An Exploratory Study of Low-Income Minority Students' Online Learning Experiences

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Abstract

This study draws on the theory of Cumulative Disadvantage and Advantage to explore the online learning experiences of low-income minority students in middle school during the COVD-19 pandemic. We draw on 8 semi-structured interviews with two students, 12 interviews with teacher participants, ongoing open-ended ethnographic interviews with students and teachers, student artifacts, and field notes from over 300 hours of synchronous classroom observations. Results suggest that low-income students experience discomfort in online learning due to factors such as inequitable access to technology and unpleasant experiences with digital tools, which lowered their self-efficacy for learning. However, students found comfort in the few circumstances where the teachers were empathetic toward them. We end with implications for improving online teaching in middle school, including advancing learner-centered instructional objectives among low-income middle-school students, providing equitable access to computer technology and digital tools, and adequately equipping students with necessary skills.

Keywords: Minority students, remote learning, middle school, learner discomfort, comforting teacher behavior.

Due to the widespread closure of K-12 institutions caused by the COVID-19 pandemic, many students from low-income minority backgrounds had to transition to learning online (Yan et al.,

2021; Sokhulu, 2020; Kaeden, 2020). COVID-19 significantly affected middle school students' online learning because of a myriad of factors. Franchi (2020) notes that the digital divide and the isolation from not having regular face-to-face contact with instructors and classmates were some of the major factors. According to Barrot et al. (2021), many students had extra trouble learning online because of anxiety, sadness, erratic internet connectivity, and unconducive learning environments at home. A few students had feelings of desertion and indifference due to their inability to obtain assistance from teachers in navigating online learning resources. Additionally, Li et al., (2015) state that low-income minority parents' inability to buy their children computers due to financial constraints was a major factor that affected students' online learning.

In the view of Kuosa et al. (2016), low-income middle school students' academic achievement suffered because they had trouble concentrating and maintaining their motivation in online classrooms and engaging in online learning as a whole. Additionally, limited access to support services (Brown et al., 2020; Tatarchenko, 2017), human resources challenges (Pedro & Kumar, 2020), and financial resources (Yardi & Bruckman, 2012; Eglash et al., 2017) were some factors that impacted the students' online learning. In effect, students experienced difficulties finishing projects and tasks that called for practical experience, creating learning loss and a gap in their education (Barrot, 2021).

This study draws on the theory of Cumulative Disadvantage and Advantage (CDA) (Merton, 1968; Dannefer, 2003; Northrop, 2017) to more deeply explore the question: How do middle school students from low-income minority students describe their online learning experiences? In the review below, we first discuss existing research related to this question, which tends to focus on three areas: students' self-confidence, teachers' behavior, and relationship-building. We next weave these findings together with CDA theory to provide a framework for our research.

Empirical Review

Based on the supposition that literacy is a social activity and is therefore shaped and mediated by cultures and ideologies (Learned, 2016), this review provides a systematic examination of the actual experiences and outcomes of low-income minority students engaged in online learning. We first focus on students' self-confidence in the online learning space, which is eroded by educational debts (such as unequal access to technology) and skill set debts (like difficulty using digital tools), which can make online learning uncomfortable for low-income minority students.

We next discuss how such discomfort may be lessened by "teachers caring presence," which is demonstrated by teachers' consoling actions and support to students in navigating online tools for online learning. Finally, we discuss the importance of peer relationships among middle-schoolers and how such relationship-building may be a challenge in the online learning space.

Self-Confidence in the Online Learning Space

Despite political rhetoric about digital abilities and equity, educational disparities remain and accumulate over time to disadvantage students from low-income minority backgrounds (Kuo et al., 2016). For most students from low-income minority backgrounds, Ball et al. (2017) opine that inequitable access to computer technology and related resources for online learning affect their self-confidence. Self-efficacy is defined by Bandura (1994) as "beliefs about their [whose?] abilities to produce designated levels of performance that exercise influence over events that affect their lives" (p. 71).

Alqurashi (2017) and Kuo et al. (2014) define self-efficacy as efficacy expectations, which reflect one's convictions toward the behavior required to achieve specific outcomes and determine how much effort and how long people will persevere when confronted with obstacles or adverse experiences. Ideas about self-efficacy influence how people think, feel, and behave. According to Bandura (1997), efficacy views define human agency.

Those who believe they will fail will likely not try. Ball et al. (2017) intimate that technology deprivation may cause students to experience negative emotions, influencing their attitudes toward technology or technology-focused activities. Therefore, self-confidence, like academic self-efficacy, is mediated by synchronous tools in online learning. Shen et al. (2013) posit that online learning students must understand how to use new tools and their importance because self-efficacy affects performance, happiness, attitudes toward computers, computer experiences, comfort with computer use, training, computer anxiety, and information-searching skills.

Many students from low-income neighborhoods struggle with navigating online tools; a lot more students also possess inadequate understanding of online learning expectations and have inadequate skill in using online learning strategies for success (Hart et al., 2018). Rafalow (2021) argues that while conversations about digital inequality in education have often focused on access to technology, research into youth culture has shown that education stakeholders can bridge the digital gap with concerted efforts.

This situation suggests a need for students to build digital and technological self-confidence and their abilities to access support services like the library, counseling, tutoring, and disability services to be successful. Yet, questions still need to be answered about how students can do these when access to these services is limited or unavailable especially in an arena where "digital inequalities and racial disparities deny students from low-income communities the chance to use "their digital knowledge as currency" (Rafalow, 2021, p. 154) and deflate their self-efficacy in technology use for learning.

In the context of self-confidence in online learning spaces, low-income minority middle students may start off with a disadvantage due to factors such as lack of access to educational resources and support, as well as societal and cultural biases that can impact their academic performance. These disadvantages create a cycle of negative feedback that reinforces a student's lack of self-confidence in their academic abilities. Students who lack self-confidence may be less likely to actively engage in online learning activities, leading to further academic struggles and a lack of opportunities to build their skills and confidence.

Comforting Teacher Behaviors in Online Learning Spaces

Middle schoolers need "online caring presence" (Mastel-Smith et al., 2015, p. 56) to succeed in online learning. Kumi-Yeboah and Smith (2016) state that in order to engage low-income minority students "Four major factors are critical: class discussion and inquiry-based learning; social media and technology; non-educational practices; and cultural, social, and language differences" (p. 172). These things make students think teachers care and lessons are fun. Thus, loving teachers and engaging content foster student-teacher relationships. According to Miller (2021), loving teachers talk to students about academic and personal issues and care about their well-being. It also includes teachers' knowledge of students' technology preferences and preferred forms of communication, such as chats, text messaging, being flexible, responsive to other multimodal online communication, and reaching out to students to check progress and offer help. Since adolescents in middle school are still gaining independence and self-regulation skills, they may need more guidance and assistance than older students (Li et al., 2015).

Yet not all students have equitable access to teachers' comforting behaviors. Many researchers say that teachers at schools with primarily working-class Latino students have low expectations because they think these kids will work working-class jobs (Anyon, 1981; O'Connor & Bobo, 2001; Irizarry, 2015). Latino children from unstable homes and prone to crime are stereotyped as low achievers in class. In schools with wealthier White and Asian pupils, teachers tend to have higher expectations of students (Anyon, 1980; 1981; Lee & Zhou, 2015). Upwardly mobile Asian-American students benefit from being seen as model minorities set for success due to racial affiliation, while White students, in particular, benefit from Whiteness' invisibility. White students' successes aren't ascribed to race (Lee & Zhou, 2015).

Such negative experiences may be deepened if teachers do not have strong IT skills for online learning. Hart (2021) advises teachers to employ online learning management systems, specialized online learning tools, and multimedia to teach online. Brown et al. (2020) observed that many teachers lacked online teaching skills after COVID-19. In addition, urban schools often face budgeting issues. Tough decisions are often made about students sharing devices/resources/equipment. Teachers need professional development on what tools to use, why they should use them, and how to use them to effectively integrate technology into learning for all students (Hart, 2021; Huang et al., 2015). Robinson (2017) states that thoughtful online learning design supports student learning and engages them. As such, Pacansky-Brock et al. (2020), Robinson, et al., (2017), and Freeman et al. (2015) argue that successful online teaching requires navigational documents, interpersonal interactions, social presence, culturally responsive content, and actionable feedback.

Peer Relationship Building in Online Learning Spaces
A significant characteristic of middle school pupils is their peer relationships (Ragusa & Crampton, 2018). Middle schoolers value friendships and bonding, which help them define themselves (Wentzel,2017). Relationships with peers provide adolescents with companionship and entertainment, assistance in problem-solving, personal validation, emotional support, and a foundation for identity development. Children with positive peer relationships experience greater emotional well-being and value prosocial behavior more than children without positive peer relationships (Wentzel, 2017).

Teachers' online caring presence may foster relational bonds by instilling confidence through positive affirmation and feedback, using group work to increase peer interaction, and providing opportunities for all community members to share personal information, preferably synchronously (Berry, 2019: Velasquez et al., 2013). Miller (2021) found that K-12 online teachers believed their participation was essential to community growth.

We contend that low-income middle school students' lack of access to educational resources and support, as well as societal and cultural biases affect their social interactions (Kaden, 2020). These disadvantages create barriers to forming meaningful relationships with peers and teachers, which further exacerbate feelings of isolation and marginalization. In an online learning environment, the lack of physical presence and face-to-face interactions may make it even more difficult for low-income middle school students to build relationships with others (Hope, 2017: Pacansky-Brock et al., 2020; Murray et al., 2012; Nandi et al., 2012). The absence of nonverbal cues and the inability to participate in group activities or discussions make it challenging to establish trust and rapport with peers and teachers.

Theoretical Perspectives

Based on the theory of Cumulative Disadvantage and Advantage (CDA) (Merton, 1968; Dannefer, 2003; Melo et al., 2019; Northrop, 2017), this study assumes that low-income middle school students have a more challenging time succeeding in online learning because of unfair disadvantages in today's globalizing world (Ladson-Billings, 2006; Tamara & Warschauer, 2022). Inequitable access to educational resources, (such as access to technology),and "skillset gaps" (gaps in students' knowledge of information computer technology and its utilization for online learning success") (Loton et al., 2020; Ledesma, & Calderón, 2015; Van Deursen, & Van Dijk, 2014) have persisted in low-income minority communities. and continue to be an ongoing challenge, adding up to more disparities in middle school results for students from low-income communities. Neumann et al. (2017), argue that these challenges lead to low self-efficacy in minority students and hinder their capacity to make sense of the world, collaborate with others, and find and evaluate information using digital resources.

Theoretical Framework

The intersection of Cumulative Disadvantage and Advantage (CDA) theory with online learning experiences offers a thought-provoking framework for examining the educational landscape in the digital age. It shows how early advantages or disadvantages can multiply and shape one's educational trajectory over time. Exploring CDA and online learning enhances our understanding of online education and emphasizes the need to address inequities in this quickly changing field. By scrutinizing the interplay between cumulative advantage and disadvantage, we identify opportunities for intervention and the design of more inclusive, equitable online learning environments.

Figure 1

A Framework for CDA and Online Learning Experiences Intersection
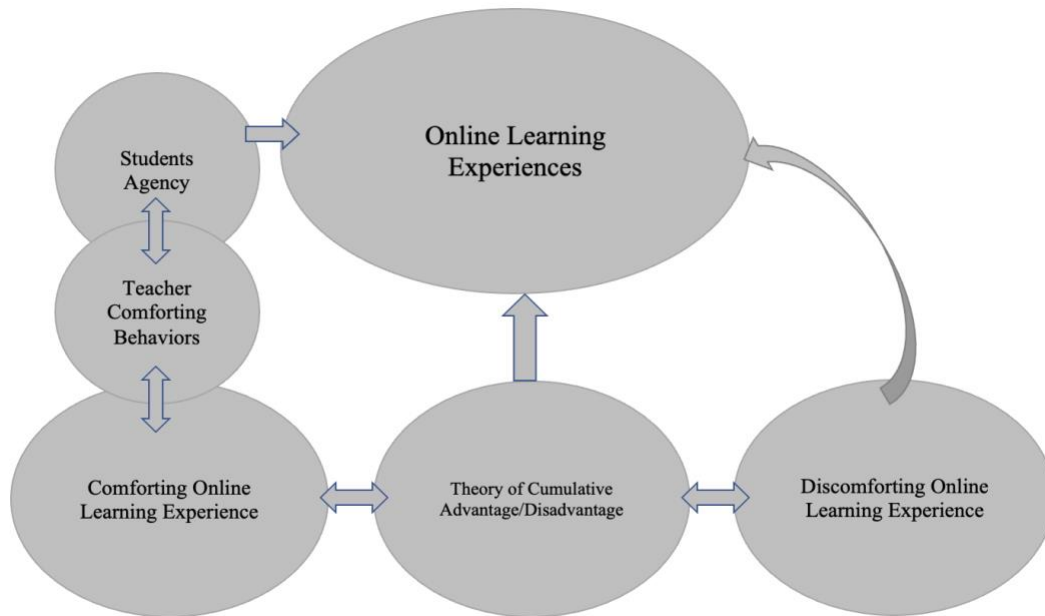
The intersection of Cumulative Disadvantage and Advantage (CDA) theory in the context of online learning experiences is complex. CDA theory suggests that initial advantages or disadvantages can compound over time, leading to disparate outcomes. In online learning, this theory can manifest in various ways. Students from privileged backgrounds may have access to better resources and technology, giving them an initial advantage. Meanwhile, students facing economic or technological disadvantages may find the online learning experience discomforting. However, this cumulative disadvantage can be mitigated through teacher comforting behaviors. Educators who provide additional support, guidance, and resources can help level the playing field. Furthermore, student agency plays a crucial role. Teachers who take proactive steps to engage with the online learning environment, seek assistance when needed, and adapt their strategies can transform a discomforting online learning experience into a comforting one, thus breaking the cycle of cumulative disadvantage and promoting more equitable outcomes in education.

Methodology

To explore low-income minority students' online learning experiences, we used constructivist and interpretive research methods to examine the intersection between Cumulative Disadvantage and Advantage (CDA) and online learning. Our approach was characterized by purposive sampling, which allowed us to select two participants who contributed unique perspectives and narratives to the study. Drawing primarily on 8 semi-structured interviews with two students, 12 interviews with teacher participants, ongoing open-ended ethnographic interviews with students and teachers, and field notes from over 300 hours of synchronous classroom observations and student artifacts. We unveil the intricate ways in which CDA manifested in online learning spaces. This qualitative methodology facilitated a comprehensive

exploration of the research question: How do middle school students from low-income minority communities describe their online learning experiences?

Research Context

Roland Middle School, an urban middle school, hosted the spring 2020–2021 study (names of all places and people are pseudonyms). The 300-student school in a major Northeastern city is culturally and linguistically diverse. The school's population included Asians (1%), Blacks (27%), Hispanics (71%), and Whites (1%), and was 55% male. About 22% of students received special education services, 25% were English as New Language (ENL) learners and received ENL services, 11% were proficient in ELA, 12 % were proficient in math, 21% lived in temporary housing, 80% received free meals, and 60% were economically disadvantaged.

Participants

We purposively chose two students and two teachers (Maxwell, 2013) for this study. Participants were selected based on specific criteria relevant to the research objectives, including gender (one male and one female), identifying as a low-income minority, aged 11 to 13, and enrolled in 6th through 8th grade. The two students were African American and Latinx (Mexican American), lived in a low-income neighborhood, attended an underperforming middle school or Title 1 school, and received free school lunches.

 Crusoe, an African American female general education student, lived in a homeless shelter, while Niagara, a Latinx male with a disability, lived in stable housing. The inclusionary criteria for the teacher participants were teachers that taught the particular class in which the focal students were enrolled. Two teachers were selected for this study: Mr. Pebble, who taught Crusoe in science, and Ms. Dell, who taught Niagara in English Language Arts. Mr. Pebble was African American and Ms. Dell white.

Data Sources

For this analysis, we drew primarily on 8 semi-structured interviews with two students, 12 teacher interviews, ongoing open-ended ethnographic interviews with students and teachers, and student artifacts. We also used field notes from over 300 hours of synchronous classroom observations as a contextualizing or secondary source. Observations enabled us to look at students' behaviors, actions, and inactions in online learning spaces as well as how students leveraged digital tools for online learning.

Student interviews principally solicited participants' experiences of online learning and what they believed were skills they would need to succeed in online learning spaces on the one hand, and teachers online instructional delivery preparedness, enactment of online curriculum, and thoughts about low-income minority students online learning experiences on the other hand. Teacher interview questions focused on their online teaching experiences, abilities to navigate educational technology for online learning and how they created comforting online classroom contexts. Artifacts from students provided contextualizing data on student's perceptions and feelings about online learning. Interviews were recorded and transcribed.
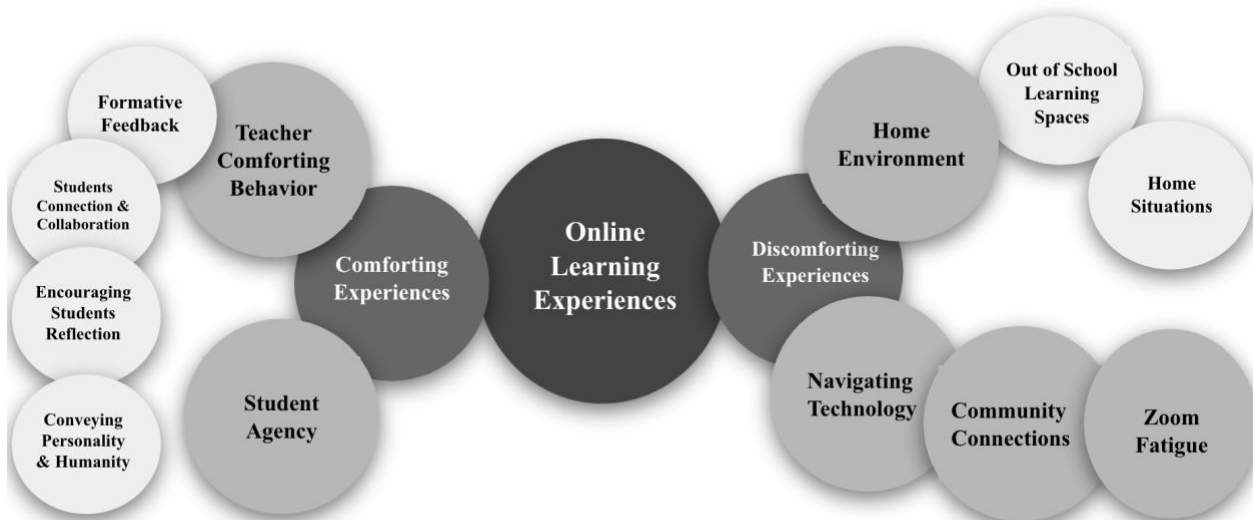
Data Analysis

Our analysis focused on the theory of Cumulative Disadvantage and Advantage (CDA) (Merton, 1968; Dannefer, 2003). Drawing on this theory, we used open coding without priori categories and the constant comparative analysis (Glasser, 1965), to identify themes related to our research question, How do middle school students from low-income backgrounds describe their online learning experiences? In the first round of coding, we identified the following themes: Low digital self-confidence, lack of access to technology, home situation, Zoom fatigue, online social collaboration, encouraging students' reflection, conveyance of personality and humanity, ana assisting in educational technology challenges. After identifying these themes, we used axial coding to group commonly occurring codes into categories (e.g., discomforting online learning experiences, comforting online learning experiences).

We then linked data within and among categories. After identifying these themes, we triangulated our data by comparing our analysis with the student discussion notes, and field notes from online classroom observations. We created key linkage charts to identify connections and divergences among the central constructs. Two broad thematic categories were created, Comforting Online Learning Experiences and Discomforting Online Learning Experiences (see Figure 2.0). Our analysis highlights specific quotes from participants as they align with the overarching themes.

Figure 2

Coding Categories for Middle School Online Learning Experiences

Researcher Positionality

There are two authors for the current study. The primary author, who self-identifies as an African-American, led the data collection and analysis processes. The primary author taught at the research site but did not directly teach the study participants. The primary author's identity

allowed for the study participants to feel comfortable sharing their lived experiences in a way they felt could best express their thoughts and feelings. The second author is a white American scholar in the U.S. who contributed to refining the theoretical framework.

Both study authors contributed to interpreting findings and the implications of the study. It is likely that our ethno-racial backgrounds influenced our interpretations of the data, but to minimize bias, notes were taken on all preconceptions that arose about the study population in order to bracket these existing assumptions during data collection and analysis process. Both authors continually explained the purpose of the study to the participants to build mutual trust .

Findings and Discussion

The findings section is structured to provide a comprehensive understanding of both discomforting and comforting experiences in online learning environments. *Discomforting* experiences are delineated into segments such as home environment, incorporating contemporary data on out-of-school learning spaces and home situations. Navigating technology is explored to discuss challenges faced by students. Community connection is analyzed to comprehend the impact of social interactions on learning online, while Zoom fatigue is examined for its effects on online learning.

On the contrary, *comforting* experiences are presented to highlight elements fostering a positive online learning environment. These elements include student agency, where students feel empowered in their learning journey. Teacher comforting behavior, which includes strategies like formative feedback, student connection, and collaboration, underscores the importance of educator-student relationships. Encouraging student reflection and conveying personality and humanity by teachers are also elucidated for their role in creating a supportive learning atmosphere.

Participants reported online learning provided both comforting and discomforting experiences. Some students who struggled with social anxiety or had difficulty focusing on a traditional classroom found online learning to be more relaxing. Conversely, others found online learning disturbing due to isolation, lack of organization, and technological hurdles. Some students felt isolated from peers and teachers, causing loneliness and melancholy. Some students lacked a reliable internet connection or the technology to successfully complete online classes. Both participants reported that falling behind on coursework caused frustration and anxiety, such as one student reported:

> ….managing multiple online assignments was tough… It felt overwhelming when deadlines for different courses coincided, and I struggled to stay on top of everything… group projects became tricky… coordinating with team members across different schedules and time zones made collaboration difficult, adding a layer of stress to the coursework.

Teachers' reassurance and online compassion reduced student anxiety. These teachers helped their students through this difficult period by creating supportive classroom communities, providing personalized support, being flexible with assignments and deadlines, providing emotional support, and creating engaging and interactive learning experiences.

Discomforting Online Learning Experiences

Learner Discomforts in Online Learning Spaces

The participants highlighted the theme of online learning discomforts. Some participants reported feeling apprehensive in online learning spaces, attributed to difficulties navigating digital tools, a lack of social collaboration, Zoom fatigue, and home situation. Niagara thought that using Google Docs and the other features on them was "a pain in the neck" and that navigating these digital tools was a difficult task.

Crusoe characterized her online learning as terrible due to the lack of collaborative engagement with her peers and her inability to concentrate due to numerous distractions. Crusoe also shared that "… sometimes, I will get distracted or not be paying attention. I mean, it was kind of stressful and hard because, honestly, it took me a while to get into that rhythm..." From these experiences, it was evident that the participants had unpleasant feelings about learning online and this was attributable to the challenges faced with educational technology.

Home Environments

Participants' poor home conditions caused severe discomfort. According to Crusoe, the noise at home kept her preoccupied. Niagara also voiced uneasy feelings, saying that online learning was complex because he felt over-monitored by family members' presence. Niagara stated, "Now that everyone is home, they monitor everything I do, and that makes me uncomfortable." Crusoe said, "I also think that online learning has made most students unresponsive and less motivated in learning."

Crusoe shared that her homeless status hindered her online learning because her brothers and neighbors were often loud. Because of the unconducive learning environment, she was mostly deprived of sleep. Therefore, sleep deprivation had a toll on her online learning experience and academics. The following conversation between Crusoe and Mr. Pebble revealed the challenges Crusoe's home situation presented for her online learning.

> Mr. Pebble: *Okay, class, let's get started. Today we're going to be talking about atoms. Can anyone tell me what a fraction is?*
>
> *(Crusoe appears on screen, looking tired and disheveled)*
>
> Crusoe: *Sorry, Mr. Pebble I'm just really tired today.*
>
> Mr. Pebble: *Is everything okay? You seem a bit distracted.*
>
> Crusoe: *Yeah, it's just that I'm not really comfortable learning from home. My little sister keeps interrupting me and my mom is always on the phone.*
>
> Mr. Pebble: *I understand that it can be hard to focus when you're at home, but we still have to get through the material. Can you try to find a quiet space to work in?*
>
> Crusoe: *I've tried, but there's just no place in my house where I can work without being interrupted.*

Mr. Pebble: *I'm sorry to hear that.*

The findings suggest that an unconducive learning environment at home is a great cause of learner discomfort during online learning. Mr. Pebble's interaction with Crusoe attests to the detrimental effects of an unconducive home environment on online learning experiences of low-income minority students.

Challenges with Technology and Navigating Digital Tools

The transition to online learning presented many challenges in terms of navigating digital tools and technology, which contributed to students' sense of disengagement and disconnection. Both participants shared that, but for their institutions, their parents could not have afforded to buy them computers. Because of this, they felt less confident utilizing computers and educational technology tools required for online learning. For example, Niagara said, "I think google docs and the other features have been a pain in the neck. Navigating those digital tools was challenging… I did not have access to a computer before online learning… I am not well equipped to use all the Google suite features needed for my learning... ."

Because Niagara did not have access to technology or had limited access to technology before online learning, he felt less confident in using educational technology tools for learning. Network challenges compounded the situation and left the participants feeling unhappy and less interested in learning online. For example, Crusoe said, "… the Wi-Fi lag made me struggle to join a class and complete assignments on time. I have had to resort to my hotspot, but sometimes it would not connect to certain devices ...."

To make matters worse, the teacher Mr. Pebble found it difficult to use digital tools to support online learning for his students, and his challenges with navigating technology affected his students. For example, he shared "Well, teaching online has definitely been a challenge. I'm not very tech-savvy, so it's been a learning curve for me…I've had trouble with my internet connection. Sometimes my video freezes, or I get disconnected from the call altogether. … I've had trouble figuring out how to use some of the features. It's been a lot more work than I anticipated…" Most participants were disengaged during class due to the instructional design, which did not include multimedia features or other interactive and engaging activities.

Community Connections

Crusoe talked to her friends more during traditional classroom sessions because she regarded them as a learning resource, but online learning rarely allowed this. Because she needed these relationships for learning support, their absence hurt her online learning. She expressed her displeasure by stating, "The classes that I don't like are not fun. And for me, I become anxious and frustrated… I would also say that learning without friends and collaboration compounded the stress...."

Niagara's response to a question about which classes he liked and why highlights the importance of friendships in online learning. Niagara shared "*I don't like science that much and would skip that class if I had the opportunity. It was more of a lecture class,*" because the social interaction that helped with brainstorming ideas and understanding the content was lacking. This poem (as classroom artifacts) shared by Crusoe was vital to the community connections discourse.

It's all about Community
~by Crusoe

It's all about community.

Because community creates unity

We used to meet, greet and eat.

But with COVID, gone are the days we all had a seat.

Friends, to me, were everything
but covid rendered friendship
nothing …

Making room for a virtual dine

We chat and talk every day
and Samara makes it always
fun and asks how our day has
been.
Checks up on us constantly
making sure we are okay.

Through it all,

Community erases isolation

The absence of isolation brings consolation…

A Poem by Crusoe as Artifact

Crusoe's artifact emphasizes community and social connections in online learning environments, particularly among low-income minority students. In this poem, Crusoe's narrative shows how in-person learning was filled with social collaborations and how that instructional strategy needed to be replicated during online learning.

Zoom Fatigue

A striking sub-theme that emerged from the accounts of the participants was students staring at their computers for extended periods of time and finishing work. Both participants showed a sense of disengagement at some point during online instruction; for example, researcher field notes included observations such as students engaging in unrelated activities; students multitasking during synchronous online classes; and students refraining from participating in discussions, asking questions, or responding to prompts in synchronous online learning spaces.

Students expressed that looking at everyone on screen all the time caused distress. Niagara explained that staring at the computer for extended periods of time made him anxious. As a tactile learner, Niagara preferred to learn through experience, and by manipulating objects to advance his learning. Similarly, Crusoe stated that "online learning was like a bad dose… Staring at the computer for long hours like a sad imposter made the learning ride a roller-coaster…" (excerpt from Crusoe's Poetry Artifact). These comments imply that lecture-style learning in online learning environments causes discomfort. According to the accounts of the

participants, online learning necessitates that instructional design offers students the agency to engage with the content and receive immediate feedback.

Comforting Online Learning Experiences

Student Agency

The COVID-19 pandemic affected students' daily life, especially learning. The sudden switch to online schooling was difficult, but it offered benefits, especially for middle schoolers. Middle schoolers had more scheduling flexibility with online instruction. Students no longer had to wake up early for school. Instead, they could wake up at their convenience, attend virtual classes from bed, and schedule their study time. This flexibility helped students balance their academic and personal lives, reducing stress and improving mental health for some.

In an interview with Niagara on how he found online learning, he said,

In spite of some challenges ... eemm, it's been really great for me. I used to struggle a lot with social anxiety in the traditional classroom setting, but being able to learn from home has been so much more relaxing… I can just focus on my studies and work at my own pace…

This indicates that, despite the pandemic, students could study at their own pace, access resources whenever they wanted, and finish at home. It gave middle schoolers more tailored learning.

Students who resided in remote areas or had physical disabilities that made it difficult to attend school in person shared that online learning provided greater access to educational opportunities, for example:

Connecting with classmates in virtual study groups made online learning feel surprisingly close-knit and supportive. It was reassuring knowing I could review materials whenever I needed… Being able to attend classes from the comfort of my home made it so much easier to manage my time

Teacher's Comforting Behavior

Participants expressed a feeling of joy and happiness (e.g., "I feel happy that we are writing poems today… Miss will you let us write poems always? … I am in the green quadrant of the mood meter today because I get to talk to my friends") in circumstances where teachers' comforting behavior (e.g., "How can I help you? You can do it, I am going to show you how. Would you want to go into a breakout room with me so we work on it together?") made them feel empowered and capable of undertaking online learning exercises, despite their divergent views on online learning experiences.

This behavior manifested in various forms, each contributing to a supportive online learning atmosphere. *Formative feedback*, where teachers offered constructive criticism and guidance, played a pivotal role in students' confidence levels. *Student connection and collaboration,* including online collaboration and encouraging students to get to know each other, fostered a sense of community and belonging. *Encouraging*

student reflection allowed students to introspect and grow, enhancing their overall online learning experience. Lastly, *conveying personality and humanity* by teachers created a personalized touch, making students feel valued and cared for in online learning environments. Through these approaches, teachers cultivated a space where students could thrive and find joy in their educational journey.

For example, in describing her online learning experience, Crusoe stated,

… I have enjoyed ELA and social studies, and I am eager to join those classes any time. These teachers make online learning fun and engaging. They infuse games, diverse activities, and collaborative tasks that create room for group work and project-based learning. We also do virtual skits, role plays, debates, etc. it is just more about us than the teacher teaching.

According to Crusoe, peer involvement, cooperation, and interaction foster learner autonomy, self-direction, and self-discipline. These possibilities let her communicate with and learn from her classmates. Conversely, Niagara's narrative showed that the school's response to the provision of technology assisted in bridging the technological equity gap for the participants, as their parents needed more financial muscle to procure technology for them.

Niagara also revealed that his school contacted his mother and asked her to "come in for a computer and a modem" for online study. It was "a great relief" to him because his mother "had indicated that she could not afford them." His instructors also changed his "Zzoom-in schedules" and considered limited onscreen hours." Crusoe, on the other hand, thought that her teachers were highly supportive. The teachers demonstrated tremendous empathy and concern. They were "warm, patient, and agreed to extend deadlines" whenever she contacted them. They would also meet with her during office hours to clarify any concepts she didn't completely grasp.

Teachers' guidance in using EdTech tools helped pupils succeed in academics and online learning. Students appreciated teachers' responsiveness and empathy, which eased learning. Town halls also gave individuals a low-stakes venue to vent and exchange ideas and participate in non-academic online learning areas. Instructor validation also boosted confidence. According to the statistics, validation built an online caring presence and motivated them to work hard. Figure 3 summarizes the comforting behavior observed in teachers in this research.

During an interview with Ms. Dell, she said,

One of the things I did was to create a safe and welcoming virtual classroom environment. I made sure to start each class with a check-in to see how my students were doing and to address any concerns or questions they had…. I also provided additional support outside of our regular class time. I made myself available for virtual office hours, so my students could reach out to me with any questions or concerns they had. I also checked in with them individually to make sure they were keeping up with their work and to offer any help they needed…One of the biggest challenges was making sure all of my students had access to the necessary technology and resources. Not all of my students had

laptops or reliable internet at home, so I had to work with the school district to make sure they had the tools they needed to succeed.

On the other hand, Mr. Pebble, who struggled with navigating educational technology for online learning said,

Honestly, I didn't do much. I knew Crusoe was having a tough time, but I didn't reach out to her or offer her any support. I just assumed that she would figure it out on her own…. I guess I was overwhelmed with my own workload and responsibilities. I didn't want to take on any additional tasks or responsibilities, and I assumed that Sarah's parents would take care of her.

In general, teachers' online caring presence helped students build trust and create relationships, and teachers' encouragement, shout-outs, and simultaneous town halls encouraged peer-to-peer contact and allowed all community members to contribute.

Participants liked when teachers helped kids build relationships to increase self-confidence and reduce racial and economic inequities (e.g., "Miss thank you for helping to get internet," or " Mr. my mom said you called to check on us … Thank you"). Teachers who provided positive affirmation and support created peer-to-peer and peer-to-teacher contact and provided participants also valued opportunities for all community members to share information.

Conclusions and Implications

Cumulative Disadvantage and Advantage (CDA) theory (Merton, 1968; Dannefer, 2003), states that small initial advantages or disadvantages can accrue over time, resulting in bigger consequences. Participants in this study initially had limited home technology and internet access, and rarely used computers for online learning before the outbreak. Because of this, they felt less confident utilizing computers and educational technology tools (Dong et al., 2020), and these initial disadvantages made online learning challenging. As these initial disadvantages compound, they can widen the academic achievement gap between low-income students and their classmates (Day, 2021).

Once students fall behind, CDA theory suggests catching up gets harder. Based on this study's participants' experiences, it is evident that it is difficult for middle school students who are at a critical stage in their academic development to keep up with the demands of online learning due to inequitable access to resources and other opportunities. For our participants, this difficulty was deepened due to unconducive learning environments at home. Similarly, Altena et al., (2020) notes that due to hectic work schedules, during COVID-19 many parents relied on their older children to care for younger children when they had to go to work. This circumstance left their online-learning children unattended, allowing for inattentiveness (Lau et al., 2021) or, like Crusoe in our study, sleep deprivation (see, e.g., Cellini et al., 2020). These difficulties resulted in feelings of low self-esteem and a sense of incapability to learn online. In general, students who feel overburdened by their home life may not see the value in putting forth the effort to learn, which can lead to chronic absenteeism and learning loss (see, e.g., Goldstein et al., 2020).

In this study, however, teachers' comforting behaviors helped alleviate the learning discomforts of low-income middle school students. In particular, the participants found joy in the few circumstances where the teachers were empathetic toward them, underscoring the importance of teachers building an online caring presence, and helping students build trust and create relationships (Mastel-Smith et al., 2015, p. 56; Miller (2021). Participants were also pleased that the pandemic prompted school involvement in the supply of computers and technology, the flexibility of online learning, and the continuation of learning.

Implications for Schools and Classrooms

One of the propositions confirmed by this study was that unpleasant experiences with digital tools affect students' acquisition of the skills required to be functional citizens of the digital world, affect students' self-confidence, and prevent middle school students from achieving online learning success (see, e.g., Hart et al., 2018; Huang et al., 2015). This could point to the need for advancing learner-centered instructional objectives among low-income middle-school students, providing equitable access to computer technology and digital tools, and adequately equipping students with necessary skills. Below, we discuss each of those three implications in turn.

First, this study suggests that instructional design and community connections are critical to the success of online learning. Participants became tired from staying on Zoom for extended periods without social collaboration or group work activities and found lecture-style learning in online learning discomforting (see, e.g., Allison & Rehm, 2016). Educators must embrace learner-centered instructional goals to increase student engagement in online learning environments (see, e.g., Hope, 2017). Learning-centered instructional objectives include creating an online learning environment that promotes learner-content interaction, learner-instructor interaction, learner-learner interaction, and addressing students' socioemotional needs. (see, e.g., Alqurashi, 2017).

Engaging middle school students effectively requires the incorporation of visual aids, videos, and interactive activities to facilitate comprehension of complex concepts (Li et al., 2015). When teachers struggle to utilize these tools effectively, students risk disengagement, hindering their learning process (Borup et al., 2020). Particularly in online learning, maintaining student engagement poses a significant challenge due to middle schoolers' fluctuating motivation levels (MacMahon et al., 2020). Creating interactive and relevant online experiences is crucial to address this issue, with multimedia features like movies, photos, and animations proving effective in diversifying content and engaging students.

Furthermore, middle schoolers place value on community, which was challenging to foster during online learning (MacMahon et al., 2020). Social relationships play a pivotal role in teaching, especially in online environments, where peer involvement fosters learner autonomy and self-discipline (Borup et al., 2020). Encouraging peer interaction enables students to communicate and learn from each other, enhancing their overall educational experience. According to Crusoe's account, interpersonal interaction was a critical skill required to promote social presence and visibility in online learning, as many scholars have suggested (Pacansky-Brock et al., 2020; Murray et al., 2012; Nandi et al., 2012).

Second, inequitable access to technology and its associated issues was a significant source of discomfort among students in this study. As a result, educational officials and stakeholders, including teachers, must recognize students' current technological capabilities and concerns to engage students in discussions about technology access and usage. To provide digital access, school leaders must allocate funds to buy low-cost digital devices (particularly Chromebooks) and open educational resources for students at school and home. School districts must provide connected devices (tablets or laptops with hotspots) to students who do not have home access when required.

Finally, the findings indicate that teachers must use technology in novel ways to prepare students to use EdTech for academic goals in today's classrooms. Teachers must purposefully teach students how to communicate using computer communication features and experiment with it with teachers or peers to prepare them to use technology in and out of school. Teachers must provide direct guidance on how to use computer organizational features to arrange work and tasks and use specific educational software programs (such as Microsoft Office) to create work products.

Implications for Research
A limitation of a study using only two students and two teachers is that the sample size is very small. This can lead to issues with generalizability and the ability to draw meaningful conclusions about the population as a whole. Additionally, the study may not account for individual differences that could exist between the two students or the two teachers. For example, one student may be more motivated or skilled than the other, or one teacher may have more experience or a different teaching style than the other. To address this limitation in future research, the sample size should be widened to include more participants, including other ethnicities. This will enable more diverse perspectives to be heard and a better understanding of how various people perceive online learning.

Also, future research is needed to examine the questions:

How do sociocultural contexts mediate low-income minority students' digital interaction?

How do perceived effective online teaching practices influence students' learning?

How do students in underserved urban communities characterize their digital literacy identities, practices, and self-perceptions?

Since digital interaction is the pivot around which online education revolves, examining these questions would advance the literature on low-income minority students' online learning experience.

Declarations

The authors declare no conflicts of interest associated with this study.

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