges associated with the pandemic. Discovery Channel made its Discovery Education Experience service freely available to schools (3BL Media, 2020).

Pandemic-era experiences highlighted the continuing educational potential of television and the need for ongoing development of this medium. The ATSC 3.0 standard uses High Efficiency Video Coding (HEVC), which provides 25–50% better compression compared to the previous ATSC 1.0 standard. This efficiency enables broadcasters to deliver 4K Ultra High Definition video and immersive audio formats such as Dolby Atmos. A robust signal allows reception of ATSC 3.0 even in challenging environmental conditions, thereby reducing the risk of digital exclusion (Shilov, 2025). A key structural innovation that significantly strengthened the system and made it more suitable for educational contexts is EduCast technology. It enables the transmission of digital files—such as videos, PDFs, and software updates—via broadcast spectrum without requiring a traditional internet connection. This capability is particularly important for students in rural areas who lack broadband access but are within range of a transmission tower (Newman, 2025; SpectraRep, 2025).

The implementation of ATSC 3.0 accelerated in 2025–2026, with significant pilot projects conducted in the states of Michigan and New Mexico. Northern Michigan University maintains an upgraded infrastructure that integrates its educational access network with ATSC 3.0 broadcast transmission. In this way, it delivers educational content to resi-

dents of the region as well as K–12 schools (Leach, Richards, Thams, & Franti, 2025). Similarly, New Mexico PBS (KNME) became the first PBS station to fully implement ATSC 3.0 broadcasting for both educational and public-safety purposes, becoming the first station in the network to fully deploy ATSC 3.0 broadcasting (Clark, 2022). In January 2026, the Consumer Electronics Show in Las Vegas showcased new devices intended for market release in 2026, designed to enable an easy and cost-effective transition to next-generation television without creating further hardware gaps or “digital exclusion spaces” among low-income populations (ATSC, 2026).

The technological pressure on educational television has fostered the development of new educational solutions and significantly expanded distribution capabilities. An example of such initiatives is the PBS Kids animated children’s series *Lyla in the Loop*. The protagonist is a seven-year-old Jamaican American girl and her family. In addition to traditional episodes, the digital package includes interactive videos in which the character Lyla asks viewers questions (Zahed, 2024). This illustrates a broader trend that has become firmly established in post-pandemic educational media. It reflects a broader shift from passive viewing toward more interactive forms of educational engagement, increasingly supported by digital technologies and AI tools. This transition is rooted in the concept of “co-viewing,” which assumes that children learn more from media when they engage in conversation about its content.

Financial stability has been an inherent element in the development of American educational television since the emergence of its earliest productions in the 1950s. The lack of systemic budgeting solutions forced broadcasters to adopt strategies of revenue diversification as the only effective mechanism for managing operational risk. Although the pandemic period brought temporary improvements to the sector’s financial condition through targeted funding programs supporting remote education, the expiration of relief funds led to a renewed deterioration in financial stability.

In July 2025, legislation was amended to eliminate approximately 1.1 billion dollars from previously approved federal funding, specifically rescinding

advance appropriations allocated to the Corporation for Public Broadcasting (CPB). This decision was linked to the beginning of the Trump administration's efforts to dismantle the CPB. On January 5, 2026, the organization's board of directors voted in favor of full dissolution of the entity, signaling the end of a centralized federal model of public media (Nebraska Public Media, 2025). In the absence of a centralized broadcasting authority, responsibility for fulfilling the educational mission of television was transferred to local stations and regional networks. These entities are being transformed into community-based leaders, combining local content—such as school sports programming and local public events—with global educational channels (Bethune, 2025).

This created a fundamentally new situation in the educational television market. The elimination of the CPB forced local stations to confront a “financial gap.” In Nebraska, where CPB funds had supported state-level early childhood initiatives, the loss of funding required the search for private financial sources and greater reliance on local community responsibility. In rural areas, the consequences were even more severe, leading to station closures or the termination of partnerships with PBS, as exemplified by Arkansas TV and WBGU-TV in Ohio (Butts, 2026). Despite the dissolution of the CPB, funding for key educational programs was maintained in fiscal year 2026, including a \$31 million allocation for the “Ready To Learn” program (Wyllie, 2025). Alongside the decline in federal support for traditional public media platforms, a strategic shift toward commercial streaming platforms has emerged. This transition enables educational content providers to reach a vast audience while offering high-quality, family-friendly streaming programming. In July 2025, NASA and Netflix announced a partnership aimed at providing Netflix's 700 million subscribers with access to live space-related content. This collaboration integrates NASA+ live streams, including rocket launches, astronaut spacewalks, and views from the International Space Station, directly into the Netflix interface. NASA+ Director R. Sirmons noted that the partnership fulfills the agency's mission, established in 1958, of making space exploration accessible to the widest possible audience (Buglass, 2025).

Despite these successes, educational television during the pandemic was a product of emergency remote learning, which differed significantly from well-designed digital or hybrid curricula (Huck, Zhang, 2021). Research also showed that it was difficult for children to maintain the same level of attention without interaction with a teacher. As for teachers, the pandemic caused high levels of stress and an intensification of burnout-related problems, but it did not lead to increased turnover or subsequent teacher shortages (Zamarro, Camp, 2026). The implementation of television as an educational tool, although necessary, led to a dramatic increase in screen exposure, which according to research resulted, among other things, in sleep disturbances and lower mood among students. This situation created a kind of functional dichotomy for broadcasters: their educational mission relied on the use of digital channels, which at the same time constituted a major source of anxiety and fatigue resulting from excessive screen exposure (Capra, Stanyevic, Giudice, Monopoli, Decarolis, Esposito, Biasucci, 2023).

Regardless of the numerous psychosocial challenges caused by intensive exposure to media in the student's home environment, the role of American educational television during the COVID-19 pandemic deserves a clearly positive assessment from the perspective of ensuring continuity of instructional processes. The educational infrastructure underwent a lasting structural transformation. The teaching experiences developed during the period of remote instruction became the foundation for the hybridization of education, within which teachers systematically implement digital tools and video materials into everyday school practice.

As school districts continue to use high-quality instructional materials to mitigate pandemic-related learning loss, the value of television today also lies in its ability to provide training content that supports cognitive development. Increasingly, artificial intelligence and advanced data transmission technologies are being used in this context. The migration of organizations such as NASA to global streaming platforms ensures that mission-based educational content reaches the widest possible audience, even as local stations struggle to survive. The post-pandemic

period has expanded the educational possibilities of television, transforming it from a largely passive medium into a platform that increasingly supports interactive and long-term learning. The challenge in the coming years will likely be ensuring the socially equitable implementation of these advanced technologies, so as to prevent the emergence of a new form of digital exclusion that could leave the most vulnerable social groups behind.

Conclusions

The COVID-19 pandemic had an unprecedented impact on students, families, and teachers. Public schools in the United States closed in the spring of 2020, and most of them shifted to remote learning modes. Despite school districts' efforts to ensure continuity of education and to manage the technology required for distance learning, pandemic experiences varied significantly among students from different socioeconomic backgrounds.

The experience of the COVID-19 pandemic constituted a historical stress test for the American education system, revealing both its deep inequalities and its capacity for rapid innovation. The revitalization of television as an instructional tool was arguably the most important achievement of this

period. The primary value of television proved to be its ability to reduce digital exclusion by providing a shared instructional baseline.

The significant reappraisal of television as an educational medium was not solely a consequence of institutional assumptions but was objectively confirmed in two key areas. First, a substantial reorientation of viewing habits was observed, which translated into a measurable shift in the structure and dynamics of media consumption. Second, the pedagogical value of television in crisis conditions was validated by research confirming its high instructional effectiveness in remote learning contexts. This phenomenon suggests that in emergency situations television regains the status of a key instrument for knowledge transmission, combining broad reach with high effectiveness in supporting cognitive processes.

The landscape of American educational television in 2026 differs markedly from that of the pre-pandemic period. The era of passive, linear broadcasting has been replaced by an integrated model that is interactive, personalized, and independent of traditional internet connectivity. The dissolution of the Corporation for Public Broadcasting (CPB) represents a painful but definitive end to the centralized model of public media in the United States, giving way to a more fragmented yet technologically advanced ecosystem.

References

- 3BL Media. (2020, March 20). *Discovery Education expands coronavirus response to help educators transition to virtual learning*. Retrieved February 10, 2026, from <https://www.3blmedia.com/news/discovery-education-expands-coronavirus-response-help-educators-transition-virtual-learning>
- Arnett, T. (2021). *Breaking the mold: How a global pandemic unlocks innovation in K-12 instruction*. Christensen Institute. Retrieved February 13, 2026, from <https://www.christenseninstitute.org/wp-content/uploads/2021/01/BL-Survey-1.07.21.pdf>
- Advanced Television Systems Committee. (2026). *ATSC highlighting benefits of next-generation broadcasting with new solutions for consumers and broadcasters*. Retrieved February 13, 2026, from <https://www.atsc.org/news/atsc-highlighting-benefits-of-next-generation-broadcasting-with-new-solutions-for-consumers-and-broadcasters/>
- Averett, K. (2021). Remote learning, COVID-19, and children with disabilities. *AERA Open*, 7. <https://doi.org/10.1177/23328584211058471>
- Bethune, N. (2025, July 8). *How public media cuts hurt kids*. Retrieved February 13, 2026, from <https://prospect.org/2025/07/08/2025-07-08-public-media-cuts-pbs-npr-education/>
- Blume, H., & Karabatur, D. (2024, June 18). LAUSD approves cellphone ban as Newsom calls for statewide action. *Los Angeles Times*. Retrieved January 24, 2026, from <https://www.latimes.com/california/story/2024-06-18/lausd-board-approved-strict-cell-phone-ban>
- Buglass, L. (2025, July 1). Netflix will start streaming NASA content soon—and the results look out of this world. *TechRadar*. Retrieved February 13, 2026, from <https://www.techradar.com/streaming/netflix/netflix-will-start-streaming-nasa-content-soon-and-the-results-look-out-of-this-world>
- Burr, R., Kemp, J., & Wang, K. (2024, January 17). *Crime, violence, discipline, and safety in U.S. public schools: Findings from the School Survey on Crime and Safety: 2021-22* (NCES 2024-043). National Center for Education Statistics. Retrieved January 24, 2026, from <https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2024043>

- Butts, T. (2026, January 23). Congress approves funding for public broadcasting emergency, educational programs. *TV Technology*. Retrieved February 13, 2026, from <https://www.tvtechnology.com/regulatory-legal/legislation/congress-approves-funding-for-public-broadcasting-emergency-educational-programs>
- Capra, M. E., Stanyevic, B., Giudice, A., Monopoli, D., Decarolis, N. M., Esposito, S., & Biasucci, G. (2023). The effects of COVID-19 pandemic and lockdown on pediatric nutritional and metabolic diseases: A narrative review. *Nutrients*, 15(1), 88. <https://doi.org/10.3390/nu15010088>
- Carter, B., Ahmed, N., Cassidy, O., Pearson, O., Calcia, M., Mackie, C., & Kalk, N. J. (2024). 'There's more to life than staring at a small screen': A mixed methods cohort study of problematic smartphone use and the relationship to anxiety, depression and sleep in students aged 13–16 years old in the UK. *BMJ Mental Health*, 27. <https://doi.org/10.1136/bmjment-2024-301115>
- Carter, B., Payne, M., Rees, P., Sohn, S. Y., Brown, J., & Kalk, N. J. (2024). A multi-school study in England, to assess problematic smartphone usage and anxiety and depression. *Acta Paediatrica*, 113(10), 2240–2248. <https://doi.org/10.1111/apa.17317>
- Chen, X. (2025). Influence of mobile phone on school performance by distracting attention and impairing memory. *SHS Web of Conferences*, 222, 02013. <https://doi.org/10.1051/shsconf/202522202013>
- Children's Internet Protection Act. (2026). Retrieved January 24, 2026, from <https://www.ecfr.gov/current/title-47/chapter-I/subchapter-B/part-54/subpart-F/section-54.520>
- Children's Online Privacy Protection Rule. (2025). Retrieved February 12, 2026, from <https://www.federalregister.gov/documents/2025/04/22/2025-05904/childrens-online-privacy-protection-rule>
- Citizen Portal. (2025, June 11). *Witnesses: Limiting personal devices during instructional time improves focus, discipline and classroom climate*. Retrieved February 11, 2026, from <https://citizenportal.ai/articles/6548107/federal/legislative/congressional-hearings-compilation/standing-committees-house-senate/education-and-labor-house-committee/Federal/Legislative/Congressional-Hearings-Compilation/Standing-Committees-House-and-Senate/Education-and-Labor-House-Committee/Witnesses-Limiting-personal-devices-during-instructional-time-improves-focus-discipline-and-classroom-climate>
- Clark, C. A. (2022, November 2). New Mexico PBS CEO Joachim elected to national board. *Daily Post*. Retrieved February 13, 2026, from <https://ladailypost.com/new-mexico-pbs-ceo-joachim-elected-to-national-board/>
- Domingue, B. W., Dell, M., Lang, D., Silverman, R., Yeatman, J., & Hough, H. (2022). The effect of COVID on oral reading fluency during the 2020–2021 academic year. *AERA Open*, 8. <https://doi.org/10.1177/23328584221120254>
- Faguy, A., Blasey, L., & Morris, R. (2024, June 22). US states want to ban phones in schools. It might be a challenge. *BBC News*. Retrieved January 24, 2026, from <https://www.bbc.com/news/articles/ce99443qwen0>
- Government Accountability Office. (2022). *Pandemic learning: Less academic progress overall, student and teacher strain and implications for the future* (GAO-22-105816). Retrieved February 5, 2026, from <https://www.gao.gov/assets/gao-22-105816.pdf>
- Haelermans, C., Korthals, R., Jacobs, M., de Leeuw, S., Vermeulen, S., van Vugt, L., Aarts, B., Prokic-Breuer, T., van der Velden, R., van Wetten, S., & de Wolf, I. (2022). Sharp increase in inequality in education in times of the COVID-19 pandemic. *PLoS ONE*, 17(2): e0261114. <https://doi.org/10.1371/journal.pone.0261114>
- Haidt, J. (2024). *The anxious generation: How the great rewiring of childhood is causing an epidemic of mental illness*. Penguin Press.
- Hamilton, I., & Swanston, B. (2024, June 6). Artificial intelligence in education: Teachers' opinions on AI in the classroom. *Forbes Advisor*. Retrieved February 12, 2026, from <https://www.forbes.com/advisor/education/it-and-tech/artificial-intelligence-in-school/>
- Huck, C., & Zhang, J. (2021). Effects of the COVID-19 pandemic on K-12 education: A systematic literature review. *Educational Research and Development Journal*, 24(1), 53–84.
- Iasevoli, B. (2025, October 27). Latest trends in educational technology for 2025. *Houghton Mifflin Harcourt*. Retrieved February 12, 2026, from <https://www.hmhco.com/blog/latest-trends-in-educational-technology-for-2025>
- Katz, V., & Rideout, V. (2021, Jun 24). Learning at home while under-connected: Lower-income families during the COVID-19 pandemic. *New America*. Retrieved February 6, 2026, from <https://www.newamerica.org/education-policy/reports/learning-at-home-while-underconnected/>
- Kaur A. (2025). Flipping the classroom with AI: A new pedagogical paradigm. *Journal of Marketing & Social Research*, 2(7), 265–270. Retrieved February 4, 2026, from <https://jmsr-online.com/article/flipping-the-classroom-with-ai-a-new-pedagogical-paradigm-384/>
- Kuhfeld, M., Soland, J., Lewis, K., Ruzek, E., & Johnson, A. (2022). The COVID-19 school year: Learning and recovery across 2020–2021. *AERA Open*, 8. <https://doi.org/10.1177/23328584221099306>
- Leach, R. G., Richards, K. A., Thams, J. S., & Franti, M. (2025). *Five-year facilities master plan*. Northern Michigan University. Retrieved February 13, 2026, from <https://nmu.edu/finance/sites/finance/files/2025-10/Five-Year-Facilities-Master-Plan-Final-October-31-2025.pdf>
- Los Angeles Unified School District. (2020, March 30). *Los Angeles Unified "At-Home Learning" partnership with California PBS stations now has over 30 states with local stations using the model*. Retrieved January 7, 2026, from <https://www.lausd.org/apps/news/article/2087588?categoryId=23516>
- Maciag, E. (2020, November 24). *How public media stations increase remote learning accessibility*. Protect My Public Media. Retrieved February 6, 2026, from <https://protectmypublicmedia.org/blog/2020/11/24/how-public-media-stations-increase-remote-learning-accessibility/>
- Mann, S., Calvin, A., Lenhart, A., & Robb, M. B. (2025). *The Common Sense census: Media use by kids zero to eight, 2025*. Common Sense Media. Retrieved February 13, 2026, <https://www.common Sense Media.org/sites/default/files/research/report/2025-common-sense-census-web-2.pdf>
- Mecom, K., & Lehtinen-Vela, A. (2024). *Teacher survey: Cell phone bans lead to safer environment and more learning time*. Study.com. Retrieved February 11, 2026, from <https://teachinglicense.study.com/featured-insights/mobile-bans-increase-engagement-and-learning-time.html>
- Mills, K. (2024). *Speaking of psychology: How Sesame Street teaches kids about emotional well-being, with Rosemarie Truglio*, PhD [Podcast episode 285]. American Psychological Association. Retrieved February 7, 2026, from <https://www.apa.org/news/podcasts/speaking-of-psychology/sesame-street>
- Mineo, L. (2023, October 31). Murthy says social media hurting kids, time for government, tech firms to help. *Harvard Gazette*. Retrieved January 24, 2026, from <https://news.harvard.edu/gazette/story/2023/10/murthy-says-social-media-hurting-kids-time-for-government-tech-firms-to-help>

- Moser, K. M., Wei, T., & Brenner, D. (2021). Remote teaching during COVID-19: Implications from a national survey of language educators. *System*, 97, Article 102431. <https://doi.org/10.1016/j.system.2020.102431>
- National Assessment of Educational Progress (NAEP). (2022). *Key Findings of Mathematics and Reading - Grade 4 and 8*. Retrieved February 4, 2026, from https://www.nationsreportcard.gov/mathematics/supportive_files/2022_rm_infographic.pdf
- Nebraska Public Media. (2025). *Public media: Our mission continues*. Retrieved February 13, 2026, from <https://nebraskapublicmedia.org/en/about/public-media-federal-funding/>
- Negera, S. (2022, June 28). Public TV stations adapt strategies for supporting out-of-school learning. *Current*. Retrieved February 7, 2026, from <https://current.org/2022/06/public-tv-stations-adapt-strategies-for-supporting-out-of-school-learning/>
- Newman, J. (2025, November 19). FCC's ATSC 3.0 rules would slow transition to Next Gen TV broadcasting. *Current*. Retrieved February 13, 2026, from <https://current.org/2025/11/fccs-atsc-3-0-rules-would-slow-transition-to-next-gen-tv-broadcasting/>
- Northwest Council for Computer Education. (2025). *The impact of technology on student mental health*. Retrieved February 12, 2026, from <https://ncce.org/the-impact-of-technology-on-student-mental-health/>
- Pew Research Center. (2024, June 12). 72% of U.S. high school teachers say cellphone distraction is a major problem in the classroom. Retrieved January 24, 2026, from <https://www.pewresearch.org/short-reads/2024/06/12/72-percent-of-us-high-school-teachers-say-cellphone-distraction-is-a-major-problem-in-the-classroom>
- Prothero, A. (2025, October 24). Do school cellphone bans work? What early findings tell us. *Education Week*. Retrieved January 13, 2026, from <https://www.edweek.org/technology/do-school-cellphone-bans-work-what-early-findings-tell-us/2025/10>
- Rauf, D. S. (2020, April 14). An unexpected tool for remote learning during coronavirus: Public TV stations. *Education Week*. Retrieved February 5, 2026, from <https://www.edweek.org/teaching-learning/an-unexpected-tool-for-remote-learning-during-coronavirus-public-tv-stations/2020/04>
- Saettler, P. (1990). *The evolution of American educational technology*. Libraries Unlimited.
- Shilov, V. (2025, January 16). *Broadcast better: The ultimate guide to ATSC 3.0 technology*. Promwad — Software and Hardware Product Development. Retrieved February 13, 2026, from <https://promwad.com/news/guide-atsc>
- SpectraRep (2025). *EduCast*. Retrieved February 13, 2026, from <https://www.spectrarep.com/educast/>
- Suleyman, M., & Bhaskar, M. (2023). *The coming wave: Technology, power, and the twenty-first century's greatest dilemma*. Crown.
- Tracey, M. W., & Stefaniak, J. E. (2014). MPATI: The Midwest Program on Airborne Television Instruction (1959-1971). *International Journal of Designs for Learning*, 5(2), 29-33.
- Turkle, S. (2015). *Reclaiming conversation: The power of talk in a digital age*. Penguin Press.
- Twenge, J. M. (2017). *iGen: Why today's super-connected kids are growing up less rebellious, more tolerant, less happy—and completely unprepared for adulthood—and what that means for the rest of us*. Atria Books.
- Twenge, J. M. (2025, June 10). *The consequences of smartphones in schools* [Written testimony]. Retrieved February 10, 2026, from <https://www.congress.gov/119/meeting/house/118355/witnesses/HHRG-119-ED14-Wstate-TwengeJ-20250610.pdf>
- Twenge, J. M., Joiner, T. E., Rogers, M. L., & Martin, G. N. (2018). Increases in depressive symptoms, suicide-related outcomes, and suicide rates among U.S. adolescents after 2010 and no substitution between cyber and in-person interaction. *Clinical Psychological Science*, 6(1), 3-17. <https://doi.org/10.1177/2167702617723376>
- Tyson, A., Lipka, M., & Deane, C. (2025, February 12). *5 years later: America looks back at the impact of COVID-19*. Pew Research Center. Retrieved February 12, 2026, from <https://www.pewresearch.org/politics/2025/02/12/5-years-later-america-looks-back-at-the-impact-of-covid-19/>
- Tyson, A., Lipka, M., & Deane, C. (2025, February 12). *How COVID-19 impacted Americans' relationship with technology*. Pew Research Center. Retrieved February 5, 2026, from <https://www.pewresearch.org/politics/2025/02/12/how-covid-19-impacted-americans-relationship-with-technology/>
- Vogels, E. A., Gelles-Watnick, R., & Massarat, N. (2022, August 10). *Teens, social media and technology 2022*. Pew Research Center. Retrieved February 14, 2026, from <https://www.pewresearch.org/internet/2022/08/10/teens-social-media-and-technology-2022/>
- Warnock, C. (2025, December). Beyond Cellphone Bans: How K-12 Schools Are Teaching Digital Citizenship and Creativity. *EdTech Magazine*. Retrieved February 11, 2026, from <https://edtechmagazine.com/k12/article/2025/12/beyond-cellphone-bans-how-k-12-schools-are-teaching-digital-citizenship-and-creativity>
- Wyllie, J. (2025). Federal budget outlook: Public media secures key funding for Ready To Learn and emergency alerting. *Current*. Retrieved February 13, 2026, from <https://current.org/2026/01/house-approves-minibus-package-with-ngws-rtl-funding-but-not-broader-support/>
- Zahed, R. (2024, February). 'Lyla in the Loop' creator and head writer introduce us to PBS Kids' new problem-solver star. *Animation Magazine*. Retrieved February 13, 2026, from <https://www.animationmagazine.net/2024/02/lyla-in-the-loop-creator-and-head-writer-introduce-us-to-pbs-kids-new-problem-solver-star/>
- Zamarro, G., & Camp, A. (2026). The COVID-19 pandemic and schools. *Live Handbook*. Retrieved February 10, 2026, from <https://livehandbook.org/k-12-education/miscellaneous/covid-and-schools/>