

Community Ecology: Museum Education and the Digital Divide During and After COVID-

19

Rachel Zollinger, Carissa DiCindio

Abstract

This article considers the inequities of digital museum programming during the COVID-19 pandemic and their alignment with audiences historically excluded from access to STEAM learning opportunities, primarily communities with low incomes and people of color. We employ an ecosystem framework to assert the critical role museums can play within communities to address these issues during and after pandemic circumstances. We describe a case study from a STEAM-oriented children's museum where staff provided out-of-school-time learning through reciprocal and collaborative community partnerships.

Keywords: digital divide, access, COVID-19, STEAM, museums, ecosystem, community

Museum programming during COVID-19

COVID-19 brought about many challenges to museums and how they served audiences. Beginning in March 2020, institutions temporarily closed or limited admission to reduce transmission of the virus, and well into 2021, these closures and restricted access continue. During this time, many museums shifted programming online to offer activities and resources when visitors could not easily visit museums in person. However, these digital museum programs created challenges. Households need access to the internet and a strong connection to participate in online programming, a requirement that can alienate audiences without reliable access to these resources. This article examines the role of online programming in museum education during the pandemic and considers ways in which museums can reach communities with limited or no access to digital resources. We approach museums as a part of the ecology of a community and consider how an educational ecosystem can support STEAM (science, technology, engineering, art, mathematics) learning for children in formal and informal education spaces. Finally, we describe the programming during COVID-19 at Explora Science

Center and Children's Museum, a STEAM museum in Albuquerque, New Mexico, to consider ways that museums focused on STEAM-related subjects can reach audiences.

To better understand museum programming during COVID-19, we look to the American Alliance of Museum's (AAM) national snapshots of the field in June and October 2020. In June, they found that because of changes due to the pandemic, 75% of museums provided virtual educational programs to students, parents, and teachers, while at the same time two-thirds predicted budget cuts to education and programming.ⁱ

By the second report in October, more than half of the responding museums had furloughed or laid off staff, with the highest percentages of lay-offs coming from front-line and education positions.ⁱⁱ Museums expanded virtual programming during a time when in-person visits, and especially large gatherings, were not possible. At the same time, museums often worked with reduced staff for educational programs, limiting the amount of programming they could offer. The concern becomes not only how museum educators can balance virtual and in-person programming, possibly with less staff to implement it all, but also how the digital divide factors into current and future programming decisions, access, and outcomes. The digital divide refers to disparities in digital and internet access, including inadequate devices, lack of connection, and limited bandwidth. Factors including age, geography, education, and income often leave many without adequate internet access. During the COVID-19 pandemic, one in four students were unable to access online school, which means that 15 to 16 million K-12 students could not connect to online school regularly.ⁱⁱⁱ Additionally, children from households with annual incomes of less than \$25,000 were as much as ten times less likely to engage in remote learning.

The RAND Corporation's report on teachers' perceptions of students' internet access and participation in remote learning demonstrated the disparities by demographics. The report found that schools serving higher percentages of students of color, located in towns and rural areas, and schools with high poverty rates were less likely to report that all or nearly all students had access to the internet in their homes.^v It also shared that the internet was an important variable in communicating with students and families and for students to be able to complete their assignments. Among the implications of this report was that educators "will need support and innovative ideas for navigating remote instruction without universal internet access or devices for their students- particularly those in rural, high-poverty schools."^{vi} Museums can contribute to addressing this inequity by finding ways to reach K-12 students without access to the technology to participate in virtual learning offered by schools by providing resources and access to STEAM materials that support their formal education.^{vii} By being a part of the educational ecosystem of the community, museum programming fits into the educational experiences of children in ways that relate to their needs and interests and complements formal education.

An ecosystems framework

Museums are components of a complex system of interconnected elements in communities that includes schools, libraries, and civic institutions. Museum education researchers John Falk and Lynn Dierking conceptualize this system ^{viii} The ecosystem framework draws from ecology and the internal structures and patterns of interaction between organisms within their environments, or communities. Using the foundation of ecology puts an emphasis on the role of diversity as a measure of the health of an ecosystem and the web of relationships between entities.^{ix} Through this lens, educational experiences are not siloed in school and outside of

school; rather, the experiences are intertwined in ways that affect children's understanding and knowledge of the world.

The framework of the ecosystem illustrates the relationships between informal and formal education settings and the community to highlight the ways that these experiences overlap as children move through their daily lives. Education researchers Marijke Hecht and Kevin Crowley note the complexity of relationships in a learning ecosystem that include "youth, educators, families, and the material elements they engage with," and propose looking at "learning as a process that exists because of the interactions between learning ecosystem actors."^x Ecosystems also include virtual spaces in addition to physical formal and informal learning environments, thus employing the ecosystem framework allows us to see both connections and gaps in this infrastructure.^{xi}

In looking at science learning through an ecosystem perspective, Falk and Dierking discussed resilient ecosystems through the "3 c's," as ones that *coordinate* different types of educational experiences in and out of school settings, *customize* learning experiences for diverse learners, and *connect* experiences in ways that fit the sociocultural diversity of its community.^{xii} They argued that communities should provide a wide range of learning experiences that engage with science topics on multiple platforms. These offerings would include a range of levels of engagement designed by multiple providers for different types of learners. Learners could access these resources as they need them, moving fluidly from one experience to another.^{xiii} We argue that the "3 c's" can serve as a lens through which museums can examine their offerings from a more holistic perspective. By considering how their programming *coordinates* with formal and informal educational experiences, is *customized* for different types

of learners, and *connects* to the diversity of their communities, museums can build programs that better fit into the ecosystems of their communities and fill voids related to access and inclusion.

Attending to gaps in digital equity means addressing both larger systemic issues and intervening with localized, adaptive approaches. For museums, understanding the ecosystem framework helps staff build relationships extending outside of the walls of the institution through collaboration and partnerships that emphasize these connections through a shared vision. This framework can also help identify gaps or disconnects within this infrastructure. The digital divide can certainly hinder the ways in which communities can access educational experiences in the ecosystem framework.^{xiv} Though the impacts of the digital divide became starkly apparent under the restrictions of the pandemic, these issues existed prior to and are sure to persist in the aftermath. During the ongoing pandemic, when disparities in digital access have become more apparent, museums can build stronger connections to youth in the community by diversifying their offerings to include multiple ways to engage in educational topics, and as a result, strengthen their role in the community ecosystem.

As part of an “ecology” of education, museums play a critical role in learning in terms of community access.^{xv} Public institution advocate and museum visionary Nina Simon defines community as “a group of people who share something in common.”^{xvi} She stresses that to reach new communities, networking is key. By getting to know people of the community, museums can learn what is important to these communities and the best way to find out if and how to connect to them.^{xvii} Cultural activist and museum educator Mike Murawski discusses the transformative power of communities, writing that museums focusing on assets of the community can “de-center the traditional power structures of museum institutions.”^{xviii} In

building these relationships as collaborative partnerships, museums become a part of the ecology of the community, not a separate entity mirroring privilege and power in the community.^{xix}

Case study: Explora Science Center and Children’s Museum

A museum’s mission

Explora Science Center and Children’s Museum’s mission is to be a publicly accessible institution and community resource for learning.^{xx} Explora strives to create “opportunities for inspirational discovery and the joy of lifelong learning through interactive experiences in science, technology engineering, arts, and math.”^{xxi} Located in Albuquerque, New Mexico, the museum serves the entire state, including remote Tribal areas that extend into Arizona. Prior to the pandemic, Explora served more than 325,000 people a year and maintained regional hubs in Gallup and Las Cruces, New Mexico.^{xxii} While the physical museum space houses permanent, interactive, play-based exhibits exploring natural and engineered phenomena, much Explora’s audience experiences the museum through outreach programming held in local schools, libraries, and community centers. City and statewide outreach is a priority and plays a fundamental part in Explora’s mission to provide STEAM learning opportunities for more than 80,000 students through 2,700 educational programs annually in more than 95% of New Mexico’s school districts.^{xxiii} Staff facilitate hands-on classroom explorations, family science events, and professional development workshops for education professionals; curricula of K-12 school programming and professional development workshops are benchmarked to national standards for STEM and art education and value children, families, and people of all ages learning together.^{xxiv}

Access and inclusion are top priorities for Explora, as evidenced by their robust outreach programs and commitment to make community connections outside of the museum’s walls.^{xxv} A

major facet of Explora's access program is reliance on partner organizations that have existing relationships of trust with diverse audiences and those historically excluded from access to Out-of-School-Time (OST) and STEM learning opportunities. Established partnerships with public schools and a variety of social services organizations strengthen community access to Explora's resources. Kristin Leigh, Explora's Deputy Director, credits the museum's ability to respond to the needs of the community in meaningful ways, in times of crisis and otherwise, to their extensive series of community listening sessions and community conversations using the Harwood Institute's model of Civic Faith philosophy and Turning Outward orientation.^{xxvi} Civic Faith centers the lived experiences of people and creates a culture of shared, mutually reinforcing responsibility;^{xxvii} Turning Outward positions the community as the reference point for creating change rather than the organization's internal goals.^{xxviii} Practiced in a symbiotic cycle moving from philosophy, to practice, to impact, community change happens through interactions of highly intentional actions. Opportunities for community listening sessions are often initially championed by a community leader who works as a trusted liaison between other community members and Explora.^{xxix} Another tool prized by Explora leadership is Asset Based Community Development (ABCD), which recognizes local assets as fundamental building blocks for sustainable development, and draws upon existing community strengths to build resilient communities.^{xxx} Tara Henderson, Director of Education and Visitor Experience, attributes an ABCD framework with helping to build resiliency within the museum by relying on staff members' strengths and aspirations. Supporting internal motivations in turn helps develop authentic relationships outside the museum. The two-pronged approach to understanding the needs and desires for the community and leveraging the knowledge held already in the

community and museum is key for meaningful engagement and transformative for the museum's relevancy.

The museum's approach to curriculum and materials is another facet of their access and inclusion strategy, with most of the activities in its extensive educational repertoire requiring only household materials and commonly found objects. This approach allows educators and families to easily replicate the activities in the classroom and at home and to connect learning opportunities with everyday experiences. Undeterred by the trend for institutions to increasingly leverage digital technologies to present their curricula, Explora recognizes that many individuals in their city and state-wide communities live in lower income households and/or rural areas affected by inadequate access to digital technology and internet connectivity.^{xxxix} Maintaining a curriculum of hands-on activities rich in everyday materials minimizes or largely circumvents these socioeconomic and geographic barriers posed by the digital divide.

Hybrid and non-digital modalities

Like many other organizations forced to adapt to pandemic mandated closures and social distancing measures, Explora quickly turned to digital platforms to share STEAM content, such as do-at-home activities, meet-a-scientist interviews, story-time videos, and museum animal feedings. Staff reinvented programs in hybrid forms to maintain the hands-on approach to learning. Family science programs were reconfigured as virtual events with participants using common household and recycled materials and featuring STEM professionals from within the community. Teacher professional development sessions continued virtually with curbside pickup or delivery of materials, with a new focus on navigating distance learning platforms and creating engaging lesson plans. Classroom materials kits were combined with virtual visits by Explora's educators and STEM mentors. Popular adults-only museum nights were similarly devised with

mini-materials kits and virtual demonstrations. The museum's extensive program of summer learning camps was adapted to accommodate both virtual configurations and limited in-person sessions as state health and safety guidelines allowed. Similar organization of OST classes and day camps continued into the fall of 2020, and spring and summer of 2021.^{xxxii}

Explora shifted to digital and hybrid forms for much of their programming, but staff recognized that with common internet access points such as schools, libraries, and community centers closed or limited in access, individuals in rural and/or economically disadvantaged areas were less likely to have access to museum's virtual or hybrid offerings. Henderson noted that while virtual platforms may reach a broader geographical audience, the audience itself becomes limited to those with reliable internet access.^{xxxiii} Determined to provide underrepresented visitors with non-digital learning opportunities as well, staff reached out to their network of local and regional community partners for help with funding, distribution, and support. Throughout the year, Explora paired with a multitude of regional and local organizations, social services, and school PTAs, and used federal monies available through school budgets to fund, assemble, and distribute thousands of hands-on learning kits to students throughout the state (see Figure 1). Educational outreach for schools, libraries, and after school programs were adapted for COVID-realities, with Explora actively communicating with preexistent funding sources regarding how the adaptations supported learning and the work of community partners.^{xxxiv} For one initiative made possible by state funding, Explora distributed bilingual STEAM activity cards (see Figures 2 and 3) in Grab-N-Go meals at elementary schools, through libraries, by mail, and published them in several small town newspapers. Anticipating that with the start of the 2020 fall school semester many students would struggle to log on to their schools' virtual learning portals, the City of Albuquerque and Explora worked together to provide internet "hot spots," or physical

spaces on the museum's campus with sufficient internet connectivity.^{xxxv} A few museum exhibit kiosks even found their way into public spaces again via a project supported by the City and the local airport.

Community collaborations and shared pathways

Explora staff found that many resources and relationships that existed prior to the pandemic grew in significance in 2020. For example, the STEAM activity cards had already taken root as an idea to share education resources for at-home learning, but their usefulness and popularity made them an invaluable pathway to reach communities and individuals when the museum was closed. This relatively small initiative was boosted by requests from local food distribution organizations to provide resources to support learning and family engagement along with nutrition. Several community partners in the Four Corners area (primarily the Navajo Nation) suggested the activity cards be printed in local newspapers, which were later shared by librarians in the area through mini take-home activity kits via Little Free Libraries.^{xxxvi} The success of the remote learning-friendly activity cards spurred the further development of similarly adaptable, easily sharable cards on a wide variety of topics, and the cards are likely to remain a valuable avenue for learning opportunities outside the museum.

Prior to the pandemic, Explora utilized their website and social media primarily for visitor information and program registration, but with the museum doors closed, regular posts to social media, podcasts, and weekly emails to members became an important way to maintain the museum's visibility and share with the community how Explora provides students, families, and educators with digital and non-digital STEAM learning opportunities. Henderson calls these media "stories of impact" and credits them with generating recent conversations with potential

partners and sparking ideas of collaboration, as well as amplifying the work of other organizations in the community.^{xxxvii} Connecting with potential partners was otherwise often difficult, owing to the awkwardness of virtual platforms and missed in-person opportunities. Staff, management, and the museum's board all intentionally worked to reach out and ask what other individuals and organizations were doing and learning in the process; this knowledge was key for converging interests, assets, and resources. In time, opportunities for working collaboratively emerged organically out of common goals and, supported by word-of-mouth and sharing stories of impact, even helped open up new funding sources.^{xxxviii}

The disproportionate effects of the pandemic on education in rural, Tribal, and economically disadvantaged areas in New Mexico emphasized the need to provide STEAM learning opportunities in multiple modalities and to deliberately engage local affiliates to effectively reach children and families. Reciprocally engaging with leaders and members of these communities amplified the resources and accessibility of the museum's initiatives and programs and in turn magnified the movements and actions already in play in the community. Partner organizations serving low-income families and families of color helped ensure more equitable access to a limited number of spots available in virtual and in-person programming by circumnavigating systems that cater to the more digitally privileged or savvy families, in addition to the traditional barriers to access in STEAM learning opportunities. Utilizing a virtual platform proved useful in another area, however. With the geographic distance collapsed by digital connectivity, the museum board recently expanded to include a member from the Four Corners area and will soon include other board members from other rural, underserved areas of the state.^{xxxix}

Explora weathered the perilous past year thanks to flexible and creative staff, a supportive board, and committed, strong relationships within their communities. Early in the pandemic, facing the abrupt loss of nearly all sources of earned revenue, the executive management made the difficult decision to lay off 80% of staff in order to maintain the long-term financial health of the organization. Remaining staff focused intensely on continuing Explora's mission and relevant work aligned with strategic, long term plans to support STEAM education in New Mexico. Longstanding investment in the broader community in turn shored up Explora while the physical museum space was closed for over a year; significant support from Explora's private-public partnership with the City of Albuquerque helped to simultaneously sustain the museum, prioritize OST learning in the community, and provide professional support for school educators during a clearly taxing time.^{xl} The past year affirmed just how crucial it is for the museum to exist and engage outside the building itself; the physical museum space is only one facet of a museum's resources and ability to engage with audiences.^{xli} While staff are looking forward to welcoming crowds of visitors to the museum once more, they are optimistic that the lessons learned and community bonds strengthened during the pandemic will continue to blossom into opportunities to provide spaces for STEAM learning, in whatever forms or modalities necessary.

Supporting learning post-pandemic

As evidenced by the recent abundance of virtual programming and educational resources, museums and other informal learning organizations helped fill the gaps in learning for students and families during the tumultuous shut down and uneven reopening of schools during the pandemic. Museums' support for continuous learning is invaluable but not surprising. As Leigh reflected, pandemic or not, students are typically out-of-school for more time than they are in-school.^{xlii} Learners spend only a fraction of their lives in classrooms and formal learning sites.^{xliii}

Museums and other OST learning organizations are critical entities in the ecology of education and play especially important roles in closing systemic opportunity gaps in STEAM learning.

Many museums expanded their digital offerings under pandemic restrictions, and some of these programs are likely to become permanent features. As museums mull options for future programming when the pandemic has receded, questions of access and equity should be considered in these decisions. Which audiences are likely to benefit from certain modalities? What do these approaches allow the museum to do? How does this align with the mission and values of the museum? Answering critical questions about equity requires museums to assess the ways in which they engage with and support their audiences. As demonstrated in Explora's story, digital technologies can be useful for maintaining and broadening connections, but the real value of the museum resides in its ability to respond to the needs of the community. Strategies and responses should fit the community, and listening to the community is central to building engagement and programs that authentically connect with audiences. Positioning the museum as a valuable resource in a learning ecosystem entails examining the underpinning motivations and intended outcomes of programs, while considering how the museum itself relates to and relies on its community. Attending to multiple, reciprocal pathways for information, resources, and support between the museum and the broader community translates to better access to meaningful learning opportunities for all.

About the Authors

Rachel Zollinger, MFA, is a Ph.D. student in Art and Visual Culture at the University of Arizona. Her research focuses on STEAM education, place-based learning, and the intersection of environmental education with art culture and science practices. She has worked in the field of museum education for seven years.

Carissa DiCindio is Assistant Professor, Art and Visual Culture Education, at the University of Arizona. Prior to this position, she was the Curator of Education at the Georgia Museum of Art. She has been in the field of museum education for over 17 years. Her research focuses on peer learning in museums and working with university museum audiences. Her work relies heavily on collaborative relationships with community partners and art museum educators that connect to research and experiential learning opportunities with students.

Notes

ⁱ “A Snapshot of US Museums’ Response to the COVID-19 Pandemic (June 2020),” American Alliance of Museums, July 22, 2020. <https://www.aam-us.org/2020/07/22/a-snapshot-of-us-museums-response-to-the-covid-19-pandemic/>. This study was conducted with Dynamic Benchmarking.

ⁱⁱ “A Snapshot of US Museums’ Response to the COVID-19 Pandemic (October 2020),” American Alliance of Museums, November 17, 2020. <https://www.aam-us.org/2020/11/17/national-snapshot-of-covid-19/>. This study was conducted with Wilkening Consulting.

ⁱⁱⁱ “K-12 Student Digital Divide Much Larger Than Previously Estimated and Affects Teachers, Too, New Analysis Shows,” Common Sense Media, June 29, 2020, <https://www.common Sense Media.org/about-us/news/press-releases/k-12-student-digital-divide-much-larger-than-previously-estimated-and>. See also, “Digital Divide,” Close the Gap Foundation, Accessed April 19, 2021, <https://www.close the gap foundation.org/digital-divide>.

^{iv} “Parents Together Survey Reveals Remote Learning is Failing Our Most Vulnerable Students,” Parents Together, accessed April 19, 2021, <https://parentstogetheraction.org/2020/05/27/parentstogether-survey-reveals-remote-learning-is-failing-our-most-vulnerable-students-2/>. See also, “Digital Divide,” Close the Gap Foundation, accessed April 19, 2021, <https://www.close the gap foundation.org/digital-divide>.

^v Laura Stelitano et al., “The Digital Divide and COVID-19: Teachers’ Perceptions of Inequities in Students’ Internet Access and Participation in Remote Learning,” RAND Corporation, 2020, https://www.rand.org/pubs/research_reports/RRA134-3.html.

^{vi} Ibid, n.p.

^{vii} Students may be online for school because it is the only available option, as was the case across the U.S. during the height of the pandemic, or electively because it is a preferred means of learning for the student.

^{viii} John H. Falk and Lynn D. Dierking, “Viewing Science Learning Through an Ecosystem Lens: A Story in Two Parts,” in *Navigating the Changing Landscape of Formal and Informal Science Learning Opportunities*, ed. Deborah Corrigan et al. (Cham: Springer International Publishing, 2018), 10.

-
- ^{ix} Karen Knutson et al., “Approaching Art Education as Ecology: Exploring the Role of Museums,” *Studies in Art Education* 52, no. 4 (2011): 311.
- ^x Marijke Hecht and Kevin Crowley. “Unpacking the Learning Ecosystems Framework: Lessons from the Adaptive Management of Biological Ecosystems,” *Journal of Learning Sciences* 29, no. 2: 268.
- ^{xi} Ibid, 266.
- ^{xii} Falk and Dierking, “Viewing Science Learning,” 14-16.
- ^{xiii} Ibid, 14.
- ^{xiv} Hecht and Crowley, “Unpacking the Learning Ecosystems Framework,” 267.
- ^{xv} John H. Falk and Lynn D. Dierking, *The Museum Experience Revisited* (Walnut Creek: Left Coast Press, 2013), 73.
- ^{xvi} Nina Simon, *The Art of Relevance* (Santa Cruz, CA: Museums 2.0, 2016), 87.
- ^{xvii} Ibid, 91.
- ^{xviii} Mike Murawski, “Towards a More Community-Centered Museum, Part 3: Defining & Valuing Community,” *Art Museum Teaching* (blog). October 18, 2008. <https://artmuseumteaching.com/2018/10/01/towards-a-more-community-centered-museum-part-3-defining-valuing-community/>. See also, Nina Simon, *The Art of Relevance*, 92-94.
- ^{xix} For a discussion on existing power structures of museums in communities, see Sheila Watson, “Museums and Their Communities,” in *Museums and Their Communities*, ed. Sheila Watson (London: Routledge, 2007), 8-17.
- ^{xx} Rachel Zollinger formerly worked for this organization prior to the pandemic. A short narrative article based on initial conversations with museum staff regarding museum education during the pandemic was published in the special section “Experiences in Distance and Isolation: Art Stories from the Pandemic” in *Art Education*; the following is the result of continued conversations and observations over the past year. See also, Zollinger, Rachel, “Being for Somebody,” *Art Education* 74, no. 4 (2021): 10-12.
- ^{xxi} Explora Science Center and Children’s Museum. “About us.” Accessed April 2, 2020. <https://www.explora.us/about/>.
- ^{xxii} Kristin Leigh, personal communication with author, September 13, 2020.
- ^{xxiii} Kristin Leigh, personal communication with author, March 31, 2021.
- Kristin Leigh, personal communication with author, September 13, 2020.

-
- ^{xxiv} Explora Science Center and Children’s Museum. “Programs.” Accessed June 26, 2020. <https://www.explora.us/programs/>.
- Explora Science Center and Children’s Museum. “About us.” Accessed June 26, 2020. <https://www.explora.us/about/>.
- ^{xxv} Zollinger, “Being for Somebody,” 10-12.
- ^{xxvi} Zollinger, “Being for Somebody,” 10-12.
- ^{xxvii} “Civic Faith.” The Harwood Institute. Accessed May 31, 2021. <https://theharwoodinstitute.org/civic-faith-1>
- ^{xxviii} “Turning Outward.” The Harwood Institute. Accessed May 31, 2021. <https://theharwoodinstitute.org/practice>
- ^{xxix} Tara Henderson, personal communication with author, May 17, 2021.
- ^{xxx} “What is Asset Based Community Development (ABCD).” Asset-Based Community Development Institute. Accessed May 31, 2021. <https://resources.depaul.edu/abcd-institute/resources/Documents/WhatisAssetBasedCommunityDevelopment.pdf>.
- ^{xxxi} Zollinger, “Being for Somebody,” 10-12.
- ^{xxxii} Zollinger, “Being for Somebody,” 10-12.
- ^{xxxiii} Tara Henderson, personal communication with author, May 27, 2020.
- ^{xxxiv} Tara Henderson, personal communication with author, May 17, 2021.
- ^{xxxv} Zollinger, “Being for Somebody,” 10-12.
- ^{xxxvi} Kristin Leigh, personal communication with author, September 13, 2020.
- “Fighting ‘COVID Slide’: STEM Activities for Kids to Do at Home” (May 2020). Programming Librarian, accessed June 26, 2021, <https://programminglibrarian.org/articles/fighting-covid-slide-stem-activities-kids-do-home>.
- ^{xxxvii} Tara Henderson, personal communication with author, March 21, 2021.
- ^{xxxviii} Tara Henderson, personal communication with author, May 17, 2021.
- ^{xxxix} Kristin Leigh, personal communication with author, March 31, 2021.
- ^{xl} Kristin Leigh, personal communication with author, September 13, 2020.
- ^{xli} Tara Henderson, personal communication with author, March 21, 2021.
- ^{xlii} Kristin Leigh, personal communication with author, March 31, 2021.
- ^{xliii} Falk and Dierking, “Viewing Science Learning,” 27.

Bibliography

- “A Snapshot of US Museums’ Response to the COVID-19 Pandemic (June 2020).” American Alliance of Museums. July 20, 2020. <https://www.aam-us.org/2020/07/22/a-snapshot-of-us-museums-response-to-the-covid-19-pandemic/>.
- “A Snapshot of US Museums’ Response to the COVID-19 Pandemic (October 2020).” American Alliance of Museums. November 17, 2020. <https://www.aam-us.org/2020/11/17/national-snapshot-of-covid-19/>.
- “Civic Faith.” The Harwood Institute. Accessed May 31, 2021. <https://theharwoodinstitute.org/civic-faith-1>.
- “Digital Divide.” Close the Gap Foundation. Accessed April 19, 2021. <https://www.closesthegapfoundation.org/digital-divide>.
- Falk, John H., and Lynn D. Dierking. “Viewing Science Learning Through an Ecosystem Lens: A Story in Two Parts.” *Navigating the Changing Landscape of Formal and Informal Science Learning Opportunities*. Edited by Deborah Corrigan, Cathy Bunting, Alister Jones, and John Loughran. Cham: Springer International Publishing, 2018.
- Falk, John H., and Lynn D. Dierking. *The Museum Experience Revisited*. Walnut Creek: Left Coast Press, 2013.
- “Fighting ‘COVID Slide’: STEM Activities for Kids to Do at Home” (May 2020). Programming Librarian, accessed June 26, 2021, <https://programminglibrarian.org/articles/fighting-covid-slide-stem-activities-kids-do-home>.
- Explora Science Center and Children’s Museum. “About us.” Accessed April 2, 2020. <https://www.explora.us/about/>.
- Explora Science Center and Children’s Museum. “Programs.” Accessed June 26, 2020. <https://www.explora.us/programs/>.
- “K-12 Student Digital Divide Much Larger Than Previously Estimated and Affects Teachers Too, New Analysis Shows.” Common Sense Media. June 29, 2020. <https://www.common Sense Media.org/about-us/news/press-releases/k-12-student-digital-divide-much-larger-than-previously-estimated-and>.
- Knutson, Karen, Kevin Crowley, Jennifer Lin Russell, and Mary Ann Steiner. “Approaching Art Education as Ecology: Exploring the Role of Museums.” *Studies in Art Education* 52, no. 4 (2011): 310-322.
- Hecht, Marijke, and Kevin Crowley. “Unpacking the Learning Ecosystems Framework: Lessons from the Adaptive Management of Biological Ecosystems.” *Journal of Learning Sciences* 29, no. 2: 264-284.

Murawski, Mike. 2018. "Towards a More Community-Centered Museum, Part 3: Defining & Valuing Community." *Art Museum Teaching* (blog). October 18. <https://artmuseumteaching.com/2018/10/01/towards-a-more-community-centered-museum-part-3-defining-valuing-community/>.

"Parents Together Survey Reveals Remote Learning is Failing Our Most Vulnerable Students." Parents Together. Accessed April 19, 2021. <https://parentstogetheraction.org/2020/05/27/parentstogether-survey-reveals-remote-learning-is-failing-our-most-vulnerable-students-2/>.

Simon, Nina. *The Art of Relevance*. Santa Cruz: Museums 2.0, 2016.

Stelitano, Laura, Sy Doan, Ashley Woo, Melissa Kay Diliberti, Julia H. Kaufman, and Daniella Henry. "The Digital Divide and COVID-19: Teachers' Perceptions of Inequities in Students' Internet Access and Participation in Remote Learning." Rand Corporation, 2020. https://www.rand.org/pubs/research_reports/RRA134-3.html.

"Turning Outward." The Harwood Institute. Accessed May 31, 2021. <https://theharwoodinstitute.org/practice>.

Watson, Sheila. "Museums and Their Communities." In *Museums and Their Communities*, edited by Sheila Watson, 1-23. London and New York: Routledge, 2007.

"What is Asset Based Community Development (ABCD)." Asset-Based Community Development Institute. Accessed May 31, 2021. <https://resources.depaul.edu/abcd-institute/resources/Documents/WhatIsAssetBasedCommunityDevelopment.pdf>.

Zollinger, Rachel. "Being for Somebody: Museum Inclusion During COVID-19." *Art Education* 74, no. 4: 10-12.