Guest editorial: Beyond digital youth: understanding, supporting, and designing for young people's digital experiences

In 2006, the MacArthur Foundation launched a $50m initiative to help determine how digital media [1] are changing the way young people learn, play, socialize and participate in civic life. The research that resulted from this initiative provided foundational insight into the complex interweaving of young people's digital and nondigital experiences, and pointed to impacts on youth's relationships, learning and sense of self, among other experiences (Ito *et al.*, 2010; James *et al.*, 2009; Jenkins, 2009). Examples of such influential work include:

- The Digital Youth Project, led by Mizuko Ito, Peter Lyman, Michael Carter and Barrie Thorne, which introduced us to the concept of HOMAGO (hanging out, messing around and geeking out), a framework for understanding young people's informal learning through online activities, and the progressively sophisticated and involved forms of participation they move through (Ito *et al.*, 2009, 2010).
- Henry Jenkins' Project New Media Literacies, which defined a set of cultural competencies and social skills, such as transmedia navigation, distributed cognition and appropriation, that young people need to navigate the new media landscape successfully (Jenkins, 2009).
- The Digital Youth Network, led by Nichole Pinkard, which has worked with a variety of educational and community-based organizations to understand and support Chicago youth in learning digital media skills and new media literacies (Barron *et al.*, 2014; Pinkard *et al.*, 2008).
- The Quest to Learn public middle and high school in New York City, which was designed by a team led by Katie Salen Tekinbas and based on a pedagogical approach to learning called game-like learning. Game-like learning places children's interests and expertise at the center of their learning experiences (Barab *et al.*, 2005; Squire, 2011; Tekinbas *et al.*, 2010).
- The GoodPlay Project, led by Howard Gardner and Carrie James, which explored the moral and ethical dimensions of young people's networked experiences in the areas of identity, privacy, ownership and authorship, credibility and participation (James *et al.*, 2009).
- The Connected Learning Research Network, led by Mizuko Ito, which introduced the connected learning framework and highlighted the value of using networked technologies to support meaningful connections across young people's learning ecologies, as well as the persistent inequities in how these networked opportunities are distributed in society (Ito *et al.*, 2013, 2020).
- The Youth and Participatory Politics Research Network, led by Joseph Kahne, which identified and described the new forms of political and civic engagement enabled by networked technologies (Cohen and Kahne, 2011; Kahne *et al.*, 2015).

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From the beginning, researchers studying young people's technology use have prioritized centering youth perspectives. Books such as Watkins' (2009) *The Young and the Digital*, danah boyd's *It's Complicated* (2014), Gardner and Davis' (2013) *The App Generation*, James' (2014) *Disconnected* and Sims' (2017) *Disruptive Fixation* all draw on the firsthand accounts of young people as they navigate the personal, social, cultural and political complexities of being the first generation to grow up having access to ubiquitous technologies.

In the decade and a half since the MacArthur Foundation launched its Digital Media and Learning Initiative, research on youth and technology has become a firmly established area across disciplines and departments, with journals, conferences and other professional organizations following suit. This journal, *Information and Learning Sciences*, illustrates the strong presence of digital youth-related research in the fields of information science and the learning sciences in particular, including research at the intersection of these two fields. Notably, much of this research is being conducted in information schools (fondly known as iSchools), illustrating the value of bringing different disciplinary perspectives to bear to understand the varied dimensions and nuances of young people's interactions with technology.

This special issue centers the experiences and perspectives of youth as they engage with the technologies that permeate their daily lives. Within this overarching frame, the papers represent a range of focal areas. Some focus on *understanding* how technologies interact with young people's distinct sociocultural contexts; others present best practices for *supporting* young people's positive technology experiences; and still others explore promising strategies for *designing* new technologies with and for youth. All papers contribute to our understanding of the opportunities and challenges that today's young people experience as they live and learn with technology.

Three trends in digital youth research

Here, we place the papers in this special issue within a broader context of research related to youth, technology, information and learning. Our intent is not to provide an exhaustive review of literature, but rather to highlight some key trends in digital youth research that set the stage for understanding the contributions of the current special issue.

Understanding young people's learning ecologies

Researchers have put forward a variety of frameworks to illustrate technology's role in young people's learning ecologies. One of the most well-known frameworks in the learning sciences and information science is the connected learning framework defined by Ito *et al.* (2013, 2020), which provides insight into technology's current and potential role in supporting young people's learning across their varied social contexts. Connected learning is "learning that connects personal interests, supportive relationships, and academic, civic, and career opportunity" (Ito *et al.*, 2020, p. 4). Connected learning can happen inside and outside of formal educational settings, as well as online and offline. Although young people do not need technology to experience connected learning, the framework recognizes that digital platforms and tools hold specific affordances – such as interactivity, searchability and scalability (Evans *et al.*, 2017) – that are relevant to a connected approach to learning. Due to their distinct affordances, online communities, digital production tools and open educational resources, among other technologies, hold tremendous potential for promoting learning that is interest-driven, supported by meaningful relationships and tied to future opportunity.

Researchers in both the learning sciences and information science have explored a range of contexts in which technologies support young people's connected learning experiences,

from formal school settings (Davis and Fullerton, 2016) to more informal learning contexts such as libraries (Bilandzic, 2016; Hoffman *et al.*, 2016; Subramaniam *et al.*, 2018), afterschool programs (Ahn *et al.*, 2014; Davis and Fullerton, 2016; Davis *et al.*, 2018) and the home (Livingstone and Blum-Ross, 2019). For instance, Subramaniam *et al.* (2018) showed how, through their youth-focused programming, public libraries can support young people in exploring their interests, provide opportunities for them to collaborate with peers and adults and develop their creativity through production-centered activities.

In addition to connected learning, frameworks such as joint media engagement, online search and brokering, gameful learning and narrative-based engagement illustrate technology's varied roles in young people's learning ecologies. Joint media engagement (JME) involves children and adults (typically caregivers) engaging in shared technology experiences that are marked by collaboration, shared meaning making and learning (Takeuchi and Stevens, 2011). JME recognizes the learning potential of seemingly noneducational technology experiences that take place in informal settings such as the family living room. Similarly, the concept of online search and brokering (OSB) describes the skills that children of immigrants develop and use as they search with their family members for information regarding important family needs and decisions (Katz, 2014; Yip *et al.*, 2017; Yip *et al.*, this issue). OSB highlights the importance of paying attention to the sociocultural dimensions of young people's technology use.

Moving from the home to more formal learning environments, gameful learning takes inspiration from video games to reconsider the underlying mechanics of teaching and learning (Aguilar *et al.*, 2018). In this approach to learning, technology's ability to provide customized, scaffolded and flexible learning experiences helps learners achieve a sense of ownership and competence related to their learning. Another approach is narrative-based engagement, which engages learners in developing empowering stories around their learning experiences. Scholars have used narrative-based curricula in out-of-school learning environments to address stereotypes in STEM careers, motivate girls' participation in STEM content and develop their interest in STEM domains (Pinkard *et al.*, 2017).

Collectively, these frameworks and the research they have inspired prompt us to take a more expansive view of young people's experiences with technology, one that recognizes meaningful learning in a variety of forms and across a range of sociocultural contexts (Means and Stephens, 2021). With this recognition, we (researchers, educators, facilitators, parents and other people who work with youth) are better equipped to value and build on young people's everyday experiences with technology instead of overlooking or even dismissing them.

Despite the promises of technology-related learning, persistent challenges make it difficult to move past the potential. With respect to formal education, for instance, the entrenched structures and practices of school systems make for strong headwinds against efforts to use technology to reimagine teaching and learning (Reich, 2020). Consequently, when new technologies are introduced into classrooms, they are typically used to make existing practices more efficient rather than as an opportunity to identify and support new pedagogical practices.

The coronavirus pandemic represents a good case in point. When US schools moved online at the start of the pandemic, most schools – especially public schools – replicated familiar classroom-based practices in the online environment. Even if teachers had been open to exploring innovative uses of this new learning format, most lacked the resources and structural supports to do so (Reich and Mehta, 2021). Similarly, in informal learning contexts such as libraries, library staff were quick to pivot to virtual library programs and offerings, without taking the opportunity to reimagine learning via these online platforms.

Those library staff who wanted to innovate ran into structural and administrative obstacles (Subramaniam and Braun, 2021).

The pandemic also highlighted the inequities in the US education system, which give rise to an unequal distribution of technology-supported learning experiences (Aguilar, 2020; Aguiliera and Nightengale-Lee, 2020; Reynolds and Chu, 2020; Reynolds *et al.*, 2022). Compared to children living in higher-income households, children living in low-income households faced disproportionately greater challenges when schools closed down and teaching moved online (Goldhaber *et al.*, 2022). These challenges included unreliable internet connections and inconsistent access to a home computer (as well as a quiet place to use it and a parent able to provide support). In addition to access and connectivity challenges, children living in low-income communities often attend under-resourced schools that lack the resources to use technology in ways that promote higher-order skills like problem-solving and creativity (Attewell, 2001; Rafalow, 2020). Instead, technology is more likely to be used to reinforce basic skills through drill and practice.

Supporting young people's digital literacies

Whether we speak of media literacy, digital literacy, web literacy or information literacy, there is widespread recognition that literacy in a digital age requires more than the ability to read and write (Head *et al.*, 2020; Jenkins, 2009). Young people must develop the technical skills needed to engage with digital tools, the social and cultural competencies to participate in diverse online communities, and the critical skills to discern trustworthy online content.

The new media literacies framework proposed by Jenkins (2009) accounts for both the social and cultural dimensions of interacting with networked technologies, as well as the technical skills needed to engage with digital tools and online content. For example, the skill of *appropriation* involves the ability to meaningfully sample and remix media content. A child who is remixing another child's project on the Scratch programming platform needs to have the technical skills to reproduce and modify the original project, as well as the ability to reflect on the ethical dimensions of repurposing existing media content. Another skill, *transmedia navigation,* involves the ability to follow the flow of stories and information across multiple modalities. A teen who participates in fan-based communities may read and comment on fanfiction stories on Archive of Our Own, reblog fan-based memes on Tumblr and share their own fan art on DeviantArt. As they engage with these multiple platforms and communities, they are actively synthesizing the information they encounter and learning to express their own ideas in a variety of modalities.

As Jenkins' new media literacies make clear, participation is central to literacy in a digitally networked world. Young people must learn to interact with others and participate in communities as they search for, share, create and remix online content. When it comes to civic participation, the concept of civic media literacy addresses the media-based skills young people need to attain their civic goals (Middaugh, Bell and Kornbluh, this issue; Mihailidis, 2018). The civic media literacies framework proposed by Mihailidis (2018) emphasizes the importance of promoting young people's sense of agency as they navigate their media environments. It also recognizes the difficulty of assuming a critical distance – as traditional media literacy frameworks tend to do – from the information that young people encounter online. Effective literacy interventions, Mihailidis argues, must take into account the emotional dimension of young people's online interactions, as well as the need for community-based supports that promote collective, rather than individual, responsibility.

Both the new media literacies and civic media literacies frameworks address issues of equity associated with young people's online participation. For instance, Jenkins (2009)

identifies the *participation gap*, which recognizes that literacy-building technology interactions are unevenly distributed in the population. Compared to youth with less privilege (with respect to the disproportionate allotment of societal benefits across socioeconomic, racial and ethnic categories), young people from privileged backgrounds tend to have greater access to supports, such as an experienced parent or sibling, that can help them develop their new media literacies and prepare them to engage in sophisticated uses of technology. With respect to civic media literacies, Mihailidis (2018) emphasizes that young people should be taught not simply to judge media content at face value but to critique the political and economic forces that shape it. Such critique involves being attuned to those voices that are centered and those that are marginalized by unseen but powerful algorithms, which themselves reflect and magnify the biases of the people who created them (Gillespie, 2014, 2018).

Frameworks such as Jenkins' new media literacies and Mihailidis' civic media literacies illustrate that looking beyond digital youth requires looking beyond traditional views of learning and engagement. The complexity and variety of young people's digital lives give rise to a new set of skills needed to navigate the digital landscape successfully. The papers in this special issue, such as Kumar and Byrne's paper on privacy education, Middaugh, Bell and Kornbluh's paper on civic media literacy, Andersson's framing of smartphone use for information search, and Keune, Peppler and Dahn's approach to using connected portfolios to support community-based learning contribute to our understanding of these skills as well as best practices for supporting their development.

Designing technologies with and for youth

Many of the technologies that young people use regularly were not designed with their developmental needs or best interests front and center. For instance, Lenhart and Owens (2021) interviewed tech industry insiders and found that adolescents are typically an afterthought in the design process. Instead, product developers design for an "imagined average user," who tends to reflect the people on their product team rather than the actual users of the technology they are designing. In addition to failing to account for the broader range of identities, privilege and sociocultural experiences in the general population, designing for the imagined average user overlooks important developmental considerations, such as information processing capacity, symbolic reasoning, attentional skills and fine motor control (Anthony, 2019; Hiniker *et al.*, 2015, 2016; Meyer *et al.*, 2021; Soni *et al.*, 2019).

Technology designers also make liberal use of dark patterns – design features whose primary purpose is to keep users engaged with a technology for as long as possible without consideration for their well-being (Fitton and Read, 2019; Narayanan *et al.*, 2020). Dark patterns may pose a distinct challenge for younger children due to their developing self-regulation and critical thinking skills (Radesky *et al.*, 2020). Dark patterns can also be extremely difficult for adolescents to navigate, especially if they tap into adolescents' heightened emotional responses to social interactions (Somerville, 2013). Features that are common to social media platforms, such as likes, comments and view counts, play directly into the weight that many adolescents place on social status (Davis, 2023; Weinstein and James, 2022).

In addition to shining a critical light on the oversights and dark patterns within commercial technology design, design researchers are trying to improve the design process when it comes to youth-oriented technologies. One promising strategy is participatory design, an approach that involves youth as active participants in the design process (Druin, 1999, 2002; Guha *et al.*, 2013; Fails *et al.*, 2013; Iversen *et al.*, 2017). By working alongside youth as design partners, researchers strive to incorporate young people's perspectives,

values, skills and experiences into the design of the technologies they will ultimately use. Researchers draw on a variety of activities to engage youth in the design process, from ideating with sticky notes to using household and art supplies to create prototype technologies (Walsh *et al.*, 2013; Yip *et al.*, 2013). Shokeen, Williams-Pierce, Katirci and Bonsignore (this issue) explore how sketching can be incorporated into participatory design to strengthen the design of technologies for children.

Young people's involvement in participatory design can take a variety of forms, from *users* of technology whose practices inform the direction of future designs, to full-fledged *design partners*, who work alongside adults throughout the design process as they share their perspectives and experiences (Druin, 2002). More recently, Iversen *et al.* (2017) proposed the role of *protagonist*, in which researchers involve children in an entire design process, supporting their development of design skills and encouraging their reflection on technology and its role in their lives. In this special issue, Coenraad shows how participatory design can be used to engage black youth in reflective discussion about technological biases and how they can discriminate against them and their communities.

Involving youth – as well as the members of their communities, such as parents, teachers and informal learning educators and facilitators – in the design process increases the likelihood that the resulting technologies align with young people's lived experiences and support, rather than undermine, their development (Davis, 2023; Subramaniam, 2016). It also helps to avoid designing for the "imagined average user" that is more reflective of the (usually white, male and highly educated [Gillespie, 2018]) designers than young people and their diverse identities and contexts (Lenhart and Owens, 2021).

Participatory approaches to designing technologies with and for youth align with current efforts across research disciplines to recognize and support young people's positive, equitable and inclusive digital experiences. In 2021, a group of researchers of youth digital media practices, led by Mizuko Ito, published a position statement for an emerging field they call HX, short for Human Experience, "an approach to talking about, engaging with, and designing technology in a way that is aligned with our needs as humans" (Ito *et al.*, 2021). Like the papers in this special issue, HX recognizes that efforts to support positive tech experiences must be grounded in a deep understanding of the social, political, economic and historical factors affecting young people's technology use, as well as a commitment to centering youth voice and agency.

The articles in this special issue

The papers in this special issue contribute new insight related to understanding, supporting and designing for young people's positive technology experiences. Although they use a variety of methods – including case studies, interviews, ethnographic fieldwork, surveys and cooperative inquiry – the authors share a common focus on foregrounding young people's lived experiences and perspectives and recognizing the individual, contextual and design-based influences shaping their digital lives. Below, we highlight key takeaways from each paper, which we have grouped according to their focus on understanding, supporting or designing for positive technology experiences.

Understanding

In their paper "Youth Invisible Work: The Sociocultural and Collaborative Processes of Online Search and Brokering between Adolescents and English-Language Learning Families," Yip *et al.* provide a case study analysis of three lower-income, bilingual families and how they search the internet collaboratively. Yip *et al.* identify specific learning processes around families' online information searches, providing new insight into the

conditions that support productive JME. This work expands our understanding of JME beyond entertainment and education to include family work, underscoring the importance of attending to the contextual factors surrounding children's technology use.

Anderrson's paper "Between Enabling and Disturbing: Smartphones and Shifting Frames in Everyday Life" examines the use of smartphones for online searching from the perspectives of Swedish youth. Using frame analysis as the lens to understand smartphone use for searching in various activities and contexts that youth are engaged with, the author identified three frames – entertainment (most prevalent), easy access to information (compared to a computer) and challenging copresence (such as the act of "phubbing" where the presence of smartphones in social interaction is considered a distraction). One major finding of this paper is that these framings cannot be easily mapped to one activity or a context – for example, searching at a family dinner table to access information that is needed during a conversation falls into a different framing (easy access) than searching for a YouTube video to watch individually over a family dinner, which is not allowed by certain families (challenging copresence). These findings contribute to our understanding of how young people use smartphones for online searches of everyday life information.

"Young Children's Interest-Driven Information Practices" explores everyday information practices among a younger group of children. Barriage engaged five- to seven-year-old children and their parents in a series of participatory activities to understand how young children seek, use and share information about topics that interest them. In addition to asking questions of other people, children made frequent use of technology to support their interest-driven information practices. Barriage identifies specific opportunities and obstacles associated with young children's technology-mediated information seeking, as well as the interplay between technology's affordances, children's individual interests and skills and their parents' support and restrictions. This work contributes needed insight into the individual and contextual factors shaping young children's interactions with technology to seek, use and share information.

In their paper, "The Role of Parents, Other Adults, Peers, and Informal Learning Communities in Shaping Positive Social Media Use in Adolescent Girls," Charmaraman *et al.* explore the roles that parents, other adults and peers can play in promoting positive social media use among adolescent girls. Using results from a survey conducted with 968 youth (M age = 13 years) and a case study of a workshop involving 16 girls aged 11–14 years, the authors found that there is an "unofficial village" with parents and peers topping the list as "advisors" to help novice social media users. Charmaraman *et al.* also identify specific conversational topics – including digital citizenship, privacy and security and healthy relationships – that promote positive social media use among girls and can be initiated by parents and other individuals who have more experience with social media.

Supporting

Middaugh, Bell and Kornbluh's paper titled, "Think Before You Share: Building a Civic Media Literacy Framework for Everyday Contexts" helps us understand the complexities of young people's online engagement while pointing to promising strategies of support for their civic engagement. Based on their work with youth from a large, urban state university in Northern California, Middaugh and colleagues unpack the most common online form of civic engagement among youth today: using social media to receive and circulate civic information. They found that young people engaging in civic information via social media receive information through incidental exposure from their networks rather than engaging in effortful search of civic information, which is different from previous findings of

information practices among youth. The authors also found that young people relied on a range of activist and aggregator accounts in addition to or sometimes in lieu of institutional sources. With these findings, Middaugh *et al.* move away from the traditional linear approach of youth civic media literacy, which delineates an effortful search, credibility analysis and production, to a new dynamic model in which youth apply judgments of credibility, relational considerations, relevance to their lived experience, civic impact and fit with internet culture as they receive, endorse, share, comment on and produce media in a nonlinear fashion.

Kumar and Byrne's paper "The 5Ds of Privacy Literacy: A Framework for Privacy Education" presents a framework to guide privacy literacy pedagogy in educational contexts. Drawing on theories of privacy and learning, Kumar and Byrne have identified a set of five learning objectives to guide the development of privacy literacy programs that go beyond a protectionist stance toward privacy and technology. The *5Ds of privacy literacy* draws on the concept of information flows – which places context at the center of information exchanges – to help children develop the skills they need to interpret social situations and act in a way that aligns with the norms of a given technology-mediated context.

To support learning, Keune, Peppler and Dahn shared the strengths of using "Connected Portfolios: Open Assessment Practices for Maker Portfolios," that focused on capturing community sociocultural practices in making, in contrast to the traditional portfolio that focuses on individual learning and practices. In this ethnographic study of school and out-of-school makerspaces, by examining the portfolios of 22 youth and interviews and usability walkthroughs with 10 of them, the authors found that portfolios that included shared projects and documentation and that were shared openly across communities made community building within and beyond maker-educational communities possible. Such concepts of "connected portfolios" open up the possibility of community-based learning, which includes greater technical and social engagement, richer opportunities for feedback and refinement, and avenues to narrate work to multiple audiences that is often lacking in individual maker portfolios.

Designing

Shokeen, Williams-Pierce, Katirci and Bonsignore, in their paper "Youth Learning to Sketch: Sketching to Learn," explore young people's sketching behavior as they engage in interest-driven design activities in the context of a participatory design approach known as cooperative inquiry. The authors show how youth participants (aged 9–11) used sketching to share their perspectives and experiences and how sketching activities supported their design-oriented learning opportunities. The findings contribute to our understanding of promising strategies for involving young people in the design of new technologies.

Another instance of the cooperative inquiry method is seen in Coenraad's paper "'That's what Techquity is': Youth Perceptions of Technological and Algorithmic Bias." Coenraad engaged eight Black youth (aged 8–13) in a rich and collaborative research process that honored and valued their perspectives. This process uncovered participants' existing awareness of visible bias in the technologies they regularly use. It also showed how the design process can be used to provide young people with a vocabulary for understanding and discussing technology bias that is less visible. In addition to contributing insights in the area of participatory design, this paper holds implications for pedagogical interventions around the topic of technological bias.

Conclusion

In addition to the contributions they make to digital youth research, the papers in this special issue point to promising areas for future research. Looking forward, we see the following areas as ripe for exploration:

Understanding

Both Yip *et al.* and Anderrson recommend that future research go beyond normative framings of young people's technology use (e.g. for entertainment) to explore a broader range of contexts and motivations, for instance, collaborative internet searches with family members. Barriage underscores the importance of taking into account individual differences in children's technology use based on their specific interests and contexts. In addition, Yip *et al.* point to the need to explore online search and brokering in the context of newer technologies such as voice assistants and other artificial intelligence-powered technologies.

Charmaraman *et al.* similarly call for future research that accounts for young people's social contexts. They recommend studies that explore in greater depth the contours of the "complex village" surrounding middle school students' early social media use that they documented in their paper. Their work also points to the value of pursuing interventions that adopt an empowerment model and develop supportive Communities of Practice around adolescents' social media use.

Supporting

Several papers in this special issue call for a reframing of traditional educational approaches in the areas of privacy literacy, portfolio-based assessments and civic media literacy. Kumar and Byrne propose using the learning objectives associated with their 5Ds of privacy framework to guide the development of privacy literacy programs that move away from prescriptive rules and instead address the contextual nature of young people's online information flows. Keune *et al.* envision using connected portfolios to move away from a model of individual learning and achievement towards a recognition of and support for young people's community-based learning experiences. Middaugh *et al.* call for civic media literacy education that integrates young people's real-world practices with social media, giving youth opportunities to evaluate real world examples of social media from varied sources as well as practice curating their own social media feeds and expressing their views on civic issues.

Designing

Finally, in the realm of design, Shokeen *et al.* and Coenraad demonstrate that codesign can be an effective way to surface young people's perspectives and experiences, and the resulting insights hold promise for improving the design of technologies for children. Future work is needed to document with greater systematicity whether and how technology can be made better through codesign with children. These papers also illustrate how codesign can be a learning tool for youth participants. Coenraad showed how codesign was used to call young people's critical attention to unseen biases in technology design. Shokeen *et al.* documented children's skill development in the areas of sketching and collaboration. Both papers point to the value of incorporating codesign methods into curriculum design as a way to support young people's active learning.

Through their emphasis on the sociocultural contexts of young people's technology use, the papers in this special issue point to the value of and need for cross-disciplinary research teams whose collective expertise enables them to tackle complex questions by drawing on a variety of disciplinary theories, methods and design approaches. Equally important are efforts to share the resulting insights with policymakers, educational institutions and

technology companies, helping them to move beyond reductionist narratives of digital youth as they regulate, educate and build technologies for young people.

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Note

1. Technology-related terminology has changed over the years since the MacArthur Foundation launched their digital media and learning initiative. In this paper, when referencing specific works, we use the terminology used in those works. Otherwise, we use the word "technology" more generally to refer to technologies that have one or more of the following qualities: digital, interactive or networked (Davis, 2023).

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