The Controversy over Digital Education Technology

An STS Research Paper
presented to the faculty of the
School of Engineering and Applied Science
University of Virginia

by

Melanie Gonzalez

March 26, 2020

On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

Signed: _____

Approved: _____ Date _____
Peter Norton, Department of Engineering and Society

The Controversy over Digital Educational Technology

Digital educational technologies can facilitate and promote education (Molenda et al., 2008). These include physical devices, such as computers, tablets, smartphones, cameras, and, digital whiteboards, and software, such as online tools, learning programs, and other applications. Digital educational technology is controversial in U.S. primary and secondary schools. Accessibility advocates, technology companies, and other promoters of educational technology argue devices enhance learning, make education more accessible, prepare students for future careers, and contribute to the economy. Opponents, such as many financial stakeholders, developmental psychologists, and privacy advocates, contend devices are costly, increase distractions, harm physical and social development, and compromise privacy. Students, teachers, and parents are divided. Participants disagree about whether and how classroom policies and norms should accommodate digital technology. Both supporters and opponents must use available resources to properly implement digital educational technologies in classrooms to facilitate more prosperous learning environments.

Review of Research

Research involving various elements of educational technologies show varying findings from surveys and experimental studies. A survey of middle and high school Advanced Placement and National Writing Project teachers revealed their opinions about classroom device use. Most teachers, 92%, 69%, 67%, and 57%, respectively, claimed the internet increases accessibility to teaching content and resources, the ability to share ideas with other teachers, communication with parents, and interaction with students (Purcell, et al., 2013). However, Purcell (2013)

contends that accessibility is not equal, particularly for low income students. Only 54% of teachers stated that all or almost all students had ample device access at school, and only 18% at home (Purcell, 2013). Many also concurred that digital tools bring new demands, 75% agreeing that the scope of knowledge and skills they must have increases and 41% agreeing that more work is necessary to teach effectively (Purcell, et al., 2013).

It is also important to evaluate the opinions of students. Students find technology to be interesting and exciting, promoting higher engagement and motivation to learn. Pearson Education, a for-profit publisher that profits from classroom technology that supports its digital products, conducted a survey asking fourth through twelfth graders about their views on classroom device use. Students reported that classroom technology makes learning more fun, lets them learn in ways that are best for them, and helps them do better in class (Pearson Education, 2015). Most students urged for more device use and felt they knew more about devices than their teachers (Pearson Education, 2015).

When personal devices are used, it is difficult to discern whether students are learning the material or engaging in unrelated activities. Richmond and Troisi (2018) found that students in lectures with open device use performed half a letter grade lower on the final exam than lectures with no device use. The researchers attribute this effect to the limitations of divided attention, which is the ability to process multiple stimuli simultaneously (Lacoboni, 2005). Students also tend to learn better when they take notes on paper, rather than laptops, because writing by hand requires active interpretation of information and deeper processing (Mueller & Oppenheimer, 2014). Mueller and Oppenheimer (2014) concluded that students using laptops are more likely to take verbatim notes than those who write by hand, and that verbatim notes require less interpretation. However, typing is typically faster than handwriting, which can save students time

and effort. The average typing speed is about 40 words per minute and the average handwriting speed is about 30 words per minute (Leonard, 2019). Tausend (2013) adds that digital notes can make studying more effective due to the ease of modification and keyword searches.

A meta-analysis of online learning studies conducted by the U.S. Department of Education found that students perform better in blended learning classes than traditional in-person classes. However, performance in online-only classes was equal to performance in in-person-only classes. These results were consistent across age and content areas (Bakia, et al., 2012). Computer-assisted learning programs that allow students to learn at their own pace have also improved academic performance. Out of the 30 studies analyzed, 20 reported statistically significant positive results, especially in math, because students can master skills by receiving immediate feedback and without rushing through tasks (Shank, 2019).

Shank (2019) suggests that technological notifications, such as reminders or text messages, for specific, one-time actions can improve communication and performance. Programs using this system have shown to improve parental involvement and communication between schools, students, and parents (Shank, 2019). This has led to increased literacy levels, assignment and test scores, and attendance (Shank, 2019).

Accessibility of Information

Digital technology offers more access to information and education. Students do not need to be in a physical classroom to receive instruction, enabling learning after school hours and when sick or traveling (Tausend, 2013). It broadens the scope of obtainable information, can accommodate topics such as graphic design or computer programming, and is well suited for independent learning (TeachThought Staff, 2019). Students can learn at their own pace, practice

what they have learned, or get help when needed (Gallup, Inc., & NewSchools Venture Fund, 2019). Devices can also reduce the inconvenience of physical supplies and simplify organization (Street, 2017).

Some students do not thrive in conventional classrooms. Differentiated learning technology adapts instruction to fit different needs, skill levels, and learning preferences, diminishing "one size fits all" education (Scharf, 2018). This can foster a more comfortable and productive environment, especially for students with learning disabilities. Janice Lintz, founder and CEO of a consultancy that promotes access for the deaf and hard of hearing, warns that limiting classroom technology can bring unwanted attention to students whose diagnosed learning needs grant them special permissions (Lintz, 2017).

Educational technology can enable innovative forms of education, including blended learning, flipped classrooms, and online schooling (Heick, 2015). Blended learning combines traditional classrooms with online learning (Maxwell, 2016). Flipped classrooms deliver content at home prior to class, freeing classroom time for interactive problems and activities (Tucker, 2012). Digital learning tools can improve homeschooling by accommodating synchronous learning, in which instruction occurs in different locations but at the same time, through video conferences, live chat rooms, or interactive webinars (Glossary of Education Reform, 2013).

Future Career Preparation

Educational technology can help students prepare for future careers by aiding in the college application process, providing networking resources, and building marketable skills. Programs using educational technologies to notify students of action items towards completing college or financial aid applications can enable more personalized processes and increase

application and enrollment rates (Shank, 2019). Employment-oriented services, such as LinkedIn and Glassdoor, increase networking opportunities by providing professionals' contact information, job postings, position credentials, reviews of companies and their application processes, and resume and interview tips (Kohler, 2018). Carson Kohler, a staff writer for the Penny Hoarder, a personal finance website, states that LinkedIn contains "more than 500 million professional profiles, which means nearly an unlimited supply of network connections and job opportunities." Signing up for email services from such companies that provide updates on developments in various domains can help users keep up with quickly changing fields of study (Purcell, et al., 2013).

The gap between IT job vacancies and the unemployed continues to grow due to the lack of technically skilled workers (Cox, 2020). In 90% of organizations, personnel skilled in IT are in short supply and an additional 1.5 million digitized jobs are expected by 2020 worldwide (Frezzo, 2017). Early exposure to technology gives students time to gain advanced skills such as programming and data analytics, which lead to higher paying jobs and greater job security (Badion, 2019). Becky Frankiewicz, President of ManpowerGroup North America, a workforce solutions company, claims technically "skilled workers are calling the shots", gaining leverage in receiving higher pay and more benefits.

High Costs

Educational technologies are expensive. U.S. primary and secondary schools spend more on educational technologies each year for hardware, software, infrastructure, and maintenance, despite tight budgets (Johnson, 2012). Software, wireless networks, and sufficient bandwidth for internet access and device integration can be costly (Christensen, 2019). Technical support staff

are needed for training, updates, maintenance, and technical assistance (Heick, 2015). There are also many variables that must work in order for devices to work, often including sufficient battery power, WiFi, bandwidth, and the device's hardware and software. Sarah Layton (2012), a customer support analyst and writer for Applied Educational Systems, a digital curriculum provider, addresses that "all it takes is one fragile piece of the puzzle to break, and the whole digital system of accessibility crumbles with it."

High costs can exclude schools, families, and students from using educational technologies, creating unfair disparities. Schools with high student-to-device ratios deprive students of time with technology (Pandolfo, 2012). Only 19% of U.S. students attend schools that provide devices, so students who cannot afford the best products are at a disadvantage (McMahon, 2019). In the U.S., students who live in low-income households, urban school districts, or the South are least likely to have their own device to use at school (Gallup, Inc., & NewSchools Venture Fund, 2019). Social pressures increase when students cannot afford the same devices as their peers, leading to segregation between demographic groups (Riggs, 2015).

To combat costs, schools can buy in bulk and use collective buying power. Bulk purchases standardize devices, reducing needs for inventory of supplies and parts, training, technical support, and incompatibility fixes (Johnson, 2012). Free software is also available for many applications (Collins, 2020). Federal funds, such as the Schools and Libraries (E-rate) program, can help schools gain affordable access to the internet and other telecommunications (USAC, 2020). Digital textbooks, memos, and other documents and virtual activities, labs, and even field trips can help save schools and families money by eliminating the need for purchasing physical resources (TrustRadius, 2019).

Many companies prosper from the sales of educational technologies. The U.S. educational technology industry grows each year, earning $1.45 billion in 2018 alone (Rice, 2019). This creates business opportunities for technology companies, and "Big tech firms see the classroom as their next major battleground" (Eadicicco, 2018). This competition contributes to the economy by increasing cash flow and spurring innovation for technological and educational advancements. Google has particularly striven to establish itself in schools, directing much of its marketing to the education sector. While many competitors have focused on high margin devices and other markets, Google offers low-cost devices and free software apps that support learning and collaboration; a strategy many are beginning to pursue (Singer, 2017).

Increasing Distractions

Educational technologies can distract students and hinder learning when devices are misused. Students who use devices in class are more likely to multitask, compromising attention, learning, and performance (Sana, et al., 2013). Students with devices can distract others nearby because the eye is naturally drawn to light, which emanates from device screens, and humans are naturally curious (Herrman, 2018). It is also unclear whether students are paying attention to the instruction or unrelated activities. With devices, students can discreetly text message, read social media, or otherwise distract themselves. New devices such as Apple Watches and MacBooks offer messaging capabilities without the need to pick up a cell phone, making it harder for teachers to ensure students are invested in the instruction (Aguilar, 2013). Technological capabilities, the internet, and social media continue to advance, making distractions increasingly prevalent in the education sector (Ortiz-Ospina, 2019).

Harm to Development

Many developmental psychologists argue that educational technologies can harm physical and social development. Excessive screen time can delay or impair brain development, pertaining to both cognitive functioning and emotional processing (Dunckley, 2014). This is especially true at young ages, when the brain goes through its most rapid development, so limiting classroom device use could be beneficial in the long term. Substantial digital device use can cause weakened information processing, decision making, attention, task performance, and impulse control. Much of this is due to grey matter atrophy, the shrinkage of grey matter areas, which affects regions controlling executive functions and emotional responses (Dunckley, 2014).

Excessive screen time can also lead to Electronic Screen Syndrome (ESS) or Computer Vision Syndrome (CVS). ESS occurs when the nervous system is overstimulated from screen exposure, causing disorganization and dysregulation of biological signs, thereby influencing behavior, mood, focus, and sleep (Dunckley, 2012). CVS results from focusing the eye on a device screen for prolonged, uninterrupted periods of time. The eye muscles strain, resulting in eye discomfort and other vision problems (AOA, n.d.).

Environmentally, the development of social and communication skills can be delayed. Students who communicate electronically may not learn the norms of effective communication. Without face-to-face interaction, students may not learn to properly read body language, tone, or other social cues (Layton, 2012). These communication issues can lead to problems building relationships, social isolation, and in more extreme cases, bullying or mental illness. Bullying has become more problematic, largely due to the anonymity of cyberbullying. Brooke Mascotto (2008) claims, in her integrative literature review on adolescent cyberbullying anonymity, that students can bully others without revealing their identity, increasing willingness to say or do

harmful things because of a “perceived minimization of consequences”. Bullies also feel less remorse because they can not see victims’ reactions (Slonje et al., 2012).

It is also beneficial for teachers to know their students more personally, particularly regarding students’ skills and interests. Teachers can alter their instruction towards those skills and interests and help individuals who need more help, which is more difficult when less face-to-face interaction occurs (Gallup, Inc., & NewSchools Venture Fund, 2019).

Privacy Concerns

Advocates of privacy and related civil liberties contend that educational technologies can violate individual freedoms by collecting and exposing private information. Data of particular concern is personally identifiable information (PII), which is any data that could be used to identify a person. This includes information about an individual student’s identity, academic record, or medical conditions, or data created by a student through the use of technology such as email accounts or online programs (Gallagher, et al., 2019). When students use educational technologies, PII is often collected by educators and the technology provider. Many companies deliver free services or products, however “when companies market their free service, it generally isn’t free” collecting student data and using it to direct their advertising efforts (O'Toole, 2017). Parents and students express concerns about what information is collected and precisely how that information is used (Gallagher, et al., 2019). There is also concern about vulnerability to cyber-attacks, where attackers can gain access to devices and steal, install, or destroy personal information (Tunggal, 2020).

There are many resources and pieces of legislation to help mitigate these concerns. Parents look to privacy groups such as Privacy International (PI) and the Electronic Privacy

Information Center (EPIC) to resist data collection from their children's device use and to demand companies be more transparent about data collection (Singer, 2017). ConnectSafely is a nonprofit organization that educates connected technology users about safety, privacy, and security, creating "The Parent's Guide to Educational Technology" to help parents understand why and how their children use technology (Gallagher & Magid, n.d.). The Privacy Technical Assistance Center (PTAC), established by the U.S. Department of Education, is a resource to learn about student data privacy and security practices (Office of Educational Technology, n.d.). Firewalls and other network security systems can be installed on devices to monitor and control network traffic to block harmful activity (Indiana University, 2019).

The Family Educational Rights and Privacy Act (FERPA) and the Children's Online Privacy Protection Act (COPPA) are federal laws that help protect privacy rights. FERPA gives parents access to their children's education records and controls access by other public entities (U.S. Department of Education, 2018). COPPA regulates websites' privacy policies, the data they can and cannot obtain from children under the age of thirteen, and when parental consent is required (Gallagher, et al., 2019). Parents and students should also be aware of state laws and school policies, and always read privacy policies before using educational technologies (O'Toole, 2017).

The Coronavirus Outbreak

The recent global pandemic caused by the coronavirus disease, also called COVID-19, is an infectious disease that causes respiratory illness (Sauer, 2020). The outbreak has led to the closing of schools and other public facilities, forcing students to learn from home in order to keep up with class material. This continuation of learning would not be as feasible without

educational technologies, showing how “a ready and waiting remote-learning system is a game changer during a major emergency”, and even more common disruptions such as weather hazards or instances where individuals must take long-term absences (Vallas, 2020). During this COVID-19 outbreak, video conferencing applications, such as Zoom and Google Hangouts, have become widely used for conducting online synchronous classes and office hour sessions (Stein, 2020). Classes can be administered in a fairly “normal” fashion due to video, audio, screen sharing, and recording capabilities (Yeager, 2016). Many of these applications also have “breakout room” features where smaller discussion sessions can be conducted (Stein, 2020).

However, COVID-19 has highlighted the issue of millions of students not having access to technological devices, the internet, or broadband connection, and the costs of obtaining them. This lack of accessibility could reduce attendance and is most prevalent for students who are from low-income households, have disabilities, or are English language learners (Collins, 2020). Elizabeth Davis, President of the Washington Teachers’ Union, warns that pre-existing equity issues could worsen between students with reliable access and those without, as “every week that they don’t have computers is a week of lost instruction”.

Companies are using COVID-19 as an opportunity to showcase their products and services by providing free use in hopes of gaining customers and increasing profits in the long run. Scott Durand, a Senior Vice President at K12, a for-profit online education provider, acknowledges that “one outcome of this could be more people are aware of what we can do,” and “maybe they’ll want to continue with us in some form”. Offering free services, including internet access, mobile hotspots, collaboration tools, online lessons, and teacher training, to schools affected by closings helps companies increase their potential future earnings and students gain accessibility (Robles, 2020).

Conclusion

It is inevitable that educational technologies in the U.S. will continue to flourish in primary and secondary education. Classrooms have gone from passive to active engagement, spurring creativity and fostering innovative learning environments. Opponents may need time to adapt to a quickly changing education landscape, as most new innovations come with their reservations. It is important that people are given the time and space to accept and adopt educational technologies. If dramatic changes are forced, reactance is likely to occur; people will feel resentment and be unwilling to adapt. Educational technologies should be used if they engage students, are easy to use, provide actionable information on student progress, allow for personalized instruction, can be practically financed, and foster a more fruitful learning environment. Schools should also work to improve the equality of access to such devices in order to decrease the disparities faced by many groups, and understand students' practicalities in being able to access resources. Despite the hesitancies of high costs, distractions, developmental harm, and privacy concerns, there are many ways to navigate these issues. "Instances of misuse shouldn't overshadow the many benefits technology can provide" (Darling-Hammond, 2019). Digital educational technologies have the potential to transform learning, so using the proper resources to mitigate challenges is critical in improving U.S. primary and secondary education.

References

Aguilar, N. (2013, March 22). How to Secretly Send Text Messages in Class or at Work Without Touching Your iPhone. https://mac-how-to.gadgethacks.com/how-to/secretly-send-text-messages-class-work-without-touching-your-iphone-0144462/

AOA. (n.d.). Computer Vision Syndrome. https://www.aoa.org/patients-and-public/caring-for-your-vision/protecting-your-vision/computer-vision-syndrome

Badion, C. (2019, Sep. 10). The 13 Highest-Paying IT Jobs in 2020. https://www.rovertha lf.com/blog/salaries-and-skills/the-13-highest-paying-it-jobs-in-2019

Bakia, M., Shear, L., Toyama, Y., & Lasseter, A. (2012). *Understanding the Implications of Online Learning for Educational Productivity*. U.S. Department of Education. https://tech.ed.gov/files/2013/10/implications-online-learning.pdf

Christensen, D. (2019, May 28). What is the Real Cost of Technology in Education? https://www.classcraft.com/blog/features/cost-of-technology-in-education/

Collins, C. (2020, March 19). Teaching Through Coronavirus: What Educators Need Right Now. https://www.tolerance.org/magazine/teaching-through-coronavirus-what-educators-need-right-now

Cox, J. (2020, Feb. 19). It's Never Been This Hard for Companies to Find Qualified Workers. https://www.cnbc.com/2020/02/19/its-never-been-this-hard-for-companies-to-find-qualified-workers.html

Darling-Hammond, L. (2019, June 16). Technology In The Classroom: The Question Is Not "If" But "How". https://www.forbes.com/sites/lindadarlinghammond/2019/06/16/technology-in-the-classroom-the-question-is-not-now-if-but-how/#30a0d3f81c55

Dunckley, V. L. (2012, July 23). Electronic Screen Syndrome: An Unrecognized Disorder? Psychology Today. https://www.psychologytoday.com/us/blog/mental-wealth/201207/electronic-screen-syndrome-unrecognized-disorder

Dunckley, V. L. (2014, Feb. 27). Gray Matters: Too Much Screen Time Damages the Brain. Psychology Today. https://www.psychologytoday.com/us/blog/mental-wealth/201402/gray-matters-too-much-screen-time-damages-the-brain

Eadicicco, L. (2018, March 28). Apple, Google, Microsoft See Big Money in Education Market. https://time.com/5218440/apple-ipad-microsoft-google-chromebooks-schools-education/

Frezzo, D. (2017, May 10). The Role of Technology in the Education of the Future. https://www.weforum.org/agenda/2017/05/science-of-learning/

Gallagher, K., & Magid, L. (n.d.). The Parent's Guide to Educational Technology. https://www.connectsafely.org/the-parents-guide-to-educational-technology/

Gallagher, K., Magid, L., & Pruitt, K. (2019). The Educator's Guide to Student Data Privacy. https://www.connectsafely.org/eduprivacy/?doing_wp_cron=1584901241.8337070941925048828125

Gallup, Inc., & NewSchools Venture Fund. (2019). *Education Technology Use in Schools*. Gallup, Inc. http://www.newschools.org/wp-content/uploads/2019/09/Gallup-Ed-Tech-Use-in-Schools-2.pdf

Glossary of Education Reform. (2013, Aug. 29). Synchronous Learning Definition. https://www.edglossary.org/synchronous-learning/

Heick, T. (2015, Nov. 13). Why Some Teachers Are Against Technology In Education. https://www.teachthought.com/pedagogy/why-some-teachers-are-against-technology-in-education/

Herrman, J. (2018, Oct. 10). Why You Can't Stop Looking at Other People's Screens. https://www.nytimes.com/2018/10/10/style/why-you-cant-stop-looking-at-other-peoples-screens.html

Indiana University. (2019, Feb. 15). About Firewalls. https://kb.iu.edu/d/aoru

Johnson, D. (2012, Jan.). The Resourceful School. *Educational Leadership*, *69*(4), 30–33.

Kohler, C. (2018, Dec. 12). Here are the 7 Reasons Why LinkedIn is Important. https://www.topresume.com/career-advice/why-linkedin-is-important

Lacoboni, M. (2005). Divided Attention in the Normal and the Split Brain: Chronometry and Imaging. *Neurobiology of Attention*, 363–367. doi: 10.1016/B978-012375731-9/50064-1

Layton, S. (2012, June 14). 3 Big Points in the Technology in the Classroom Debate. https://www.aeseducation.com/blog/2012/06/technology-classroom-debate

Leonard, K. (2019, Jan. 29). What Is a Good Typing Speed Per Minute? https://smallbusiness.chron.com/good-typing-speed-per-minute-71789.html

Lintz, J. S. (2017, Nov. 29). Banning Laptops Calls Attention to Students with Learning Disabilities. The Chronicle of Higher Education. https://www.chronicle.com/blogs/letters/banning-laptops-calls-attention-to-students-with-learning-disabilities/

Mascotto, B. (2008). Exploring the Impact of Anonymity on Cyberbullying in Adolescents: An Integrative Literature Review. BScN University of Ottawa.

https://dspace.library.uvic.ca/bitstream/handle/1828/5986/Mascotto_Brooke_MN_2015.pdf?sequence=1&isAllowed=y

Maxwell, C. (2016, March 4). What Blended Learning Is - And Isn't. https://www.blendedlearning.org/what-blended-learning-is-and-isnt/

McMahon, W. (2019, June 5). Educators See Positive Impact of Mobile Devices in K–12. https://edtechmagazine.com/k12/article/2018/11/educators-see-positive-impact-mobile-devices-k-12

Molenda, M., Rezabek, L., & Robinson, R. (2008). Facilitating Learning. In *Facilitating Learning* (2nd ed.).

O'Toole, J. (2017, Sep. 29). Tips And Tools For Student Privacy When Using Educational Technology. https://elearningindustry.com/student-privacy-when-using-educational-technology-tips-tools

Office of Educational Technology. (n.d.). Privacy. https://tech.ed.gov/privacy/

Ortiz-Ospina, E. (2019, Sep. 18). The Rise of Social Media. https://ourworldindata.org/rise-of-social-media

Pandolfo, N. (2012, Jan. 24). As Some Schools Plunge into Technology, Poor Schools are Left Behind. https://hechingerreport.org/as-some-schools-plunge-into-technology-poor-schools-are-left-behind/

Purcell, K., Buchanan, J., & Friedrich, L. (2013, Feb. 28). How Teachers Are Using Technology at Home and in Their Classrooms. https://www.pewresearch.org/internet/2013/02/28/how-teachers-are-using-technology-at-home-and-in-their-classrooms/

Rice, M. (2019, June 10). 31 Edtech Companies Changing the Way We Learn. https://builtin.com/edtech/edtech-companies

Riggs, L. (2015, July 6). Technology, But Not for All. https://educationpost.org/technology-but-not-for-all/

Robles, Y. (2020, March 3). Amid Coronavirus Fears, the CDC Told Schools to Plan for Remote Learning. That's Harder Than It Sounds. https://chalkbeat.org/posts/us/2020/03/03/amid-coronavirus-fears-the-cdc-told-schools-to-plan-for-remote-learning-thats-harder-than-it-sounds/

Sana, F., Weston, T., & Cepeda, N. J. (2013). Laptop Multitasking Hinders Classroom Learning for Both Users and Nearby Peers. *Computers & Education*, *62*, 24–31. Doi: 10.1016/j.compedu.2012.10.003

Sauer, L. M. (2020). What Is Coronavirus? https://www.hopkinsmedicine.org/health/conditions

-and-diseases/coronavirus

Scharf, A. (2018). Critical Practices for Anti-bias Education. https://www.tolerance.org/magazine/publications/critical-practices-for-antibias-education

Shank, S. (2019). *Will Technology Transform Education for the Better?* Abdul Latif Jameel Poverty Action Lab. https://www.povertyactionlab.org/sites/default/files/2020-03/education-technology-evidence-review.pdf

Singer, N. (2016, July 27). Amazon Unveils Online Education Service for Teachers. https://www.nytimes.com/2016/06/28/technology/amazon-unveils-online-education-service-for-teachers.html?_r=1

Slonje, R., Smith, P. K., & Frisén, A. (2012). Processes of Cyberbullying, and Feelings of Remorse by Bullies: A Pilot Study. *European Journal of Developmental Psychology*, *9*(2), 244–259. doi: 10.1080/17405629.2011.643670

Street, E. (2017, Jan. 24). How Laptops in the Classroom Improve Student Learning. https://www.learningliftoff.com/how-laptops-in-the-classroom-improve-student-learning/

Stein, P. (2020, March 24). D.C. Students Head to School Online Tuesday, highlighting City's Divide in Access to Technology. *The Washington Post*. https://www.washingtonpost.com/local/education/dc-students-went-back-to-school-online-on-tuesday-but-is-anyone-learning/2020/03/24/14710500-6ddf-11ea-aa80-c2470c6b2034_story.html

Tausend, J. (2013, Aug. 27). How Students Use Technology Outside of the Classroom. https://edtechmagazine.com/higher/article/2013/08/how-students-use-technology-outside-classroom

TeachThought Staff. (2019, Sep. 10). Using Technology To Help Students Lead Their Own Learning. https://www.teachthought.com/pedagogy/using-technology-help-students-lead-learning/

TrustRadius. (2019, March 28). How Technology Can (and Does) Improve Education. https://www.trustradius.com/buyer-blog/how-technology-improves-education

Tucker, B. (2012). The Flipped Classroom. https://www.educationnext.org/the-flipped-classroom/

Tunggal, A. T. (2020, Feb. 20). What is a Vulnerability? https://www.upguard.com/blog/vulnerability

U.S. Department of Education. (2018, March 1). Family Educational Rights and Privacy Act (FERPA). https://www2.ed.gov/policy/gen/guid/fpco/ferpa/index.html

USAC (2020). Universal Service Administrative Company. E-rate. https://www.usac.org/e-rate/

Vallas, P. G. (2020, March 13). Hey, Teacher, Teach Those Kids at Home. https://www.wsj.com/articles/hey-teacher-teach-those-kids-at-home-11584114461

Yeager, N. (2016, June 1). 5 Must-have Capabilities for the Best Video Conferencing Solutions. https://www.broadviewnet.com/blog/2016/06/5-must-have-capabilities-for-the-best-video-conferencing-solutions