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Pandemic Pivoting:

The Use of Home Wi-Fi Accounts and Fast-Food Parking Lots for Teachers' Internet Connectivity

Trina Harlow, Yang Yang, Sarah Ackermann, Beth Dobberstein, Bob Reeker, and Tim Needles

Many people and organizations worldwide are still trying to gain access to internet services (Buechner, 2020). The quest for the internet is ongoing, just as electricity was once a privilege when it was first invented and made available mainly to only scientists and engineers, then to people of financial means in primarily urban areas (Southern Oral History Program, n.d.), and continues to be a struggle even today in many parts of the world (Odarno, 2017). Thus, the development and implementation of the ever-morphing internet also continually changes.

In early 2020, education was caught off guard by the COVID-19 pandemic. As a result, American education's need for accessible, reliable internet services for all teachers and students became a prominent concern. In this second part of the National Art Education Association's Public Policy and Arts Administration Special Interest Group 2020 Device and Internet Accessibility Study, various internet complexities of U.S. school art teachers during hybrid and remote teaching will be discussed.

Literature Review

Ruralization and Urbanization

Studies by the information and communications technology sector have reported issues connecting the internet across distances, over mountains, through forests, and elsewhere. A National Telecommunications and Information Administration (NTIA, 2018) study found that 86% of urban and 82% of rural households had internet connections. Pascal (1987) predicted that the internet would quickly connect life in rural America to other geographic areas. Some of Pascal's predictions on the ruralization of the internet have happened, but challenges still exist. Research on the digital divide between the ruralization and urbanization of the internet continues to explore equitable internet access across all geographic divides (Braesemann et al., 2022; Opalka et al., 2020; Power et al., 2020; Stone, 2021; Sundeen & Sundeen, 2013).

Inequities of Geographics and Income

U.S. school internet access data on connectivity exist, but the literature on connection dependability is lean. An EdWeek Research Center study found that 96% of teachers had wireless high-speed internet at home—most of the 4% who did not have wireless high-speed internet lived in rural areas or areas lacking infrastructure (Bradon, 2020). A study by the Education Superhighway (2019) found that 99% of American schools had sufficient on-campus bandwidth. However, just 2 years prior, NTIA (2018) data reported that 14% of school children aged 6 to 17—equating to roughly 7 million students—lived in homes without internet connectivity. Further, the NTIA study linked family income with offline status, reporting that children from lower

income households were less likely to have internet service than their peers in higher income households. The NTIA study found that 74% of children in households with an income of \$25,000 or less had internet access. Households with an income of more than \$100,000 had 92% internet connectivity.

Inequities of Race

NTIA's study also called attention to racial disparities. Homes of White and Asian school-aged students had 88% connectivity, Black students had 81% connectivity, and Hispanic students had 83% access (NTIA, 2018). The National Center for Education Statistics (NCES, n.d.) reported that in 2018, there were 50.7 million schoolchildren in the United States, with 23.4 million being White, 14 million Hispanic, 7.6 million Black, 2.8 million Asian, 2.3 million of two or more races, half a million Native American or Alaskan Native, and 186,000 Pacific Islanders. Comparing the NCES and NTIA data indicates that approximately 7.2 million school-aged children (14%) did not have internet access during these studies. With 20% of Americans living in rural areas (Ajilore & Willingham, 2019), 22% of the rural population being racially or ethnically diverse (Castillo & Cromartie, 2020), and 17% of the rural population being children (Economic Research Service, 2005), this means that potentially 2.5 million diverse children may be affected by internet ruralization issues.

Internet Preparedness of Schools

In 2020, there were approximately 3.7 million public and private school teachers in the United States (Duffin, 2021)—4% (or 148,000) of teachers did not have the internet (Bradon, 2020). Even if 96% of teachers have home internet service (Bradon, 2020), having the

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NAEA Public Policy & Arts Administration Special Interest Group 2020 Survey for PK-12th Grade Art Teachers

The NAEA PPAA Special Interest Group is gathering information regarding device availability and Internet access during the global pandemic. Information is being gathered for the spring and fall semesters of 2020 from American PK-12th grade art teachers in public and private schools. Data gleaned from this survey will be analyzed and disseminated through NAEA and other educational stakeholders in an effort to fully understand some of the experiences and challenges of art educators during 2020.

Definitions: For this survey, the term "devices" means any digital equipment you had available to use to instruct and communicate with your students (computers, laptops, cell phones, land line phones, tablets, etc.). "Internet" refers to the way in which you accessed the Internet (wifi, Hot Spots, cell phone lines/data, etc.). This survey is not about applications, learning management systems, or software.

Directions: This survey should take about 7-15 minutes to complete. Complete the survey ONE time. Only PK-12th grade art teachers should take the survey. If you have any questions, please contact PPAA at PPAAsurvey2020@gmail.com or Dr. Trina Harlow at drtrinaharlow@gmail.com.

By taking this survey, you are formally agreeing to share the data you anonymously provide on device and Internet access during the spring and fall semesters of 2020 for this study with NAEA PPAA and the principal investigator, Dr. Trina Harlow (NAEA member).

Thank you for the time you contribute to the field of art education by completing this survey. The deadline to complete is January 15, 2021.

Figure 1. PPAA Survey. A 31-question survey was distributed across the United States via email and social media to NAEA members and K–12 art teachers.

theory of relational cohesion (Lawler & Yoon, 1996) each report on the need for positive human interaction within organizations and the relevance of thoughts and emotions for human success (Lawler, 2001; Lawler & Thye, 1999; Mannix et al., 2007). The internet can be a hard-to-understand system of interconnected digital computer networks involving tangible cables, control stations, and satellites. As implied by these theories, the intangible opinions and realizations of humans who use the internet nearly all day long must be factored into discussions regarding performance and success.

Methodology

Data

In this mixed-methods survey study, quantitative and qualitative data were used to examine the internet accessibility of art teachers during 2020 hybrid and remote instruction. Quantitatively, Google Forms and Statistical Package for Social Sciences software were used

internet does not indicate dependability. For schools to be functional and successful in remote and hybrid modalities, teachers and their students must have dependable internet. A March 2020 study by the School Superintendents Association revealed student challenges with remote learning in which 81% of superintendents reported that a lack of home internet access would prohibit their districts from being fully online (Rogers & Ng, 2020). Two years before the pandemic, 14% of students (7.2 million) did not have home internet access, and an estimated 12 million students routinely could not complete homework because of insufficient home internet access (Rogers & Ng, 2020). Thus, the digital divide becomes more visible.

Frustrations of Teachers and Students

Even if most teachers and students have the internet service needed for the successful interplay of instruction, the hike across the digital divide for 148,000 teachers and 7.2 million children is frustrating and concerning on all fronts of education. The swift pivot to remote teaching during COVID-19 brought much attention to the already existing inconsistencies of home Wi-Fi access, causing many teachers to lament their internet issues (personal communication, March 20, 2020). Teachers' financial burden in securing home internet services is prominent (Bradon, 2020). Only 1% of U.S. schools in EdWeek Research Center's 2020 survey provided home internet financial compensation to teachers (Bradon, 2020).

So why worry about such inconsistencies in internet access? Social exchange theory, affect theory (Mannix et al., 2007), and the

to collect and analyze data on participants' overall internet usage experiences based on (1) town size or rural location and (2) grade levels taught. Qualitatively, content analysis was used to examine open-ended answers to participants' responses regarding their internet experiences. A Google Form survey with 31 questions was developed and digitally distributed to art teachers in various ways, including through

- private Facebook groups for elementary, middle, and high school art teachers;
- a private Facebook group called Online Art Teachers (K–12);
- sharing the survey link on various National Art Education Association (NAEA) social media sites, including available Facebook groups for all NAEA State Chapters and NAEA Regional Divisions; and
- two bulk NAEA membership emails.

The survey was strategically shared across the United States to have a balanced geographic representation (Figure 1).

The swift pivot to remote teaching during COVID-19 brought much attention to the already existing inconsistencies of home Wi-Fi access, causing many teachers to lament their internet issues.

Participants

Participants were 903 preK–12 art teachers from the United States. Some participants were NAEA members. Participants anonymously and freely participated in the study's survey. The only identifiers obtained from participants were the size of the community in which they taught art and what grade levels they taught.

Results

Survey data regarding internet accessibility during remote pandemic instruction—both in the emergency pivot to remote instruction during the spring semester of 2020 and during the 2020 fall semester's hybrid and remote instruction—revealed answers around the use of personal internet accounts. Results were obtained through multiple-choice and short-answer questions. Various issues reported by participants were addressed using a few overarching categories: (1) internet availability, (2) internet satisfaction, and (3) internet cost. Data were triangulated with statistics provided by the NCES (n.d.), the 2020 School Superintendents Association report (Rogers & Ng, 2020), and the Education Superhighway (2019), as well as personal communications with art teachers.

Respondents' backgrounds were first examined, including town size and grade levels taught. A total of 896 respondents provided valid responses on the size of the town where they taught school. Among them, 48 (5.36%) taught in rural areas, 298 (33.26%) in small to medium-sized towns (up to 12,000 residents), 162 (18.08%) in large towns (12,001–40,000 residents), and 388 (43.3%) in metropolitan areas (40,001 residents and above). A total of 773 respondents provided valid responses on the grade levels they taught. Among them, 232 (25.8%) taught preK–5, 116 (12.9%) grades 6–8, 301 (33.5%) grades 9–12, and 243 taught in more than one category of these grade levels. Seven respondents taught only

high school Advanced Placement or special education courses, and their answers were excluded from the analyses because of the sample size.

Internet Availability

Not all participants had access to the internet for remote teaching in spring 2020. Ninety-one percent reported internet access at nearly all times, 8% reported intermittent service, and 1% reported no service. Most of the respondents across all sizes of towns had to use personal Wi-Fi accounts to conduct remote instruction during spring 2020—94% of rural; 96% of small, medium, and large towns; and 98% of metro-area participants. Twenty percent of participants used their personal cell phone data to conduct instruction and communicate with students. Of all participants, 20% used cell phone data to power other devices, and 6% used purchased internet hot spots.

For those with no service, Figure 2 conveys reasons for the lack of service. For the 24.6% who stated another reason, responses included internet signals bouncing off the water, intermittent provider signals, living at someone else's home with no internet, and choosing not to have home internet to call attention to needed school financial compensation. Some teachers reported that terrain issues blocked service. Issues with routers, wiring, electrical transformers, and other home equipment caused connection and financial issues. One of the most revealing responses was the emergence of “fast-food parking lot teachers” who worked inside their cars at local eating establishments to access Wi-Fi.

Internet Satisfaction

Regarding spring 2020 Wi-Fi services, 27% of participants reported satisfaction with services and had no problems, 43% were primarily satisfied with only a few problems, 21% were somewhat satisfied, 7% were rarely satisfied, and 1% were never satisfied. Respondents who taught in large towns reported the

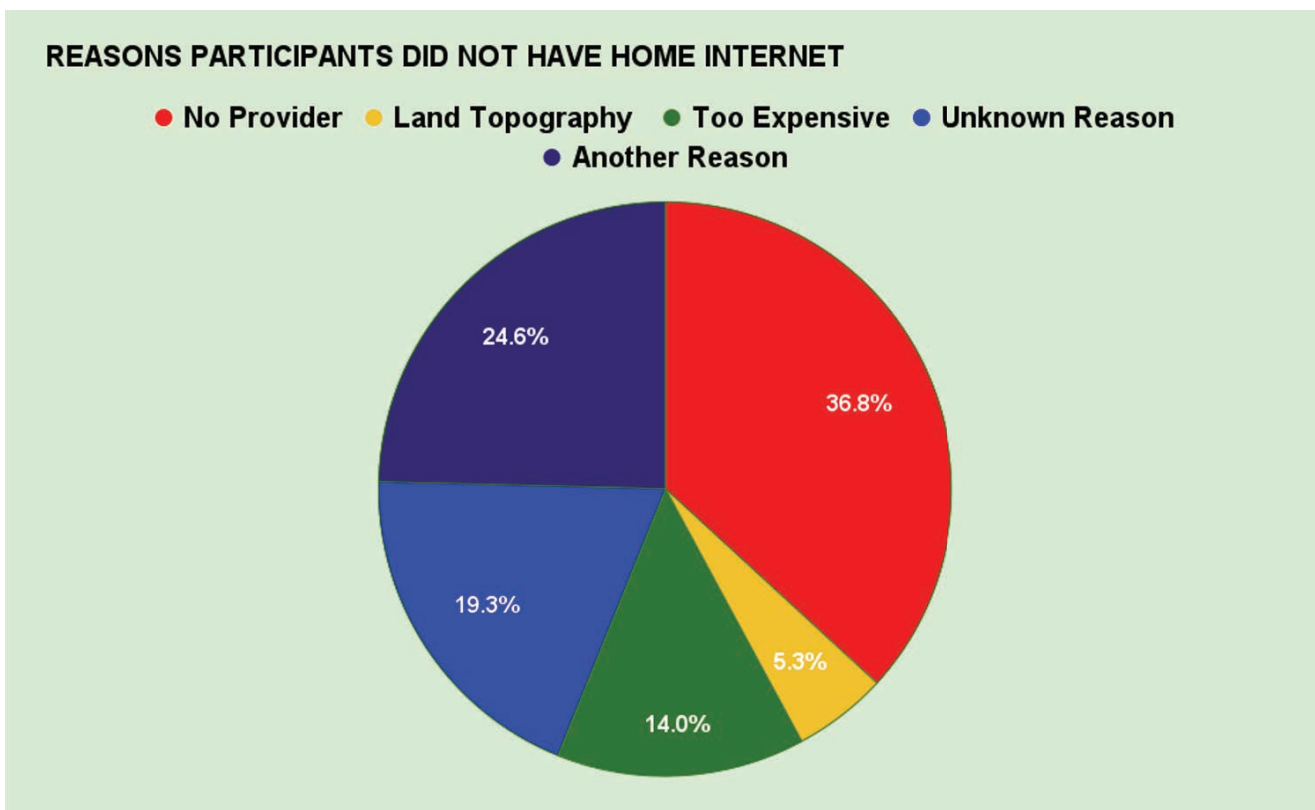


Figure 2. Reasons participants did not have home internet.

TEACHERS' FINANCIAL COMPENSATION BY SCHOOLS

● No Compensation ● Compensation

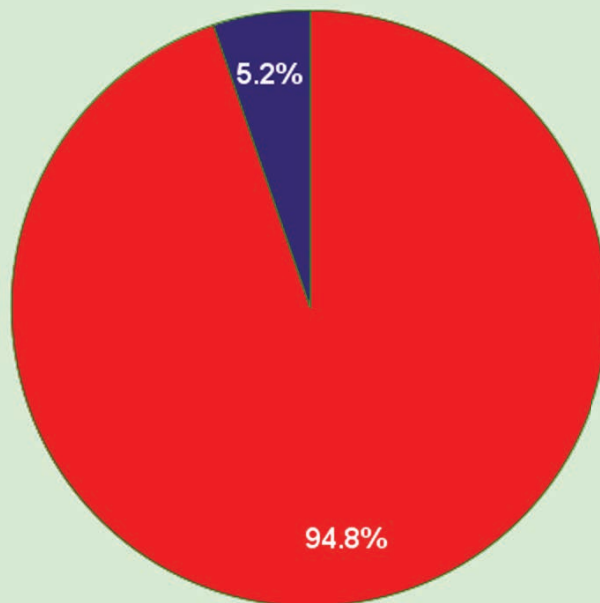


Figure 3. Teachers' financial compensation by schools.

highest percentage of either very satisfied or most satisfied (76.3%), followed by participants from small to medium-sized towns (73.7%). Respondents from rural areas had the lowest percentage of either very satisfied or most satisfied (60%). Sixty-eight percent of total respondents experienced a lagging or slowness in their home Wi-Fi services. Across town sizes, metropolitan areas had the highest percentage of respondents experiencing lag when using home Wi-Fi services (70%), signifying that large population centers also had issues with the pull on internet usage. The small to medium-sized towns had the lowest percentage of respondents experiencing slowness (68%). While rural participants were both the most unhappy with their internet service and had more lack of service, metropolitan areas reported more drag and lag.

Two common problems reported in the data included (1) a slowness or dragging of home Wi-Fi or (2) their home internet needing more bandwidth to allow for the uploading and downloading of large video files. To compensate for slowness, teachers mentioned personally paying to upgrade their home internet or having to ask shared household members to use home internet less. Some participants worked early in the morning or at night when there was less competition for bandwidth. Some teachers even reported working in the middle of the night.

Internet Cost

Many participants relayed financial obstacles in providing quality remote instruction. Figure 3 survey data report that 5% of total participants' schools offered financial compensation for

spring 2020 personal internet use. Rural participants received no financial compensation. Respondents teaching 100% remotely or hybrid from their homes in fall 2020 were further asked if schools provided them with financial assistance for home internet. Only respondents from large-sized towns (1%) or metropolitan areas (3%) received any new financial support for their home internet service in fall 2020.

Many teachers reported that personal financial hardships—during or prior to the pandemic—prevented them from increasing their Wi-Fi data plans. Some teachers reported financial issues with replacing broken routers and other equipment. Some teachers also reported stress caused by the need to pay for upgrading data plans or personal stress caused by too much data for work, which did not leave enough data for personal business. With multiple family members working from home and multiple children participating in remote instruction, the size of some teachers' data plans were a constant source of frustration—for their emotions and their wallets.

Discussion

While significant advances in internet connectivity and reliability have been made across the United States, a canyon must be crossed regarding the digital divide for all teachers and students and the potential for internet accessibility to be more commonly publicly provided. Based on the findings of this study, at least three areas of focus need further examination for the success of internet-driven education—not just for art education. The study proposes

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The study proposes a gain in the provision of home internet services, financial compensation for home internet use by school staff, and including educators in stakeholder internet discussions.

a gain in the provision of home internet services, financial compensation for home internet use by school staff, and including educators in stakeholder internet discussions.

Gain Is the Goal

Diverse educational and technology stakeholders from various geographic areas need seats at the worktable—all with the task of exploring how to improve internet access and capability for teachers and students during periods of remote instruction or for accessing the internet for nonpandemic schoolwork. Problematically, when a convening of stakeholders is identified and assembled, and an action plan is developed, their expertise may be potentially or instantly outdated because of rapid technological advancements. The adage “nothing ventured, nothing gained” must be employed to address ever-changing school internet needs. Gain is the goal, even if that gain is small and constantly evolving.

Financial Compensation for School Staff and Students

The average teacher salary in the United States is \$63,645 (Perino et al., 2021). A basic internet bill costs \$50 to \$120 a month, depending on the chosen data plan, plus equipment rental, taxes, and other special fees (Holslin, 2023). The livable wage from state to state and varying teachers’ salaries must also be considered when reviewing the financial burden of educators paying for their home Wi-Fi services. For example, in 2021, a starting teacher’s salary in Montana was \$31,148, well under the livable wage of \$47,000 (World Population Review, 2021), yet they paid approximately the same as everyone else in the United States for their internet (Holslin, 2023). Teachers’ use of personal cell phones and personally purchased internet hot spots must also be a part of further investigation. School administration, district Board of Trustees, and State Departments of Education must consider internet stipends or compensation for teachers because remote instruction, or the many hours of planning that most teachers do outside of school hours, cannot generally happen without home internet access. Our internet-hungry society requires more and more connectivity to tend to education and the most basic of needs. Though education generally does try to address the needs of all students and educators, those who cannot equitably harness the internet for teaching and learning should be an immediate societal concern.

Listening to Educators

In a society that depends increasingly on the internet to conduct and transmit nearly every facet of life, one also wonders how long the internet can continue to log and transmit the growing number

of transactions between human beings (Lohr, 2021). Educators must be prepared for profound changes in how the internet will be used and the achievement of reliable access for all teachers and students (Smith, 2020). Will schools use the internet as a grander example of Alexander Graham Bell’s telephone, mainly transmitting communication, information, and files? Or, someday, will the internet do something for education that we cannot yet imagine? According to Lidewij Edelkoort (2017), founding dean of hybrid studies at Parsons School of Design and one of the world’s foremost trend forecasters, a cloth-handkerchief holographic computer she is working to develop will commonly be used one day. As each new technological idea comes to pass, humankind imagines another one.

With known and rapid changes in the technology sector, the more urgent and bigger question for education is *How can schools provide equitable, dependable, accessible, and affordable internet services for teachers and students to use for remote teaching, learning, and working and studying from home, whether during emergency remote instruction or nonemergency schooling?* Should a teacher who does not have dependable internet or internet access be compromised in performing their job? Should the student whose family does not have the internet be prevented from completing school assignments and learning? Should the student whose family has the internet have the opportunity to be more successful in school? Should the income levels of teachers and students’ families affect their ability to have the internet at home if it is genuinely needed for teaching and learning? Teachers’ experiences will give a detailed and informed assessment of educational needs.

Conclusion

Education’s internet superhighway is attempting to stretch to rural and urban areas, yet detours exist. It is nearly impossible to fathom a dedicated and/or frustrated art teacher sitting in their car in a fast-food parking lot to access the internet and teach their students. While these fast-food parking lot teachers were not positioned in a seat of educational privilege by American standards, almost all American schools are positioned in a seat of privilege on the world stage, by having both electricity and access to the internet. Questions raised by this internet accessibility study beckon the need for increased convening of educational and technology sector stakeholders to seek informed answers on internet access, even if the questions and/or answers change before stakeholders push their chairs away from the internet worktable. For education to be equitable, we must provide solutions for the estimated 148,000 U.S. teachers and 7.2 million U.S. students who do not yet have an entrance ramp to the internet superhighway and those whose vehicles keep breaking down—both in the United States and beyond. ■

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State Departments of Education must consider internet stipends or compensation for teachers because remote instruction cannot generally happen without home internet access.

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