

Cultural Disconnection During the Pandemic: Access, Art Museums, and the Digital Divide

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ABSTRACT

This article considers who has access to cultural resources during the pandemic, and how isolation from resources due to insufficient technology can impact art museum audiences. The authors consider the benefits and consequences of digital programming during the pandemic through the framework of a museum ecosystem, and how museums can circumnavigate the digital divide. This article also addresses the precarious position of art museum educators during the pandemic and their critical role in serving as bridges between museums and communities.

KEYWORDS: Digital Divide, Cultural Resources, Art Museum Education, COVID-19, Community Access

When the spread of COVID-19 in the United States caused closures of public spaces in March 2020, museums quickly considered ways they could heighten digital programming to maintain audiences and offer ways to connect during a time of physical isolation (Cieko, 2020). Art museums, including the Los Angeles County Museum of Art (LACMA, n.d.), the Metropolitan Museum of Art (Smith, 2020), and the Smithsonian American Art Museum and Renwick Gallery (Snyder, 2020), created Zoom backgrounds to showcase their galleries and give users visually appealing settings to their virtual meetings and presentations. Audiences engaged in recreating works of art at home and sharing their interpretations over social media through the J. Paul Getty Museum's "Getty Museum Challenge" (Barnes, 2020)¹. Lists of the best virtual art museum tours sprung up online (e.g., Lovell, 2020; Santos, n.d; Wilson, 2020), sharing digital connections to art and architecture for people cut off from cultural activities.

¹ This challenge was inspired by a Dutch Instagram, Tussen Kunst & Quarantaine (Between Art and Quarantine in English).

Educational offerings changed as art museums sought to engage adult audiences and support families and K-12 classes when they could not visit public spaces safely, and many of these initiatives were digital. Online gallery talks and lectures for adults and virtual field trips and activities for children became consistent features of art museums' schedules during this time.

According to the International Council of Museums (ICOM), in 2020, museums globally increased digital content by 15%, and with the inclusion of social media, live streamed events, and educational programs, this content increased almost 50% (ICOM, 2020). In a survey of 330 museum educators by the arts and culture evaluation firm RK&A and the Museum Education Division of the National Art Education Association (NAEA), 91% of respondents said that their workload was redirected to create new digital resources, and 72% modified existing museum resources to digital formats (Chevalier, 2021). When answering a question about what work they are most proud of during the pandemic, 110 educators, the largest response for this question, mentioned digital and virtual programs and resources.

These digital initiatives have been resourceful, responsive, and creative. However, with amplified digital programming comes issues of access. While digital technology may offer greater geographical reach, audiences become limited to those with reliable internet, sufficient technological devices, and proficiency in navigating the digital landscape. The digital divide, as the gap between digital inclusion and exclusion is known, emerged as a major source of social inequality during the pandemic (Sanders & Scanlon, 2021), and should be part of museums' conversations and programming considerations even as the pandemic abates.

How do digital programming initiatives in art museums work within a system of inequitable access to the internet? How can museums reach communities without digital access, especially during and after COVID-19? What role do art museum educators have in this programming when reduced resources, staff, and budgets as a result of lost revenue during closures affect how educators are able to do their work and the amount and types of programming they can offer (AAM & Wilkening Consulting, 2020; Chevalier, 2021)? In this article, we examine digital programming in art museums through the framework of ecosystems by considering how the digital divide affects access to these resources. We consider the implications of heightened digital offerings on museum audiences as well as impacts to the field of art museum education.

The Deepening Divide

The pandemic made painfully apparent the complex nature of the

digital divide and its mirroring of broader sociocultural inequities. The previously unimaginable constraints on everyday life posed by the pandemic cannot be understated, and the unequal diffusion of digital technology in society only magnified some existing inequities and accelerated others. From work, to school, to basic daily tasks, the internet quickly became important, if not essential, to pandemic life, yet access to necessary technology is beset by difficulties. The digital divide is not a single, binary gap of the "haves" and the "have nots" of digital technology, but multiple gaps that vary in points of access and accessibility, and are complicated by demographic differences, including geography, age, gender, education, and income.

The most common definition of the digital divide, according to research of the concept and its attendant problems, is "a division between people who have access and use of digital media and those who do not" (van Dijk, 2020, p. 1). This definition is overly simplistic, as anyone who struggled during the pandemic to necessarily shift job, school, and personal life to virtual avenues could attest. We have been hampered by varying degrees of (un)connectivity, from inadequate or nonexistent resources including devices and broadband services, to unfamiliarity with or inability to use necessary programs, to simply an appropriate physical space to do work or school in digital formats. Screen-time burnout, clumsy platforms, and sluggish internet plague even the most digitally privileged individuals. At the other end of the spectrum, difficulty or inability to access basic resources compound social isolation.

The digital divide is concomitant to the internet, becoming apparent nearly as quickly as the introduction of the internet for public use in the 1990s. The term was coined to describe the pattern of unequal access to information and communication technology based on income, ethnicity, geography, age, education, and other factors (IMLS, 2004). In the early days of the internet, the issue was largely viewed as binary, with those who could access a computer and modem positioned outside of the divide, and those who could not within it, as first revealed by studies from National Telecommunications and Information Administration (NTIA) (Mossberger et al., 2003). Initial policy responses to the disparities framed the issue as a problem of physical access and sought to establish schools and libraries as points of connection. Widespread availability of computers, internet, and digital literacy classes for students and the public significantly boosted equality of access and utility in users' lives (IMLS, 2004), and helped gradually move society online. As reliance on computers, smartphones, and internet connection increased, it became apparent physical access was only the start of the problem (van Dijk, 2020). Studies conducted in the early years of the new millennium soon demonstrated the digital divide was multidimensional, affecting not just disparities in access, but skills and literacy, economic opportunity,

and civic participation (Mossberger et al., 2003). The boundaries of the “haves” and “have nots” grew fuzzier, more complex, and invariably reflected entrenched social and economic inequities.

Fixed and mobile broadband availability have made significant gains toward near universality in the U.S. (World Bank, n.d.), at least on maps if not in user experience. Income and geography persist as major obstacles for digital inclusion. The economic burden of technology and connection is recurring and interminable, thanks to subscription fees and rapid technology turnover (Anderson & Kumar, 2019). Obsolescence and disposability of technology long ago opened an ever-deepening abyss of devices, peripheral accessories, and supporting technologies that are quickly rendered outdated and require upgrades at individual and community levels (van Dijk, 2020). Similarly, rapid turnover of hardware and software requires constant adoption of new techniques and skills to maintain digital readiness/literacy (Micklethwaite, 2018; Sanders & Scanlon, 2021). Rural areas continue to lag urban areas in terms of availability and quality of internet connection, with fewer choices in providers and higher prices for lower quality service (West & Karsten, 2016). Tribal areas are particularly impacted by proximity to reliable internet access points and are often underserved or unserved by mobile services (IMLS, n.d.; Perrin, 2019).

The internet is now an essential service and a necessity for daily life, so interwoven into our networks of communication and social participation that it should be treated as a public utility service, much like electricity and water. In the wake of the pandemic, some have taken this concept further, insisting digital access is a human rights and social justice issue. The implications of digital disparities have adverse economic and social implications for those left behind, extending from basic tasks such as bill paying and shopping, to connecting with family and friends, to facilitating learning and finding employment (Sanders & Scanlon, 2021). Dutch sociologist and new media researcher Jan van Dijk (2005; 2020) argues that in affluent countries where broad physical access has been largely achieved, the digital divide is deepening rather than widening, which tends to lead to more digital and social inequality. While stark differences in physical access have diminished, the conditions of access and the capacity of the technology available shapes the user experience.

In other words, someone who has the means and proximity to advanced resources tends to sustain digital proficiency to effectively and advantageously navigate the digital landscape, while outdated or inadequate technologies tends to discourage or inhibit learning digital skills and negatively impact personal, political, and economic capabilities (Micklethwaite, 2018; van Dijk, 2020). Consequently, those with more access to the latest technologies benefit substantially more

from internet use and participation than those with less access. The more digital technologies are immersed in society and necessary for everyday life, more inequalities of access exacerbate broader existing inequalities.

The Ecology of Education

The role of museums in circumnavigating the digital divide may be understood through an ecological framework. Ecology, or the study of the systems of relationships within complex assemblages, originated within the field of biology as a way of beginning to describe the immensely intricate dynamics of living things and their contexts, and emphasizing a systemic view over the study of individual organisms or elements (Falk & Dierking, 2018; Hecht & Crowley, 2019; Morin, 2011). The strategies and analytics of ecologists to understand the structures and functions of key elements of a biological community have been adopted by some researchers in other fields as useful approaches to multidimensional, dynamic environments, including human communities and education infrastructures (Falk & Dierking, 2018).

Psychologist Urie Bronfenbrenner (1986) proposed an “ecological systems theory” for studying human development “in the actual environments in which human beings lived their lives” (p. 287), advocating for an approach in which the interaction of processes, person, and context are taken into consideration (Johnson, 2008). Bronfenbrenner theorized that a social environment consists of nested layers of patterns of behaviors and activities occurring over time that interact in complex ways and can both affect and be affected by a person’s development (Johnson, 2008).

In their extensive study of the functionality and relevance of museums, Falk and Dierking (2018) “share the idea that learning is a complex phenomenon that needs to be understood as occurring within the context of a range of sociocultural and physical contexts, multiple factors and players” (p. 13). Their research locates museums as part of a complex ecology of education deeply interconnected to other educational organizations and institutions including schools, universities, and libraries. While formal education entities such as primary and secondary schooling are “critical and necessary components” (Falk & Dierking, 2018, p. 11), they represent only a small part of the entire system of educational opportunities and resources, as learning experiences can, and do, happen in a wide and diverse range of contexts in and out of schools. The expanded notion of the learning ecosystem includes informal and free-choice learning organizations, and acknowledges the importance of community-based, social resources such as peers, educators, friends, and family (Falk et al, 2014). In their studies of art museum education, Knutson

et al. (2011) define learning ecology as “a landscape of art learning opportunities that exist across a network of informal and formal educational organizations” (p. 311). They suggest that while formal environments support systematic instruction, informal environments can be more responsive to lifelong learning interests and learner-directed experiences. The two learning domains operate in tandem, offering complimentary experiences of creating, experiencing, and engaging with art.

The analogy of the ecosystem has proved useful for studying interdependencies across contexts, allowing insight into how life-long, life-wide, and life-deep learning needs and interests may be more equitably addressed and fulfilled (Falk & Dierking, 2018). Issues in education are not just complicated but complex, meaning they are interconnected and must be approached in multidimensional ways that reflect the relational processes that exist between and among its constituent entities: youth, parents, adult learners, educators, and the range of formal and informal learning settings. Knutson et al. (2011) argue that an ecological perspective of educational organizations as connected and interdependent allows for a holistic evaluation of the full range of education experiences available across institutions within a region, rather than assuming a single organization with limited resources and capacity should provide all components of education.

Education scholars have recently argued for a less metaphorical ecological approach to education in favor of a more literal study of the relational processes and interactions between and among the multifarious elements of the learning ecosystem (Falk & Dierking, 2018; Falk et al., 2014; Hecht & Crowley, 2019; Jung, 2011; Knutson et al., 2011). The study of biological systems has shown communities with higher diversity and more integrated, collaborative systems tend to be more resilient and able to withstand perturbations and disturbances (Morin, 2011); the same can be said for learning ecosystems. Robust systems are reciprocal, having “numerous, often redundant and reinforcing feedback loops that feed information and resources back into the system” (Falk & Dierking, 2018, p. 12). Multiple opportunities and two-way avenues for information and resources translates to adequate support for a broad diversity of learners, not just a favored or privileged few.

Multi-Faceted Museums

How does heightened digital content contribute to community ecosystems? Who is being left out? In a recent study of memory institutions, including museums, during COVID-19, Samaroudi, Rodriguez Echavarría, & Perry (2020) found that digital programming appealed to audiences who were already interested in the institutions, although there was effort to bring in new programming, especially

related to societal developments such as anti-racist activism. The authors recommended that these institutions consider a more direct focus on vulnerable populations, including their “interest, requirements, and digital capabilities...to avoid digital exclusion” (p. 357).

This was not only an issue during the pandemic. An earlier study in the United Kingdom indicated that, even before the pandemic, digital offerings in the cultural sector did not expand the reach and impact of museums on communities not already visiting museums and galleries (Mihelj, Leguina, & Downey, 2019). Researchers examined data on the growth of cultural participation over a decade, noting an increase in internet access and on museum and gallery websites during this time period. They also investigated if this rise resulted in an increase in diversity of museum audiences online and offline, finding the same population utilizing increased online content was visiting these spaces physically. Because digital content is driven by commercial profit, search engines and recommendation systems online “that operate in this environment, and which shape citizens’ digital cultural diets, are driven by commercial considerations” instead of public interests (p. 1469). The authors argued that through this system, rather than diversifying audiences, digital resources reinforced and even exacerbated inequity.

A multi-faceted approach to art museums focused on resources in the community can expand the reach of both digital and physical museum experiences. To implement this type of programming, museums must include community voices in every step of the process. Simon (2016) argued that museums using a service model to meet the community needs as they see them is demeaning and “suggests that people are passive consumers” (p. 95). She instead proposed an asset-based model that looks at strengths, stressing people’s skills and resources in the community. This approach is supported by Murawski (2018) in his vision of museums in communities: Museums and cultural organizations hold the potential to be these places where community assets can be powerful together. We just need to take bold steps to value the skills, interests, culture, and heritage of our communities and neighborhoods and begin to de-center the traditional power structures of museum institutions. (n.p.) By taking a multi-faceted approach to the digital divide that not only addresses the gaps in the system, but also ways in which the museum can work with the assets of the community, museums can broaden their audiences through innovative and collaborative programming that is community-driven.

Ecosystems of museums evolve if museums rethink what an art museum community can look like, expand their scope to include more voices as part of this conversation, and find ways to create

openings to build communities both physically and digitally. The museum does not have to be only one thing. It can serve in multiple roles to multiple communities by creating programming that is flexible, far-reaching, and attending to the many different groups of people who wish to access it.

Jung (2011) wrote that the ecological museum is “immersed in the community” and because of this, the museum hears and reflects the voices of the community members. Art museums that are ecological museums will consider whose voices are left out in programming during the time of the pandemic and after. She took up Bateson’s (2000) position that organizations that embrace “social flexibility” are open to “the uncommitted potentiality of change,” writing that it allows museums to “transform knowledge and perspectives in multiple ways and to abandon the practice of transmitting knowledge only from top to bottom.” Social flexibility does not limit us to traditional informal and formal learning institutions; instead “the greater community and natural world can be embraced as learning sites through outreach, collaboration, consultation, exploration, and experimentation” (p. 335).

We saw the ecological museum in innovative programming during the pandemic that responded to communities. For instance, Explora Science Center and Children’s Museum in New Mexico (Zollinger & DiCindio, 2021), a science, technology, engineering, art, and math (STEAM) organization, reimagined their outreach programming not only through virtual events and digital content, but also paired with other local organizations to print and distribute thousands of bilingual, hands-on STEAM activity cards in Grab-N-Go meals at elementary schools, through libraries, by mail, and even published them in several small town newspapers. While the idea of easily distributed, highly accessible education resources for at-home learning existed prior to the pandemic, their usefulness and popularity made them an invaluable connection to the local communities and individuals most deeply impacted by the digital divide and loss of learning opportunities. Encouraged by the success of the activity cards, Explora and their robust network of community partners and liaisons kicked off the assembly and distribution of thousands of hands-on learning kits to students throughout the state, an collaborative effort demonstrated to be additionally beneficial to teachers and families even as children returned to in-person schooling.

Other museums reached out to their communities in similar, non-digital ways. The Denver Art Museum distributed free Creativity Kits to schools and community centers in and around the city in lieu of their Art Lives Here community-led exhibitions (Denver Art Museum, n.d.). Boston’s Institute of Contemporary Art paired with Boston

Public Schools to provide thousands of “creative nourishment” art kits along with meals and grocery boxes to local families (Shea, 2021).

We also saw museums responding to the community by serving as vaccine sites (O’Neill & Lee, 2021) and when the International Museum of Art & Science in southern Texas became a daytime warming center for people without power during Winter Storm Uri in February 2021 (Martinez Gray, 2021). We saw it in the Anacostia Community Museum when they partnered with the nonprofit organization Feed the Fridge and put a refrigerator stocked by local restaurants with healthy food in their parking lot for the community. The museum also created a physical outdoor exhibit, in addition to virtual programs, to reach more members of the local community than they could online (Adams, 2021).

Museums have been built, and most continue to operate, as institutions of power and inequity and have a long way to go to truly be spaces of civic engagement and public trust (Watson, 2007). By adopting an ecological model, museums can reposition themselves as receptive spaces that contribute to the overall benefit of the community. It is critical that these initiatives are both digital and physical for greater community access.

Art Museum Education during COVID-19 and After

Jung (2011) argued that the ecological museum shares characteristics with the concept of an emancipated museum that is free from “the illusion of a fixed reality” (p. 335). Emancipated museums realize that museums are both a community and a piece in a broader community. Jung and Love (2017) see museum ecosystems as part of a systems thinking paradigm that involves interconnected internal and external museum systems. Working outward with communities is necessary to create relevant programming that is visitor-centered and community driven, but museums also must look inward to replace hierarchical structures “with networks where all involved parties are equally valued and their input and perspectives are reflected in major decision-making processes” (p. 9).

There is great potential for art museum educators to create meaningful experiences through digital content at a time when there is a demand for it, but digital initiatives need planning and support. Amplified digital programming is happening at the same time that museums have less resources, especially in museum education. A recent survey during the pandemic by AAM and Wilkening Consulting (2020) found that, on average, 53% of responding museums had furloughed or laid off staff during COVID-19. Museum staff most affected by layoffs and furloughs due to the pandemic were Guest Services/ Admissions/ Frontline/ Retail (68%) and

Education (40%). 67% of responding museums reduced education, programming, and other public services due to budget and staff cuts.

The survey by RK&A and the Museum Education Division of the National Art Education Association (NAEA), discussed in the introduction of this article, noted the impact of the virus on art museum education (Chevalier, 2021). The results of the survey reported that 30% of respondents were negatively affected in their employment and job security, including furloughs, reduced hours, and layoffs. One of the authors of this study from RK&A, Amanda Krantz, (2020) considers the repercussions of laying off museum educators from the perspective of an evaluator, writing that museum educators are essential parts of museum's missions and "often the name and face of the museum to the community." She worried that without these staff members, "museums will have burned bridges into their communities" (n.p.). Additionally, Juline Chevalier, Director of NAEA's Museum Education Division, speculated that there is potential for museum educators to be stretched too far both now and after the pandemic. Although the work is getting done, it is by less staff with less resources and a lack of technology and technological support. Chevalier noted her concern that museum educators will be expected to keep up with this amplified online programming while bringing back in-person offerings.

A study conducted by HG&Co and deployed through American Alliance of Museums (AAM) just prior to the pandemic found that even before COVID-19, American museums often had limited dedicated staff, strategy, and audience data dedicated to digital programming (Knight Foundation, 2020). Arts institutions were more likely to have strong partnerships for digital projects, but less likely to work to understand audience needs. These projects were typically siloed into singular initiatives, rather than more holistic integrations into programming, and lacked defined goals and outcome measures. Size was a factor in digital innovation, with smaller museums lacking staff and resources. With fewer resources after closures due to the pandemic, it could be difficult for museums, particularly smaller museums, to gain traction in creating a more holistic digital model, one that fits into the ecosystem of the museum and the community. We fear that if digital preparedness was a problem in art museums before the COVID-19, the digital divide will deepen through this rapid increase of digital museum programming during the pandemic.

Incorporating flexibility in multiple program offerings needs the support of museum leadership. We are concerned that educators and their knowledge of communities and collaborations are left out of the conversation, as museums develop content without deeply understanding who has access to it and who does not. If museum educators still employed are responsible for more programming and

content with less resources, as indicated in recent reports, there is potential for the digital divide for cultural resources to deepen at a rapid pace. While time and energy are needed to maintain digital programming, which many museums relied on during a time when physical access is limited or impossible, resources should also be given to efforts to promote collaborations with assets in communities through partnerships and programs that have access to communities without digital resources.

The discussion recalls issues that arose in the field of art museum education during the Great Recession of the early 2000s. Writing in 2010, Tina Nolan argued that museum educators are best suited to be leaders in social justice and civic engagement and "can and should be the bridge that connects the museum directly to the challenges that face our society" through community engagement (p. 119). Today, museum educators serve as leaders in this role, but they need consistent resources and support to continue their work. By acknowledging the critical role museum educators play in these relationships and providing resources through funding, staff, and materials to art museum education to build community connections, museums can create a foundation of collaboration. They can share materials and programming with community centers, libraries, and other points of access for people in the community without or with limited online resources. These types of programs have long-term benefits after museums reopen because these relationships can develop and evolve into partnerships that offer avenues to expand museum programming outside of the digital realm.

New Possibilities for Art Museum Education

The circumstances of the pandemic have created a sort of Venn diagram of the digital divide and art museum education, with digital programming converging in the middle. In addition to issues with museum content catering mainly to digitally privileged audiences, we see similarities in the motivational aspects of digital inclusion and museum inclusion. Difficulty of access, insufficient resources, and perceived irrelevance tend to discourage or inhibit people from actively participating in and benefiting from opportunities offered by both digital technology and museums. Conversely, easily accessible and relevant resources tend to sustain interest, generate enthusiasm, and are meaningful to the lives of participants. Prior experience always informs our understanding of and views about the world and our patterns of participation in it (Falk & Dierking, 2013), whether in regard to the value of digital tools or interest in a museum's cultural resources. Building deep engagement with whole communities now ensures a museum's future is not limited to those with the lion's share of digital access.

With these challenges comes the potential for new solutions. Wided Khadrawoui (2020) considered this time as one of “opportunity for genuine digital engagement to gather traction and rediscover its place in creating meaning and connections with audiences in profoundly different ways” (n.p). This is a time when museums can rethink their role in communities, and by adopting the ecological model, they can take critical steps to rebuild broken internal and external systems of inequity in their institutions. Museums must understand how the digital divide impacts programming, especially because technology can be both a tool and a hindrance in this ecosystem. Supporting educators in physical and digital community-led initiatives is a critical part of this equation because they can lead these necessary and transformative changes.

References

- Adams, M. A. (2021, April 12). *Serving the needs of the community during a pandemic*. Center for the Future of Museums blog, American Alliance of Museums. <https://www.aam-us.org/2021/04/12/serving-the-needs-of-the-community-during-a-pandemic/>
- American Alliance of Museums & Wilkening Consulting (2020). *National snapshot of COVID-19 impact on United States Museums*. <https://www.aam-us.org/wp-content/uploads/2020/11/AAMCOVID-19SnapshotSurvey-1.pdf>
- Anderson, M. & Kumar, M. (2019). Digital divide persists even as lower-income Americans make gains in tech adoption. *Pew Research Center*. <https://www.pewresearch.org/fact-tank/2019/05/07/digital-divide-persists-even-as-lower-income-americans-make-gains-in-tech-adoption/>
- Barnes, S. (2020, May 24). People recreate works of art with objects found at home during self-quarantine. *My Modern Met*. <https://mymodernmet.com/recreate-art-history-challenge/>
- Bateson, G. (2000). *Steps to an ecology of mind*. Chicago: University of Chicago Press.
- Bronfenbrenner, U. (1986). Recent advances in research on the ecology of human development. Silbereisen, R.K., Eyferth, K., Rudinger, G. (Eds.). *Development as action in context*. Springer.
- Chevalier, J. (2021, January 14). *COVID-19 has taken a toll on museum education*. Art museum teaching: A forum for reflecting on practice. <https://artmuseumteaching.com/2021/01/14/covid-19-has-taken-a-toll-on-museum-education/>
- Ciecko, B. (2020, March 25). *4 ways museums can successfully leverage digital content and channels during Coronavirus (COVID-19)*. AAM. <https://www.aam-us.org/2020/03/25/4-ways-museums-can-successfully-leverage-digital-content-and-channels-during-coronavirus-covid-19/>
- Denver Art Museum. (n.d.) *Art lives here*. <https://www.denverartmuseum.org/en/art-lives-here>
- Falk, J. & Dierking, L. (2013). *The museum experience revisited*. Left Coast Press, Inc.
- Falk, J. & Dierking L. (2018). Viewing science learning through an ecosystem lens: A story in two parts. In D. Corrigan., C. Bunting, A. Jones, & J. Loughran (Eds.), *Navigating the changing landscape of formal and informal science learning opportunities* (pp. 9-29). Springer International Publishing.
- Falk, J., Dierking, L., Osborne, J., Wenger, M., Dawson, E., Wong, B. (2014). Analyzing science education in the United Kingdom: Taking a system-wide approach. *Science Education*, 99(1), 145-173.
- Fang, M. L., Canham, S., Battersby, L., Sixsmith, J., Wada, M., & Sixsmith, A. (2019). Exploring privilege in the digital divide: Implications for theory, policy, and practice. *The Gerontologist*, 59(1), E1-E15.
- Hecht, M. & Crowley, K. (2020) Unpacking the learning ecosystems framework: Lessons from the adaptive management of biological ecosystems. *Journal of the Learning Sciences*, (29)2, 264-284, DOI: 10.1080/10508406.2019.1693381
- Institute of Museum and Library Services. (n.d.) *Broadband*. <https://www.imls.gov/our-work/priority-areas/broadband>
- Institute of Museum and Library Services. (2004). *Toward equity of access: The role of public libraries*. <https://www.imls.gov/assets/1/AssetManager/Equality.pdf>
- International Council of Museums (2020). *Museums, museum professionals and COVID-19: Follow-up survey*. <https://icom.museum/wp-content/uploads/2020/11/FINAL-EN-Follow-up-survey.pdf>
- Johnson, E. S. (2008). Ecological systems and complexity theory: Toward an alternative model of accountability in education. *Complicity*, 5(1), 1.
- Jung, Y. (2011). The art museum ecosystem: A new alternative model. *Museum Management and Curatorship*, 26(4), 321-338.
- Jung, Y, & Love, A. R. (2017). Systems thinking and museum ecosystem. In Y. Jung & A. R. Love (Eds.), *Systems thinking in museums* (pp. 3-16). Rowman & Littlefield.
- Khadraoui, W. (2020). *COVID-19: An opportunity to revolutionize the arts, part 3*. Voices in contemporary art. <https://voca.network/blog/2020/09/18/covid-19-an-opportunity-to-revolutionize-the-arts-part-3/>
- Knight Foundation (2020). *Digital readiness and innovation in museums: A baseline national survey*. <https://knightfoundation.org/wp-content/uploads/2020/10/Digital-Readiness-and-Innovation-in-Museums-Report.pdf>
- Knutson, K., Crowley, K., Lin-russell, J., & Annsteiner, M. (2011).

- Approaching Art Education as an Ecology: Exploring the Role of Museums, *Studies in Art Education*, 52(4), 310-322.
- Krantz, A. (2020, June 24). *Caution: Laying off museum educators may burn bridges to the communities museums serve*. RK&A. <https://rka-learnwithus.com/caution-laying-off-museum-educators-may-burn-bridges-to-the-communities-museums-serve/>
- Los Angeles County Museum of Art (n.d.). Download free LACMA video conference backgrounds. <https://www.lacma.org/videobackgrounds>.
- Lovell, L. (2020, April 6). *Check out these virtual tours of museums around the world*. Time Out. <https://www.timeout.com/travel/virtual-museum-tours>.
- Martinez Gray, C. (2021, February 23). *Texas museum opens doors during historic winter storm*. Center for the Future of Museums blog, American Alliance of Museums. <https://www.aam-us.org/2021/02/23/texas-museum-opens-doors-during-historic-winter-storm/>
- Micklethwaite, A. (2018). Onwards! Why the movement for digital inclusion has never been more important. Reedy, K., & Parker, J. (Eds.). *Digital literacy unpacked*. Facet Publishing.
- Mihelj, S. Leguina, A., & Downey, J. (2019). Culture is digital: Cultural participation, diversity, and the digital divide. *New Media & Society*, 21(7), 1465-1485.
- Mossberger, K., Tolbert, C. J., & Stansbury, M. (2003). *Virtual inequality: beyond the digital divide*. Georgetown University Press.
- Morin, P. (2011). *Community ecology* (2nd ed.). Wiley-Blackwell.
- Murawski, M. (2018, October 1). *Towards a more community-centered museum, part 3: Defining & valuing community*. Art museum teaching: A forum for reflecting on practice. <https://artmuseumteaching.com/2018/10/01/towards-a-more-community-centered-museum-part-3-defining-valuing-community/>
- Nolan, T. (2010). History repeats itself: American museums in a time of recession. Will we ever learn? *The Journal of Museum Education*, 35(1), 117-120.
- O'Neill, J. & Lee, R. (2021, May 7). *Sign of the times: Museums become vaccine clinics*. American Alliance of Museums. <https://www.aam-us.org/2021/05/07/sign-of-the-times-museums-become-vaccine-clinics/>
- Perrin, A. (2019). Digital gap between rural and nonrural America persists. *Pew Research Center*. <https://www.pewresearch.org/fact-tank/2019/05/31/digital-gap-between-rural-and-nonrural-america-persists/>
- Samaroudi, M., Rodriguez Echavarria, K., & Perry, L. (2020). Heritage in lockdown: Digital provision of memory institutions in the UK and US of America during the COVID-19 pandemic. *Museum Management and Curatorship*, 35(4), 337-361.
- Sanders, C., & Scanlon, E. (2021). The digital divide is a human rights issue: advancing social inclusion through social work advocacy. *Journal of Human Rights and Social Work*. Advance online publication. <https://doi.org/10.1007/s41134-020-00147-9>
- Santos, J. (n.d.). 20 famous art museums you can visit from your living room. *We are teachers*. <https://www.weareteachers.com/virtual-museum-tours/>
- Simon, N. (2016). *The art of relevance*. Museums 2.0.
- Shea, A. (2021, February 11). *ICA distributes 1,200 art kits to Boston public school kids for creative nourishment amid the pandemic*. WBUR. <https://www.wbur.org/artery/2021/02/11/institute-contemporary-art-kits-tps-students>
- Smith, R. (2020, April 21). Attend your next virtual meeting in style with these ten lavish backgrounds. *Collection Insights, The Metropolitan Museum of Art*. <https://www.metmuseum.org/blogs/collection-insights/2020/period-room-zoom-meeting-background>
- Snyder, S. (2020, March 27). *The art of the teleconference*. Eye Level, Smithsonian American Art Museum. <https://americanart.si.edu/blog/art-zoom-virtual-background-or-computer-desktop>
- Van Dijk, J. (2005). *The deepening divide : Inequality in the information society*. SAGE Publications, Inc.
- Van Dijk, J. (2020). *The digital divide*. Polity Press.
- Watson, S. (2007). Museums and their communities. In S. Watson (Ed.), *Museums and their communities* (pp. 1-23). Routledge.
- West, D.M., & Karsten, J. (2016). Rural and urban America divided by broadband access. *Brookings Institute*, July 18, 2016. <https://www.brookings.edu/blog/techtank/2016/07/18/rural-and-urban-america-divided-by-broadband-access/>
- Wilson, A. (2020, March 23). 10 of the world's best virtual museum and art gallery tours. *The Guardian*. <https://www.theguardian.com/travel/2020/mar/23/10-of-the-worlds-best-virtual-museum-and-art-gallery-tours>
- World Bank. (n.d). *Individuals using the internet (% of the population) - United States*. The World Bank. Retrieved January 28, 2021, from <https://data.worldbank.org/indicator/IT.NET.USER.ZS?view=chart&locations=US>
- Zollinger, R. & DiCindio, C. (2021). Community ecology: museum education and the digital divide during and after COVID-19. *Journal of Museum Education*, 46(4).