

Literature Review – Digital Equity and Inclusion for Education

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Serving 11 states and D.C., the IDRA EAC-*South* is one of four federally-funded centers that provide technical assistance and training to build capacity to confront educational problems occasioned by discrimination on the basis of race, national origin, sex and gender, and religion.

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Overview

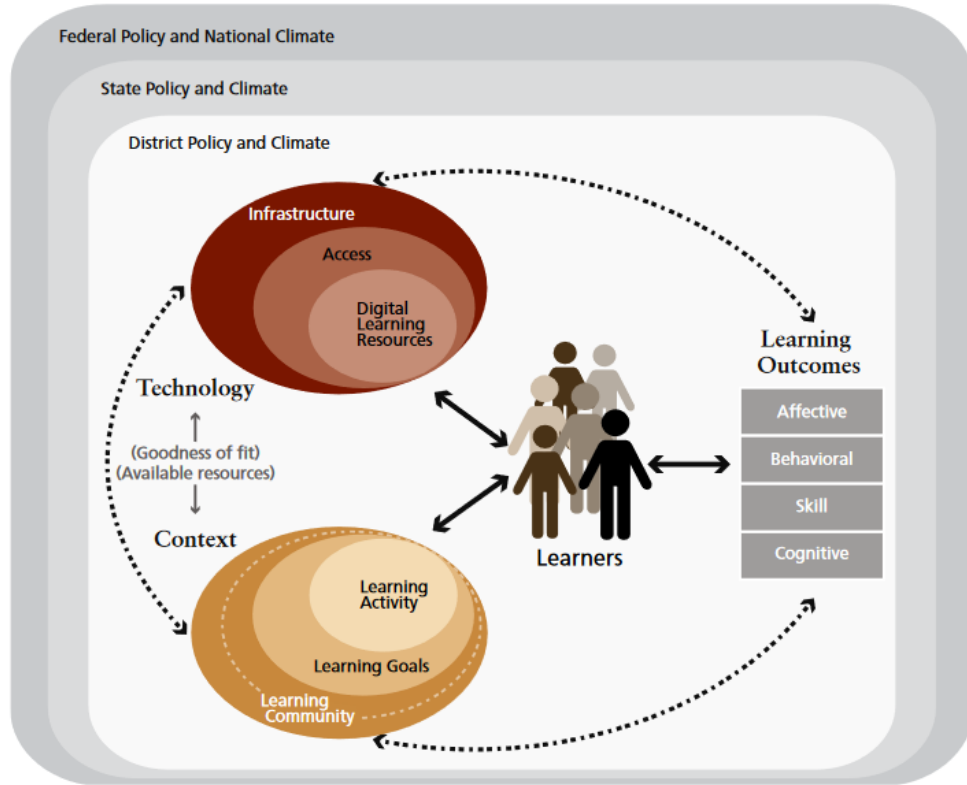
The proliferation and increased sophistication of technology has enabled people to research and connect more broadly and thoroughly than ever before. There is an overwhelming volume of information available online, and Internet users equate to over half the world's population (Collins & Shuster, 2017). As technologies evolve and the digital landscape becomes more complex, it is also becoming more difficult to access and navigate. Misleading news and pure misinformation have also proliferated (Collins & Shuster, 2017). Digital literacy has evolved beyond simply understanding how to properly use computers and navigate the Internet.

Research and advocacy have pinpointed the necessity of improving access to broadband and electronic devices in addition to securing research skills as part of a well-rounded education (Collins & Shuster, 2017; Turner et al., 2017). Learning is a multifaceted process, and digital literacy and education involve numerous interconnected variables from policies surrounding access to the complexity of learning how to navigate trusted resources (Zielezinski & Darling-Hammond, 2016).

The numerous factors surrounding digital literacy are also directly related to equity. Traditionally underserved students can face barriers in securing electronic devices, accessing academically rigorous programs and having a reliable, speedy Internet connection.

Overview

THE DIGITAL LEARNING ECOSYSTEM 2.0



Source: © 2015, Molly B. Zielezinski, Stanford University Graduate School of Education

Digital Access and Digital Audits

As early as 2000, U.S. stakeholders have warned that unequal access to technology and digital skill building by income, education level, race, and geography could deepen inequities. It is estimated that nearly 16 million students lack adequate Internet connections, access to a proper device or both. Access issues significantly impact rural, Black, Latino and Native American households (Ali et al., 2021).

Even the usage of devices in education differs by race and income. White and students in families with higher incomes are more likely to use technology for creativity and problem solving and to receive guidance and mentorship from adults. In contrast, students of color and students in families with lower incomes are more likely to use technology for routine drills with lower levels of adult supervision (Reich, 2019).

- **By Race-Ethnicity:** Children of color experience the digital divide more profoundly than their white peers. Half of all Native American and Alaskan Native children lack computers, high-speed Internet, or both at home. Over one-third of Black and Latino children do not have computers or high-speed Internet home in contrast to only one fifth of white children and one in seven Asian/Native Hawaiian and other Pacific Islander children (Jacobsen, 2020).
- **By Income:** Household income contributes to the digital divide, and this impacts children of color. Around 47% of school-aged children who live in poverty, including 43% who receive SNAP benefits, lack access to computers or high-speed Internet. In contrast, only 21% of children who do not receive SNAP benefits and whose family incomes are above the poverty line lack access to computers or high-speed Internet at home (Jacobsen, 2020).
- **By Immigration Status:** Data on digital access and skills for immigrants in the United States can be inconsistent or difficult to determine. At the classroom level, there is a focus on emergent bilingual students, who are comprised of both immigrant students and citizens who speak a language other than English (Cherewka, 2020). What is clear, though, is the technology accessibility and skills gap between wealthier, white households and those of people of color, those with lower incomes or those who have lower levels of formal education mirror the factors often attributed to immigrant subpopulations (Cherewka, 2020).

In 2015, 36% of native-born, native-language adults were more proficient at solving problems in digital environments compared to 12% of U.S. residents identified as foreign-born and who speak a language other than English. One-tenth of families headed by Latino immigrants had no Internet access in 2016, which is a greater rate than the 7% of U.S. born Latinos without access and twice the rate of non-Latino white residents. Households

Digital Access and Digital Audits

identified as low-income, people of color and those with lower levels of education are far more likely to use a smartphone as their sole way to access the Internet (Cherewka, 2020).

- **By Language Status:** For emergent bilingual students, there has been a trend in education to use technological tools to help build academic skills. Implementation of these digital tools has been put into practice without proper research about whether or not they work for emergent bilingual students (Altavilla, 2020). In general, emergent bilingual students not only face a digital divide in terms of the cost of devices and broadband but they also face a "second-level" digital divide that centers on how students use technology. While they may not face significant barriers to navigating digital devices, the programs they use may only be for vocabulary drills and rote lessons (Altavilla, 2020). Many educators lack training how to use technology to engage emergent bilingual students or enable them to participate in meaningful work like collaborating with their peers online (Altavilla, 2020).

Given the importance of connecting and learning in digital spaces, equal access should be a fundamental human right. Students are capable and should be prepared for lifelong learning and have the proper skills to analyze, evaluate create and participate in civic discourse online (Turner et al., 2017).

Digital Audits

Issues of access vary from school to school, making targeted evaluations necessary. When schools and educators adopt new technology, there should be a process behind it to evaluate how the new tool or program will be beneficial to the campus and its students.

Digital audits are analyses of both the assets and measures used to ensure that a school's spending on digital resources has the best and biggest impact. A broad audit looks at technology operations, classroom tech, infrastructure, staffing and data flow (Brown, 2019).

Each school will have unique pedagogical needs. Digital audits should be carefully crafted to properly gather qualitative and quantitative data specific to each school that can provide information on technology usage and needs that will truly benefit the campus (Parsons, 2020).

Supporting Different Types of Learners

Digital literacy is inherently an equity issue and addressing the needs of diverse learners must be a key part of preservice education and professional development. Providing digital literacy for an inclusive classroom is a layered process that centers student needs, creates capacity for students to make sense of content across modalities, and enables them to become producers

Digital Access and Digital Audits

of digital knowledge themselves.

It is important to ensure that educators do not take a deficit lens to their students based on academic, linguistic, physical, cognitive, or economic factors when integrating digital content and skills into learning (Price-Dennis, Holmes & Smith, 2015). Additionally, students should be allowed to express their understanding of class content in a variety of ways to make the most of technological tools, from text responses to integrating visual or video content (Zielezinski & Darling-Hammond, 2016).

Educators of emergent bilingual students should be aware of baked-in biases of computer programs when it comes to meaningful participation for their students. For example, while speech-recognition software can help emergent bilingual students work on their spoken intelligibility, these programs can have issues accurately registering the pronunciation of non-native English speakers (Altavilla, 2020).

According to data from the U.S. Department of Education, in 2017-18, nearly 7 million students in the United States received special education under the Individuals with Disabilities Education Act (IDEA). For students with disabilities, implementing assistive technologies in the classroom can help them to have more control over their education. Assistive technologies are any tool, equipment or software that helps people cope with and work around challenges in learning, communication or mobility (Castelo, 2020). These technologies vary greatly depending on student need – from alternative keyboards or input devices to accessibility features on websites and in programs for students with visual impairment.

Digital audits and classroom preparation should consider the needs of diverse learners to ensure that all students can meaningfully participate and learn.

Preparing Students for Work

A lack of access to digital devices and resources, especially when they are critical to attending class or completing assignments, can curtail a student's learning. This compounds to impact income losses that can last throughout their lives. Even if students are learning in the classroom, one estimate of the lower lifetime income of K-12 students caught in the digital divide can result in a \$22 billion to \$33 billion annual GDP loss (Chandra et al., 2021). The number is likely to grow as jobs increasingly require employees with digital skills.

Even industries that have not traditionally needed technology skills now require some degree of digital literacy. Workers without the requisite skills find themselves struggling to adapt and employers have a difficult time filling the workforce they need to thrive (Cobert & Chang, 2019).

Digital Access and Digital Audits

Additionally, the ubiquity of digital devices among higher-income households and schools directly relates to how students can access higher education. College and financial aid applications are most easily submitted online, providing another barrier for student impacted by the digital divide (Aguilar, 2020). Attending college classes require some form of digital access and completing a college degree necessitates proficiency in technological tools and a reliable Internet connection, particularly with online components required for class participation or attendance (Skinner, Levy & Burtch, 2021).

Digital Access and COVID-19

During the COVID-19 pandemic's school closures, 50 million K-12 public school students participated in remote learning (Chandra et al., 2020). The pandemic worsened education inequities when many students who faced barriers to learning were suddenly forced into positions where learning was impossible (McLaughlin & Resta, 2020; Aguilar, 2020; Skinner, Levy & Burtch, 2021).

The U.S. experienced a sudden shift in interaction in all fronts – many adults had to navigate working from home while school closures required most students to cope with distance learning (Huck & Zhang, 2021). Students had to secure a device for their education, while potentially having to share it with other children or adults in the home.

Working or learning from home also requires reliable Internet service, particularly if numerous devices are online, that many traditionally underserved and rural students lack (Lai & Widmar, 2021). Students without broadband services at home experienced more frequent disruptions in their schooling than their peers with steady Internet access.

Among 8- to 18-year-olds who attended school remotely during the pandemic, 41% who have broadband “often” or “sometimes” experienced disruptions. Among those without, 56% “often” experienced disruptions in online education (Rideout & Robb, 2021).

Though the full impact of the pandemic on learning is still being assessed, there is a growing body of guidance on the effectiveness of distance learning.

Distance learning is not an adequate substitute for in-person classes: The results of distance learning's effectiveness are mixed at best and learning outcomes have been generally worse with remote learning (Muñoz-Najar et al., 2021). Previous studies on distance versus in-person learning in general have had mixed results, and there is little research on the effectiveness of remote elementary education (Huck & Zhang, 2021).

The digital divide diminished student engagement: The pervasiveness of online remote learning in K-12 education during the COVID pandemic revealed stark inequities in access to home broadband Internet and digital technologies to support students' learning among students of color and students from families receiving low incomes, particularly. For many students across the nation during this period, engagement with their schools, teachers, peers, and classroom learning was negatively impacted by limited access to Internet and limited technical support for increasing their capacity to engage with materials and resources meant to facilitate their online

Digital Access and COVID-19

learning. IDRA's study for Texas found that, in many parts of the state, diminished student engagement was a direct result of limited Internet access during the transition to remote learning. Schools lost touch with 10% of students during the pandemic (Quintanilla-Muñoz, 2021).

Educators need better training in technology use: The sudden nature of school closures left many educators uncertain how to proceed with distance learning, and a general lack of online teaching experience constituted a major barrier. A lack of preparedness is unsurprising since online teaching methods are not properly integrated into most preservice in-service teacher programs (Huck & Zhang, 2021).

Emergent bilingual students and students with disabilities faced additional barriers: Emergent bilingual students faced barriers to getting connected during the pandemic, from a lack of digital literacy to lower effort from school districts to ensure these students had devices and Internet service (Ali et al., 2021; Mitchell, 2020). To make matters worse, educators of emergent bilingual students have, on average, fewer hours of professional development with digital learning resources than their general education counterparts (Mitchell, 2020). Students with specialized educational needs often lacked the hands-on assistance that they needed to fully participate in the classroom (Huck & Zhang, 2021).

Language is fundamentally interactive. Effective bilingual instruction requires verbal learning, listening comprehension and engaging dialogue. Early in the pandemic, IDRA issued some recommendations for states and schools including the following (IDRA, April 2020):

- Educational continuity plans – either online or through paper packets – should continue sound language acquisition practices, such as bilingual materials, explicit language and content objectives, comprehensible input, and differentiated assessments.
- States should increase the funding for bilingual instruction as this educational disruption will have long-lasting effects for emergent bilingual students.
- Dissemination of educational continuity resources must provide instructions in students' home languages. This includes bilingual procedures for checking out tablets and other equipment.
- In states where parents must sign off on curriculum changes, such as graduation plans, schools must make every effort to speak directly with parents in their home language by leveraging translators.
- States and districts must use or develop clear, accessible and multimedia bilingual education and ESL guidelines that do not solely rely on Internet access.
- School districts and teachers can provide ways for families to engage with the at-home instructional materials through suggested activities, interactive projects and instructional

Digital Access and COVID-19

guides for families to work through academic content with students. Additional follow-up communication with families from teachers and educational staff via phone, mail and electronically helps to ensure that students' language and instructional needs continue to be met.

Remote learning requires effective teaching, adequate technology and engaged learners: Educators need to be incredibly effective both in terms of curriculum mastery and technological skills. Technology needs to be suitable for the curriculum, and students must be intrinsically motivated to work from home (Muñoz-Najar et al., 2021).

Some learners benefit from more autonomy: While the pandemic distance learning situation was far from ideal, some educators saw improved learning outcomes for students who prefer to learn at their own pace and who could have more flexibility in their schedules and method of learning (Abramson, 2021; Huck & Zhang, 2021).

Schools with “one-to-one” device policies in place saw greater success: Schools that already had the ability to provide all students in need with a suitable device for online learning saw better transitions because they did not have to set up or find funding for entirely new technology programs (Workie et al., 2022).

Fewer distractions helped some special needs students succeed: Some students with special education needs with issues focusing in group or classroom settings found it easier to focus on education without distractions. Small groups or individual learning can be helpful to students with ADHD, anxiety or autism (Abramson, 2021).

Technological tools provide more ways to connect with parents and families: Generally, teachers highlighted electronic communications, including social media and email, as a good way to connect with parents and families, particularly those with busy schedules who cannot talk during school hours. Unfortunately, there were still too many parents disconnected due to a lack of devices or reliable broadband (Huck & Zhang, 2021).

Traditionally underserved families had difficulty accessing online learning: Though data are still being gathered, surveys on family concerns regarding online education showed that 26% of both foreign- and native-born Latino families with school-aged children indicated that they needed better access to the Internet or technology and 65% said learning was more difficult during COVID-19 school closures (Cherewka, 2020).

Many schools faced higher levels of absenteeism and disenrollment during the pandemic,

particularly among youth in immigrant families because of access issues and economic pressures (Workie et al., 2022).

Additionally, the “homework gap” was exacerbated by access issues during the pandemic as a lack of broadband service or a device prevented vulnerable students from accessing educational content (Chandra et al., 2020). Even beyond connectivity issues that disproportionately impact underrepresented students, being unable to access necessary content to complete assignments, regardless of where they are learning, contributed to lower academic achievement (Ali et al., 2021).

See IDRA’s tools:

- Ensuring Equity in Online Learning – Considerations in Response to COVID-19’s Impact on Schooling <https://idra.news/EEOLp>
 - Spanish version: Mejores Prácticas para la Instrucción en Línea a Raíz del COVID-19 <https://idra.news/MPILRp>
- Best Practices for Online Instruction in the Wake of COVID-19 <https://idra.news/BPOI>
 - Spanish version: Garantizar la equidad en el aprendizaje en línea <https://idra.news/GEALp>

Digital Equity Landscape Post-COVID-19

Digital Equity Landscape Post-COVID-19

Despite efforts to help close the digital divide to enable students to learn remotely during the pandemic, attempts were not sufficient. Even after most public schools resumed in-person classes in 2021, up to 12 million K-12 students were under-connected in terms of Internet and device access as they began the 2021-22 school year (Ali et al., 2021).

Most efforts to connect students were short-term, stop-gap solutions. Software and programs require license renewal over time, emergency federal funding for distance learning had a 2021 expiration date, and school districts did not have funding to ensure device repair or replacement (Ali et al., 2021). Post COVID-19, lessons learned indicate that stakeholders must better attend to the needs of students in both terms of device accessibility and Internet infrastructure (Aguilar, 2020).

About one in four children from lower-income households still do not have a computer at home (Rideout & Robb, 2021). While the presence of a computer does not indicate that a student will get the time they need on the device for educational purposes, the lack of a computer at all ensures that they will not. Equally important to having a reliable electronic device is steady Internet access. Nearly one in five 8- to 18-year-olds still do not have residential broadband (Rideout & Robb, 2021). Roughly 17 million or 14% of U.S. households do not have broadband of any kind (ALA, 2022a). The quality of broadband or Internet services also varies greatly by income and race or ethnicity.

Educational Disruptions Due to Inadequate Digital Access, by Age, Race/Ethnicity, and Income

Among 8- to 18-year-olds who have attended school remotely during the pandemic, percent who say that technical issues or lack of access to a computer or the internet have made it hard for them to attend class or do their schoolwork:

	All	By age		By race/ethnicity			By income		
		8-12	13-18	White	Black	Hispanic/Latino	Lower	Middle	Higher
Ever	75%	77%	73%	72% ^a	71%	81% ^b	82% ^a	74%	73% ^b
Often	10%	13% ^a	8% ^b	8% ^a	9%	16% ^b	13%	11%	8%
Sometimes	34%	34%	33%	30%	34%	39%	42% ^a	35%	29% ^b
Once or twice	31%	30%	32%	34%	28%	26%	27% ^a	28% ^a	36% ^b
Never	25%	23%	27%	28% ^a	29%	19% ^b	18% ^a	26% ^b	27% ^b

Note: Lower income is <\$35,000; middle is \$35,000–99,999; higher is \$100,000 or more. Superscripts are used to denote statistical significance. Items with different superscripts differ significantly at the level of $p < .05$. Items that share a common superscript (and those with no superscript) do not differ significantly. Significance should be read across rows, within each demographic category.

Rideout & Robb (2021)

Digital Equity Landscape Post-COVID-19

In addition to student impacts, over 400,000 (10%) K-12 teachers also struggle with a lack of Internet access at home, and about 100,000 lack devices (Chandra et al., 2020; Ali et al., 2021). When educators lack consistent access to the Internet, their students suffer as well.

Digital Literacy

Students must gain the skills necessary to properly navigate information on the Internet. Digital literacy includes the ability to properly use electronic devices. But processing and contributing to online information is a major factor that impacts all students as well. Being digitally literate requires a good eye for reliable sources and the willingness to thoroughly evaluate resources and sort out truth from misleading or false information (Collins & Shuster, 2017).

This is vital for students selecting and learning from reliable resources, and it facilitates lifelong learning and critical thinking skills. Being an informed digital user requires understanding how we process information and how easy it can be to believe or pass on misinformation. Common missteps in thinking that contribute to believing or spreading misinformation include the following.

- **Confirmation Bias:** This is the tendency to accept information as truth when it aligns with one's beliefs or biases (Collins & Shuster, 2017; Miami Dade College, 2022). This effect makes it more difficult to fact-check misinformation that goes viral. It can reduce exposure to multiple viewpoints and even decrease empathy for those with different cultures or beliefs (Collins & Shuster, 2017).
- **The Illusion of Explanatory Depth:** This is the tendency to believe that one has more knowledge of a topic than they do in reality. The tendency to trust what we already know limits the ability to fact-check, can lessen interest in conducting further research, and make it easier to circulate misinformation (Collins & Shuster, 2017).
- **The Dunning-Krueger Effect:** This is a bias that leads people with limited skills or knowledge in a certain area to believe themselves to be more capable (Collins & Shuster, 2017). In terms of misinformation, this effect leads to people believing that they have the skills to sort out false narratives. The Dunning-Krueger effect can make teaching digital literacy skills more difficult because an educator must convince students that they too can be part of the problem (Collins & Shuster, 2017).
- **The Illusion of Comprehension:** This is a bias that causes the user to mistake familiarity or awareness of a topic with having a deeper understanding. Users who believe that awareness equals full understanding are less likely to research a topic, and they may consider familiar misinformation as factual (Collins & Shuster, 2017).
- **Single Story Narrative:** This is the tendency to define events and people by a singular, popular or familiar narrative. A single story creates stereotypes and defines one story as the only story. It highlights differences and creates oversimplifications (Adichie, 2022).

Digital Literacy

These cognitive biases and thought processes make it difficult for users to become informed about important topics. Becoming digitally literate requires not only knowing about shortcuts or biases in thinking but also how to hone skills to overcome them (Collins & Shuster, 2017).

Digital literacy is especially important given its role in private communication and in sharing personal information online. Hacking and doxxing have happened more frequently and become more of an issue to understand and prevent (Collins & Shuster, 2017). Teens are more likely to share personal information about themselves on social media sites and apps, which necessitates providing guidance for them regarding information that is safe to share or make public, such as hobbies and interests, versus important privacy information like their phone number and address (James, Weinstein & Mendoza, 2021).

There also are ethical questions school personnel face regarding online privacy and minors, such as whether schools should monitor social media accounts for student safety and the difficulty of addressing online-specific behaviors like consensual or non-consensual sexual content sent via messages or texts (James, Weinstein & Mendoza, 2021).

Especially with how early children may sign up for social media accounts or share information online, having good privacy and security awareness applies to both digital literacy and safety. Children are protected under federal laws related to data collection for minors in personal and educational contexts. The *Family Educational Rights and Privacy Act* (FERPA) applies to schools, while the *Children's Online Privacy Protection Act* (COPPA) deals with consumer data collection for children under 13 (James, Weinstein & Mendoza, 2021).

As COVID-19 spread through schools, educators faced a quandary about how to share student health information for the safety of everyone in the classroom without violating FERPA (Nouiouat, 2022). Though COPPA ostensibly prevents companies from tracking personal data from kids, it has become a widespread practice, and teens age 13 and up have no federal laws protecting their online privacy. Teenagers can be tracked and targeted with advertisements, making this an important aspect of digital literacy and privacy (James, Weinstein & Mendoza, 2021).

Media Wise

Though media studies have been a poignant discipline for decades, few educators receive exposure or training in them. Increasingly, scholars have acknowledged that media and digital literacy were becoming more interconnected and relevant today given the proliferation of online content (MediaSmarts, 2022).

Digital literacy does not replace media literacy but builds on it. For example, students learning

how to keep their personal information private should also understand the commercial aspects of online data collection, which is part of media literacy (MediaSmarts, 2022).

Media itself impacts users in various ways, though research does not show a strong link between media exposure and telling users what to think, it does influence what users think about. Media coverage of a person or topic can influence views, particularly if they are shown often or with a particular framing (MediaSmarts, 2022). When it comes to the portrayal of attitudes or themes, the author's intention does not necessarily change the impact of their work.

No media is completely neutral, and there is little difference between content creators knowingly or unconsciously inserting their assumptions into their work. Further, meaning is highly dependent on the collaboration between creator and audience: diverse audiences can take away different meanings from a single work.

Users should be aware of their own biases to both try and evaluate media on their own merits and for critique (MediaSmarts, 2022). Even works and tools that students use purely for entertainment value, such as mobile devices, video games and entertainment sites, can be learned from confidently, effectively and safely (Turner et al., 2017). Concerns about the negative impact of media on students and youth can be helped by teaching them skills to properly digest digital media, minimize negative consequences and emphasize positive messages (Turner et al., 2017).

This learning requires must continue and grow as well. The Consortium for Media Literacy developed a media literacy framework for education and adapted it over time as the media landscape evolved. The approach was confirmed in a longitudinal study that it has a positive impact on student knowledge, attitudes and behavior. (Jolls & Wilson, 2015)

Media Literacy Framework

Consortium for Media Literacy Questions/ TIPS (Q/Tips)

	Deconstruction – 5 Key Questions (Consumer)	Core Concepts	Construction – 5 Key Questions (Producer)
Authorship	Who created this message?	All media messages are constructed.	What am I authoring ?
Format	What creative techniques are used to attract my attention?	Media messages are constructed using a creative language with its own rules.	Does my message reflect understanding in format , creativity and technology?
Audience	How might different people understand this message differently?	Different people experience the same media message differently.	Is my message engaging and compelling for my target audience ?
Content	What values, lifestyles and points of view are represented in, or omitted from, this message?	Media have embedded values and points of view.	Have I clearly and consistently framed values, lifestyles and points of view in my content ?
Purpose	Why is this message being sent?	Most media messages are organized to gain profit and/or power.	Have I communicated my purpose effectively?

Jolls, T., & Wilson, C. (2014). The Core Concepts: Fundamental to Media Literacy Yesterday, Today and Tomorrow. *Journal of Media Literacy Education*, 6(2), 68-78. <https://doi.org/10.23860/jmie-6-2-6>

Misinformation

Misinformation on the Internet includes fake news and online content that is posted and spread with the intention of manipulating and misleading users (Collins & Shuster, 2017). The propagation of misinformation on important topics has negatively impacted efforts to combat COVID-19, amplified hate against people of color and LGBTQ+ communities, and even threatened democracy itself (Collins, 2021).

People are more likely to share false or exaggerated stories online for numerous reasons: it is more expensive and time-consuming to create factual reporting and the benefits of publishing misinformation for shock-value and revenue encourages publishers to create misleading content. Many people, especially students, struggle distinguishing fact from fiction.

Additionally, many users have a lack of trust when it comes to traditional news, preferring stories shared on social media that leave them more vulnerable to seeing misinformation (Collins & Shuster, 2017). There are several factors that contribute to misinformation online listed below.

- A **filter bubble** refers to when a user is siloed from different information and perspectives via algorithms that only include materials on their preferred interests and point of view (GCFGlobal, 2022). Many users may not even know they are in a filter bubble because the

algorithms do not ask permission, make it clear when they are active nor provide information on what has been filtered out (GCFGlobal, 2022).

- The **misinformation effect** is the tendency for information received after an event to interfere with someone's memory of the original occurrence. It speaks to memory impairment, particularly when an individual is exposed to misleading information (Cherry, 2022).
- Misinformation is also linked to **super-spreaders** or individuals who have access to millions of people on social media sites and share misleading or false information, allowing it to proliferate and reach millions of users. These instances of misinformation can be more difficult to refute when they include a kernel of truth that is the basis for a larger lie (Woo, 2021).

Helping students gain the skills to identify and stop spreading misinformation should include discussions on why stopping publicized lies from spreading is important. Students should learn to critically analyze who benefits from widespread misinformation and who is left out. Educators should be prepared to bring in issues relevant to their students' lives and facilitate tough conversations (Collins, 2021).

Digital Citizenship

It is crucial for students to learn how to be responsible digital citizens who are empathetic, informed and create lasting relationships with others via the Internet or any sort of online social community (Zook, 2019). The full scope of digital citizenship can be difficult to comprehensively define because it is sometimes made synonymous with digital literacy, digital etiquette and digital wellness (Chen et al., 2021). Digital citizenship tends to encompass some form of proper online ethics as users should be taught how to respect other people online, and they also bear the responsibility of disseminating credible information (Atif & Chou, 2018).

Regardless of the aspects of digital literacy that overlap with the notion of digital citizenship, the equity aspect of citizenship applies when there is an agreement that every citizen should have the right to reliably access content online to be informed and an active participant in the democratic process. Ribble lists nine elements of digital citizenship below as they apply to education (2015).

- **Digital Access:** Full participation in society in digital spaces.
- **Digital Commerce:** The responsible buying and selling of goods online.
- **Digital Communication:** Knowing appropriate methods and means for communication.
- **Digital Literacy:** Teaching and learning about how technology works and appropriate ways to use it.
- **Digital Etiquette:** Proper online conduct.
- **Digital Law:** The legal responsibility for deeds online and awareness of the rules that govern technology.
- **Digital Rights and Responsibilities:** The freedoms extended to everyone online and the question of how to protect the rights of others.
- **Digital Health and Wellness:** The physical and emotional well-being of those using digital technology.
- **Digital Security:** The precautions necessary to protect privacy and safety.

Common Sense Education and Project Zero's Digital Citizenship Curriculum divides it into "five core dispositions" (James, Weinstein & Mendoza, 2021):

- **Pacing and Self-Direction** – Being self-aware when looking at online content and pushing beyond first impressions to understand the complexity of the topic being explored.
- **Empathy and Curiosity** – Encouraging students to be open-minded, consider different perspectives and their own civic responsibilities.

Digital Citizenship

- **Fact-Checking and Evaluation** – Students should uncover relevant facts through research, compare information from multiple sources and be alert to disinformation strategies.
- **Impact Aware** – Students should be mindful of their own values and evaluate the possible outcomes of information they create or share online.
- **Be Mindful of Action and Responsibility** – Courses of action in sharing or creating online material should be productive and positive, digital habits should support students' wellbeing, students should ask for help when necessary, and students and adults should stand up for others online.

Digital Redlining and Equity Issues

Disproportionate Access

The digital equity gap is characterized by students' ability to access devices as well as by the types of devices they access, where they access them and the infrastructure in place that enables them to use digital devices and programs. As wealthier schools have invested in innovative technological tools, this gap has only widened for schools teaching traditionally underserved students (Aguilar, 2020).

On average, 30% of public K-12 students do not have access to adequate Internet devices. Inequities in Internet access occur due to myriad issues and affordability is an especially prominent barrier due to the cost of securing a working electronic device and an Internet connection.

Internet infrastructure is also a problem. At least 18 million individuals across the United States have limited or no access to high-speed broadband infrastructure, including urban, rural and tribal communities (Chandra et al., 2020). Populations or factors lacking access to service, devices and digital literacy fall most commonly into the following categories.

- **Geography:** The severity of the digital divide varies by state. California, Florida and Texas have the largest number of students without adequate Internet access. Even in states with the smallest digital divide, one in four students do not have access to a suitable device or connection (Chandra et al., 2020).
- **Population Density:** Eighty percent of disconnected students live in urban or suburban regions (Ali et al., 2021). About one in four people living in rural and tribal regions continue to lack constant access to broadband services (ALA, 2022a). Rural communities may not have broadband services available and satellite coverage is both more expensive and has a higher tendency for interruptions (Ali et al., 2021).
- **Race, Ethnicity and Language:** Though around 40% of disconnected students are white, the digital divide disproportionately impacts Black, Latino and Native American students (Chandra et al., 2020; Ali et al., 2021). Emergent bilingual and immigrant students also face additional barriers to digital access. Spanish-speaking households have an overall lower rate of internet adoption than English-only ones (Ali et al., 2021).
- **Income and Mobility:** A growing body of research indicates that socioeconomic status predicts digital literacy skills (Turner et al., 2017). Youth from households identified as low-income are most likely to be disconnected. Those in households with incomes of less than \$50,000 make up about 30% of the K-12 population yet are over 50% of disconnected

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students (Ali et al., 2021). Students identified as homeless are unable to access broadband Internet entirely as public housing or shelters often lack infrastructure (Chandra et al., 2020). The process of obtaining Internet service itself can be difficult as there can be conflicting or inconsistent information on eligibility for discounted or free offerings for low-income families (Chandra et al., 2020).

Students can only be considered prepared to conduct research or school online if they have a desktop computer, laptop or tablet and reliable Internet services fast enough to see important media content and fully participate in online classrooms. Adequate Internet service can be defined as having sufficient speeds of 25/4 Mbps (megabit per second) at a minimum, though households with multiple device users will require higher speeds. The National Digital Inclusion Alliance (2022) recommends at least 100 Mbps download speed. This means that the Federal Communications Commission's recommended 25/3 megabits per second is not enough to have students to be productive over the Internet. In this case, 50/5 megabits per second or even 100/1 would be more adequate.

Simply having a cellular device is insufficient for distance learning (Chandra et al., 2020). In addition to being able to access online content, students should have the digital literacy skills to fully participate in the classroom. Online content should also be available in the primary language of emergent bilingual students (Ali et al., 2021).

Redlining and Modern Access

There is a marked gap in broadband coverage in low-wealth neighborhoods that aligns with redlining – a now-banned practice that denied service based on race and led to a lack of vital services to include insurance, healthcare and essential facilities such as supermarkets in lower-income neighborhoods that were primarily populated by people of color (Tibken, 2021). This trend has extended to Internet infrastructure as big providers often focus on wealthy parts of cities and shun low-income communities when they invest money to upgrade their networks. As a result, lower-income communities that are primarily populated by people of color often have no Internet or pay as much as their wealthier neighbors for low-speed networks that cannot meet their needs (Tibken, 2021; Skinner, Levy & Burtch, 2021).

Unlike the historical practice, digital redlining is not illegal as there are no specific regulations governing where broadband providers operate their networks. Though there is a dearth of research about the nationwide prevalence of digital redlining, more localized studies have found it in cities across the United States. A top-down study showed that the top 20 cities with the least access to broadband all had poverty rates of at least 10%, and all but two had high percentages

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of people of color as residents (Tibken, 2021).

Digital redlining not only impacts students' ability to connect with education and skills online, communities and schools without speedy broadband infrastructure have fewer opportunities for rigorous academics. Some AP classes are only offered online, making them inaccessible for students without a reliable Internet connection and others struggle accessing credit recovery opportunities. A lack of access to stable, speedy Internet can also detrimentally impact a student's ability to learn about and enroll in college, complete financial aid applications and conduct research necessary in college courses (Skinner, Levy & Burtch, 2021). critical

Recommendations

General

Funding for Internet Access: A part of alleviating the digital divide and ensuring a more equitable education will require robust funding. The cost of closing the divide for students ranges from \$6 billion to \$11 billion in the first 12 months in terms of device allocation and broadband infrastructure. This will require that policymakers break down silos to allow public, private and community stakeholders the opportunity to evaluate student needs and execute plans to remedy device and access issues (Chandra et al., 2020; Ali et al., 2021; Cobert & Chang, 2019).

Closing the digital divide and ensuring access for all students will is critical to improving educational outcomes as is preparing school systems to handle disruptions and emergencies that require schools to close (Ali et al., 2021).

- At the federal level, the government can subsidize broadband service and reduce price-related sign-up barriers. Title I and Title IV can be expanded for block grants (Ali et al., 2021; Chandra et al., 2021).
- The federal government can also encourage broadband competition that can lead to consumer protections, high-quality service, lower prices and universal access (Ali et al., 2021).
- Broadband providers and device makers can make cost-effective offerings and invest in infrastructure (Chandra et al., 2021).
- For their part, philanthropies, educational technology companies and education industry associates should continue to support and advocate for digital equity by informing policy and by continuing to invest in digitally enabled learning (Chandra et al., 2021).
- The Affordable Connectivity Program (ACP) is a federal benefit that provides a discount of up to \$30 per month toward Internet service for eligible households and up to \$75 per month for households on qualifying tribal lands.

Achieve Student-to-Device Parity: A single digital device, such as a computer, laptop or tablet, is insufficient in households with multiple students. To ensure every student has the tools to learn, policymakers and stakeholders must ensure that each student has consistent access to an affordable digital device (Chandra et al., 2020; Zielezinski & Darling-Hammond, 2016). There are many local organizations that are working to close the device gap by offering device check out or device donation programs. To find out what is available in your area, we recommend that you reach out to your local public library, school district or area non-profits, such as Goodwill, who have digital Inclusion programs that offer devices to local community members. For

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example...

- Digital Inclusion Donate a Device Program <https://www.goodwillsa.org/digital-inclusion>
- San Antonio Public Library Digital Inclusion Efforts <https://guides.mysapl.org/digital-inclusion>
- Older Adults Technology Services <https://oats.org/>

Mindful Assessment and Community Communication: Stakeholders must be aware of barriers and limitations when gathering information or addressing digital inequities. Relying on online surveys and requests for data will not reach many households without Internet access and using digital methods to gather information will inevitably leave some families behind. Schools should work directly with families, community organizations, churches and volunteers to gather and disseminate information and ensure it reaches everyone (Ali et al., 2021).

Ensure that Educator Programs Teach Digital Literacy: There should be a set of competencies or proficiencies in teacher preparation programs that will enable faculty and leaders to establish digital literacy skills as a requirement for entering the field (Huck & Zhang, 2021). Collaborating with stakeholders in professional associations can help streamline and hone these competencies (Borthwick & Hansen, 2017). Teachers should be given the support to increase their confidence in using technological tools and resources in the classroom (Huck & Zhang, 2021).

Increase the Scope of Equity Conversations: All stakeholders should be aware that inequities in access to online services are not only rural-urban but also impact within-urban and suburban areas. These gaps disproportionately impact low-income and communities of color. Additionally, the presence of an offer of broadband service does not equal universal access for all students (Skinner, Levy & Burtch, 2021).

Ensure Digital Audits Consider Accessibility Elements: Devices that help students with disabilities – from visual impairment to those with communication barriers – must be included in the process of determining necessary digital resources. Assistive technology can help these students thrive.

To ensure that language needs are being met, new programs in consideration should have support in student-relevant languages and allow students to meaningfully participate (Fennelly-Atkinson, 2022). The selection of tools and programs for emergent bilingual students should focus on programs that are proven effective for their learning.

State Level

Develop a State Strategy: Each state should create a broadband office to manage coverage

Recommendations

maps, come to an agreement on universal connectivity standards and direct infrastructure projects (Ali et al., 2021).

Streamline Outreach: State websites can gather and promote programs and affordable Internet options on their websites that should be publicized and released to stakeholders to spread awareness of useful resources (Ali et al., 2021).

Eliminate Outdated or Tests with Inappropriate High Stakes: Digital literacy and equity issues are often forgotten when discussing standard testing, which is an issue when tests have shifted to online, adaptive offerings. These tests still too often focus largely on multiple-choice or short-answer questions that do not invite students to demonstrate the full range of skills required to be digitally and media literate. If students are to become digitally proficient, informed and active citizens, traditional test structures must be replaced by those that build and reinforce the wide range of skills and ways of disseminating information reinforced by digital literacies (Turner et al., 2017).

Evaluate Speed in Addition to Access: While ensuring that all students can access Internet service is important, it is equally vital that stakeholders assess and address the necessary steps to ensure that Internet services are speedy enough for students to use for online learning (Chandra et al., 2020).

Expand Digital Literacy Efforts: Direct funds for digital literacy to more support for educators, digital literacy training for parents and outreach efforts that specifically target underserved or hard-to-reach communities (Ali et al., 2021). Additionally, digital and media literacy should not be siloed as a standalone subject, aspects should be a part of all subject areas (Collins, 2021).

School Level

Gather and document information: Districts and schools can directly pull information on their communities' broadband and device needs and use the data to inform solutions (Ali et al., 2021).

Develop media and digital literacy in educators: Teachers must have a theoretical basis for developing their own media literacy activities. They can also tailor literacy lessons to individual student needs (MediaSmarts, 2022). The organizations below have many good resources.

- Center for Media Literacy <https://www.medialit.org>
- Common Sense Education <https://www.commonsense.org/education/news-media-literacy-resource-center>
- Consortium for Media Literacy <https://www.consortiumformedialiteracy.org/>
- Media Smarts <https://mediasmarts.ca/digital-media-literacy/general-information/digital-media->

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[literacy-fundamentals/key-concepts-digital-media%C2%A0literacy](#)

- PBS Classroom Newshour <https://www.pbs.org/newshour/classroom/2021/02/lesson-plan-media-literacy-news-thats-nice-to-know-news-you-need-to-know/>

Ensure continuity: Students can learn digital skills throughout their academic careers so that they are evaluating developmentally-appropriate content from elementary school through high school (MediaSmarts, 2022). Educators can also add elements of digital literacy and equity to other lessons.

Avoid obsolete tools and programs: Educators and stakeholders should be appraised of the tools and programs most often used by their students so that they can continue to tailor lessons to the kind of content that their students will regularly encounter (MediaSmarts, 2022). In general, policy must meet technologies as they change to ensure relevant solutions (Turner et al., 2017).

Ensure access by language: Emergent bilingual students should not be barred from accessing important online educational content due to a language barrier. Notices and online resources should be available in a student's primary language in addition to English (Ali et al., 2021).

Conduct meaningful digital audits: Audits should be ongoing to both evaluate the usefulness of existing technology and tools and to identify new ones that will help educators and students. Conducting a proper digital audit should include tailoring questions and analyses to the educators, gathering both qualitative and quantitative data and ensuring that data gathering tools are easy to use and respect teachers' time (Parsons, 2020). Schools should bring in district or community auditors trained to analyze information and provide recommendations on how to improve digital access on campus (Brown, 2019; Parsons, 2020). See IDRA's sample survey questions in this assistance package.

Include strategies to protect privacy and identify misinformation: Students who receive training specifically on identifying misinformation and understanding their own capacity to be misled can analyze questionable material they find online. More specifically, teaching students to analyze news more laterally by conducting research on sources and topics covered in misleading stories helps them to sort out truth from misinformation (Andrews, 2022). Students should be made aware at a young age about the importance of privacy online and the types of information they should not share publicly or in private messages with others (James, Weinstein & Mendoza, 2021).

One method of helping students combat misinformation is to teach Civic Online Reasoning (COR) curriculum that translates skills used by professional fact-checkers into classroom practice (Collins, 2021).

Recommendations

Classroom Level

Use an equity lens: An educator's use of technology is not necessarily separate from other pedagogical practices. Students must be given access to academically rigorous, high-quality materials regardless of how they are delivered. Educators must adopt equitable teaching practices and ensure that technological tools allow students to engage with quality academics as opposed to rote, drill-based digital lessons.

Similarly, educators should reject the notion that students who receive specialized services should only complete remedial coursework or use tools that make them passive receivers of information (Reich, 2019; Price-Dennis, Holmes & Smith, 2015).

During remote or distance learning, it is important to remember that not all students have a room to themselves or a dedicated study area. Thus, requiring a student to be visible to prove presence is not equitable. Not all students have a space they can share with others and therefore turn their cameras off to protect themselves or their environment.

Prioritize empathy online: Young people can become less empathetic toward those outside of their immediate social group as Internet culture often promotes humor and memes rather than genuine human connection. Students can become radicalized by those who use humor tactics to appear youthful, edgy and fun while normalizing harmful messages (Collins & Shuster, 2017).

Students must be taught how misinformation spreads, who it helps and who it harms (Collins, 2021). It is important that students gain a sense of empathy and tolerance as they interact with others online (Zook, 2019). Social and emotional learning can help students gain the tools they need to better empathize with others and process their own thoughts and emotions (Abramson, 2021; Huck & Zhang, 2021).

Connect to student interests: The interests that students have in technology, from games to coding, should be treated as gateways to student engagement. Encouraging learners to develop relevant skills in fields that interest them can encourage them to hone these skills and see their relevance to learning and eventual college and career (Reich, 2019). Ensure that issues meaningful in their lives are being addressed and help them constructively address these relevant community or social issues through their academic work (Price-Dennis, Holmes & Smith, 2015; Zielezinski & Darling-Hammond, 2016).

Create a community of learners: Students who are digitally literate should be collaborators, learners and teachers. Students should be encouraged to design questions to ask their peers for discussion and collaborate to create projects about issues important to them that they can also bring to the larger community (Price-Dennis, Holmes & Smith, 2015).

Ensure interactivity and discovery: Programs and technology tools allow for various levels of

Recommendations

interaction. Technology in the classroom should not put students in a passive role. Highly interactive activities that facilitate students to craft and explore their own understandings of complex content benefits learning and the development of critical thinking skills, particularly for traditionally underserved students (Zielezinski & Darling-Hammond, 2016).

Allow students to drive their own learning: Providing learning opportunities that enable students to become content creators increases their engagement, skill development and sense of self-efficacy (Zielezinski & Darling-Hammond, 2016).

Community Power Building

Use common terminology: Stakeholders should agree on a common set of terms and definitions so that when they discuss digital literacy and equity, everyone understands the basic concepts (MediaSmarts, 2022). Ideally, these terms would be shared not just in the community, but by schools across the nation.

Recognize complex solutions for each community: Policy solutions to reinforce digital equity should not be over generalized, they should consider variability and relevancy to impacted communities. At the federal and state level, solutions should empower local officials to make decisions about instruction and assessment in schools that are informed by their needs and backed by reliable research (Turner et al., 2017).

Uplift family voices: Community organizations and advocates can amplify the issues and concerns of families and ensure that their ideas are at the forefront when implementing solutions (Ali et al., 2021). Community organizations can link families, businesses and local government to encourage collaborative solutions.

Encourage family engagement: A promising strategy for increased family and student engagement is to partner with community or business stakeholders to provide computers and training to parents. This allows parents to have another avenue for learning and communication, and they will be better equipped to help their children with academics and projects (Reich, 2019).

To learn more about digital equity and community power building please visit the National Digital Inclusion Alliance (NDIA) to find a digital equity coalition in your area.

Terminology

Confirmation Bias: The thought process or tendency to accept information unquestioningly when it reinforces an existing belief or attitude. When an individual wants to believe something is true, they may selectively choose information that confirms a prejudice (Miami Dade College, 2022).

Digital Audit: Analysis of both the technological assets and measures currently being used in a school to ensure that the school's spending on digital resources has the best and biggest impact. A broad audit looks at technology operations, classroom tech, infrastructure, staffing and data flow (Brown, 2019).

Digital Citizenship: The responsible use of technology by anyone using computers, the Internet or other electronic devices to engage with society at any level (Zook, 2019). This definition can be difficult to pin down due to the many dimensions it covers, but there is generally some aspect of access and responsibility as an online citizen (Chen et al., 2021).

Digital Divide: The gap between those with affordable access and necessary skills to effectively engage online and those who do not. The digital divide impedes equal participation in increasingly relevant online spaces. The digital divide disproportionately impacts people of color, Indigenous peoples, low-income households, people with disabilities, rural households, and older adults (NDIA, 2022).

Digital Equity: The condition where all communities and individuals have the technological capacity needed for full participation in our society, democracy and economy (NDIA, 2022).

Digital Literacy: The ability to use information and communication technologies to find, evaluate, create and convey information. This requires both cognitive and technical skills (ALA, 2022b). A person who possesses digital literacy skills understands how to access and interpret information and can use these skills to collaborate, communicate and participate in a civic society (NDIA, 2022).

Digital Redlining: Discrimination by Internet service providers in the deployment, maintenance or upgrade of digital infrastructure. Denying services has disparate impacts based on income, race and ethnicity (NDIA, 2022).

Doxxing: The purposeful and often malicious sharing of someone's personal information or images online (Collins & Shuster, 2017). Doxxing can also be part of online bullying and

Terminology

harassment (stopbullying.gov, 2021).

Dunning-Krueger Effect: Cognitive bias leading people with limited knowledge to believe that their abilities are greater than they are in reality (Collins & Shuster, 2017).

Filter Bubbles: Also known as “echo chambers,” filter bubbles use automated personalization that can isolate a digital reader from information outside of their preferences. Filter bubbles can also funnel misinformation and weaken a user’s ability to avoid bias and fake news (Miami Dade College, 2022).

Illusion of Explanatory Depth: The tendency to believe that one knows more about a topic than they do in reality (Collins & Shuster, 2017).

Misinformation Effect: The tendency for information received after an event to interfere with someone’s memory of the original occurrence. It speaks to memory impairment, particularly after an individual is exposed to misleading information (Cherry, 2022).

Single Story Narrative: The tendency to define events and people by a single narrative. A single story creates stereotypes and defines a single story as the only story. It highlights differences and creates oversimplifications (Adichie, 2022).

Super-Spreaders: Individuals who have access to millions of people on social media sites who share misleading or false information, allowing it to proliferate and reach millions of users (Woo, 2021).

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