



Proceedings of the
2023 Connected Learning Summit



Edited by Danielle Filipiak & Cherise McBride

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From the Editors

Welcome to the Proceedings of the 2023 Connected Learning Summit. 2023 has been an invitation for learners and their families, as well as educators and their communities, to think deeply about the longer arc of transformative, connected work and movement-building amidst crisis. As a connected learning community, our current research and practice have no doubt been touched by the emotional and relational residue of a hurting world shaped by multiple forms of violence and the degradation of human freedoms and social cohesion across the globe. As we grapple with the impact of these challenges on both formal schooling and everyday learning, we have become even more convinced of the urgency of a framework like connected learning, which holds up a light to the web of literacies, practices, and relationships that support the creativity needed to imagine more hopeful and humanizing pathways forward. Even in the thick of such uncertain and precarious times, we have witnessed incredible care and ingenuity enacted by those who have entrusted us to support their learning. Through their dreaming and resisting, we see glimpses of what we might build and who we might be together, connected—toward more dignified and equitable futures.

Like our recent gatherings, the 2023 Connected Learning Summit happened in a virtual space, bringing together more than 400 participants who were able to consider collectively the complexities of an ever-evolving landscape of digital technologies and media tools and the diverse learning ecologies that come to bear. As CLS has expanded to support both in-person and online convening, so too have our hosting organizations. This year, hosts included UC Irvine's Connected Learning Alliance, Connected Learning Lab and Connected Camps, as well as MIT's Scheller Teacher Education Program and the Centre of Excellence for the Digital Child, via the Australian Research Council. We also wish to extend a special acknowledgement of the powerful work shared by keynote speakers Diana Nucera and Lucy Pangrazio. Their analyses of critical digital literacies and pedagogies happening in learning spaces that were oceans apart expanded our understandings of the collective, affective, and critical dimensions of technology tools and their related learning ecologies.

This proceedings features 6 research papers that were accepted, after blind peer review, for presentation at the 2023 summit. We are grateful for the intellectual contributions of these 18 authors, whose work comprises the 5th publication of the CLS proceedings. As with prior proceedings, we could not have accomplished our work without guidance from the Connected Learning Lab's Don Miller, proofreading assistance from Elissa Alves, as well as support from Brad King and the team at Carnegie Mellon University's ETC Press.

Finally, please know that our community will again gather virtually for the 2025 Connected Learning Summit, with details and dates to be announced during the coming months. We look forward to reconnecting with you all soon.

On behalf of the proceedings team,

Danielle Filipiak and Cherise McBride
Co-Editors, Proceedings of the 2023 Connected Learning Summit

I. Let's Ask the Experts

How Homeschooling Parents of Reddit Approach Game-Based Learning

ANDRE ADAME

Abstract: Although research on the various uses of video games for learning continues to proliferate, the perceptions and practices of homeschooling families around the use of video games have remained severely understudied. The need for understanding how homeschooling families think about video games has been accentuated by substantial increases in homeschooling enrollments and shifting perspectives of youth technology use brought on by the COVID-19 pandemic. Through an analysis of homeschool-themed subreddit posts, this paper aims to examine homeschooling parents' perceptions and practices around the use of games. Findings point to highly diverse perceptions and practices related to the cognitive, emotional, motivational, and sociocultural functions of games that are impacted by a variety of contextual factors worth considering. Through exploring these perceptions and practices we hope to identify areas where game-based learning can continue to thrive within homeschooling contexts while identifying strategies that could benefit the educational applications of video games as a whole.

Introduction

The COVID-19 pandemic and subsequent lockdowns played a pivotal role in shaping the way many families approach education and technology use. An area of significant impact was seen in homeschool enrollments (Eggleston & Fields, 2021), with data indicating a 30% increase between 2019 and 2022 – even after schools began reopening for in-person instruction (Dee, 2023). Coupled with increased video game play among youth and shifts in parental perspectives on technology use (Donati et al., 2021; McClain, 2022), it is becoming increasingly important to closely examine how homeschooling parents approach their child's use of video games within the context of home education. As a severely understudied area of research, this paper aims to explore how homeschooling parents express their perceptions and practices regarding the use of video games as they balance the dual identities of caregiver and educator. To do so, we look to online homeschooling communities on Reddit, a popular social media site with over 100,000 active discussion forums and 57 million unique daily visitors (Reddit Inc., 2021). Within Reddit's library of online communities are several homeschooling-themed subreddits (categorized discussion forums), which we examine to address the following research questions:

RQ1: In what ways do homeschooling Reddit caregivers perceive the cognitive, emotional, motivational, and sociocultural functions of video games? What practices are associated with these perceptions?

RQ2: What factors or considerations are linked to these perspectives and practices?

Background

Who homeschools and why

Throughout the 1980s and 1990s, homeschooling was considered a practice predominantly for white, conservative, middle-class, two-parent households (Ray, 2020). While this demographic remains the majority, the past two decades have seen an increase in homeschooling enrollments among low-income, single-parent households and minority families. The underlying motivations for parents to homeschool their children can vary, with the U.S. Department of Education identifying the top motivations as (a) concerns about the environment of traditional schools, (b) a desire to provide moral instruction for their children, (c) an emphasis on family life together, and (d) a dissatisfaction with academic instruction in traditional schools (National Center for Education Statistics [NCES], 2022).

Homeschooling structure and practices

Homeschooling can look vastly different from one household to another, making it difficult to produce research with generalizable findings. One method used by researchers is to study homeschooling based on its degree of structure. Guterman and Neuman (2018) examined the homeschooling structure as a continuum, with more structure determined by the number of hours of prearranged teaching per week and the consistency of a daily schedule within the home. Their exploratory study found that high levels of parent conscientiousness and having a mother with higher education experience correlated with more structured homeschooling. Conversely, low-income households and less exposure to higher education correlated with a less structured approach, with the far end of the structure spectrum being referred to as “unschooling”. Another study involving primarily high-income families found that parents (predominantly female) frequently reported teaching practices promoting student autonomy and achievement, such as using non-textbook materials, allowing the student to manage their own time, discussing learned topics with the student, encouraging questions, taking the student’s preferences into account, encouraging the student to pursue their interests, and providing frequent praise for the student’s progress (Bell et al., 2016). Conversely, the sample of families was less likely to use teaching strategies associated with control, such as using rewards and loss of privileges to incentivize work, giving tests, setting deadlines, and setting a schedule for the student to follow.

Given the findings of Guterman and Neuman (2018) and of Bell et al. (2016), we see the importance of differentiating homeschool structure (i.e., the time allotted for learning and the presence of a daily schedule) from the more nuanced pedagogical practices that parents employ. That is to say, to assume that more structured homeschooling households seek to duplicate the traditional schooling experience would be inaccurate. This highlights the need for further research into specific homeschooling practices and the underlying motivations and perspectives behind them.

Games and Learning

Stemming from playful learning, game-based learning is defined as a change in knowledge as a result of playing a game (Mayer, 2020). Generally, there are two categories of games in which game-based learning can take place. On the one hand, there are serious games that are designed to achieve specific user outcomes (Young et al., 2012), On the other hand, there are commercially-driven entertainment games that tend to prioritize user engagement. Though the design of the latter is not typically geared toward specific learning outcomes (other than learning to play the game itself),

research has shown that some entertainment games have the potential to support learning outcomes (e.g., Steinkuehler, 2007; Squire, 2008; Miller et al., 2012).

Game-based learning is beneficial in supporting four functions: cognitive, emotional, motivational, and sociocultural (Granic et al., 2014; Plass et al., 2020; Schwartz & Plass, 2020). In terms of cognitive functions, games encourage players to navigate complex systems (Gee, 2008) through the acquisition and applications of factual, conceptual, procedural, and strategic knowledge (Mayer, 2020), often by embodying a specific role. Games serve emotional functions by placing players in emotionally charged situations that affect the storing and organization of long-term memories (Gee, 2008). Multiplayer games can also create opportunities for players to explore emotional management through interactions with others (Loderer et al., 2020; Steinkuehler & Tsaasan, 2020). Games support motivational functions by tapping into a player's intrinsic motivations to gain new experiences, skills, or knowledge (Ryan & Rigby, 2020). Games also use extrinsic incentives such as point systems, virtual goods, and unlocking new levels, as well as opportunities for cooperation and competition with other players (Gee, 2008; Loderer et al., 2020). Lastly, games serve sociocultural functions by placing players in diverse social and cultural settings that vary between genre and title. Within each setting, players must navigate the value of knowledge, practices, and dispositions associated with the game, all of which are socially constructed through discourse among the community (Black & Reich, 2012; Steinkuehler & Tsaasan, 2020). The sociocultural implications extend beyond the gaming experiences, as players communicate and collaborate through websites and applications (e.g., forums, Discord, and Reddit) to engage in sociocultural practices such as mediation, modeling, and apprenticeship (Steinkuehler & Tsaasan, 2020).

Methods

To address this paper's research questions, this study conducted a textual analysis of original Reddit posts from homeschooling subreddits. Posts were identified using Reddit's search engine within three homeschooling-focused subreddits: r/homeschooling (~8,400 members), r/homeschool (~157,000 members), and r/unschool (~7,800 members). The keyword "game" was used to narrow down search results to original posts mentioning games, resulting in an initial set of 132 original posts. Posts from each subreddit were then screened for several criteria. First, only original posts from those self-identifying as homeschool educators (i.e., caregivers) were included for analysis. Additionally, the posts needed to express or elicit a value or perspective around video games or an associated learning principle (e.g., interest-based learning) within its core content. This meant that the original poster either expressed a view regarding games or game-based learning or provided a prompt for the subreddit community to offer their perspectives on similar topics. Posts that served to advertise or promote specific products were excluded from the analysis. This screening process also identified *Roblox* (2006), *Minecraft* (2011), and *Prodigy* (2011) as recurring popular titles within these communities, prompting additional searches to identify original posts specifically mentioning these titles that may add additional insights to the initial set. This identified an additional 112 posts that were also screened based on the aforementioned criteria, resulting in an overall total of 65 original posts for analysis.

In addition to analyzing the 65 identified original posts, 32 were selected for deeper analysis based on the post's content and the community's response. Original posts that fit this criteria typically asked the Reddit community for advice or suggestions reflecting values around games and learning, generating conversations worth observing to explore this paper's research questions even further. The analysis of these posts included comment responses from other Reddit users to explore the ongoing discourse of games and learning perspectives and practices occurring within these communities.

Analysis and Results

Posts were analyzed based on content indicating the poster's values related to any of the four game-based learning functions: cognitive, emotional, motivational, and sociocultural. It should be noted that several original posts fell into multiple coding categories. Furthermore, these values did not always reflect pro-gaming perspectives, and sometimes represented curiosity or uncertainty toward a particular function. For example, some parents might acknowledge the motivational function of video games (i.e., observing that their child loves playing a particular game) yet remain uncertain if or how that function can facilitate learning. Posts were also coded based on contextual factors that appear to impact homeschooling parents' perceptions and practices regarding game-based learning.

Cognitive Functions

Of the 65 original posts selected for analysis, 25 reflected values related to the cognitive functions of games. Many of these posts indicated clear connections between video games and cognitive benefits across several subjects. For example, *Prodigy* (2011) was a recurring title among posters and commenters proclaiming its efficacy in reinforcing math fundamentals. Another poster highlighted how the "discovery tours" function included with several *Assassin's Creed* titles (2017-2020) was an effective supplement for teaching history. An emerging theme within the coding was how original posts expressed perspectives on the educational nature of games. Several posts emphasized educational games only, while others identified the learning potential in commercial titles such as *Roblox* and *Minecraft*.

Original posts included in the cognitive functions coding most commonly asked the subreddit community for software suggestions (or activities utilizing specific software) that reinforce specific subjects. For example, one poster (whose username has since been deleted) asked the subreddit for recommendations for videos, online games, and activities to help explain addition and subtraction to their kindergarten-age children. Comment responses to such posts included recommendations, product assessments, and personal experiences with specific software. While many users advocated for certain software, community acceptance of a single software was not universal. This was reflected in several original posts that indicated a failure to find success with popular software (e.g., *Prodigy*), leading the posters to turn to the subreddit community for alternatives. These subjective experiences with software indicate that what works for one homeschooling family might not work for another.

Emotional Functions

Of the 65 analyzed posts, only two recognized the emotional function of games in some way. The first post depicts a five-year-old's obsession with *Minecraft* to the extent that they would fight and cry when parents tried limiting playtime. While this emotional response is less connected to the game's narrative or activities as described by Gee (2008), it is important to identify as an emotional response that parents link to their child's gameplay. It is also a scenario that many caregivers may be familiar with and could potentially impact how they perceive the relationship between video games and their child's emotional development. The second post comes from the /r/unschool subreddit, depicting a more complex picture:

(My son) has been getting really frustrated by one of the games he loves (*Warframe*) because he can't figure out how to advance it... I suggested we could work together to lay out a plan and do all of the research required to get him where he wants to be. It would mean A LOT of reading, probably taking some "notes," and writing out step-by-step plans. All of which would be great skills for him to work on. (dustyvirus525, 2021)

In this example, the caregiver identifies the frustration brought about by the emotional function as an opportunity to practice healthy responses to stress while reinforcing important skills. The post proceeded to ask the community for assistance with designing the project and received only three comments, offering suggestions such as finding a YouTube guide or pointing to resources for unschooling youth with autism. More importantly, this post presents a very different perspective compared to the first example regarding how homeschooling caregivers might perceive the role of video games in their child's emotional development.

Motivational Functions

Motivational functions were most represented in the data set, with 33 out of the 65 analyzed posts indicating the motivational nature of video games in some way. How caregivers perceived the value of this motivational function was categorized into four themes: satisfaction, uncertainty, preference, and mitigation.

Satisfaction posts expressed the caregiver's satisfaction in seeing their child motivated to continue playing games that were deemed valuable. For example, one post described a caregiver's satisfaction with seeing their child motivated to read through playing RPGs. This perceived value from gameplay was not always educational, as expressed by another caregiver's satisfaction with seeing their child simply have fun for the sake of fun.

Other posts expressed the caregiver's *uncertainty* as to how to utilize their child's gameplay motivations to progress their learning, often asking the subreddit for suggestions. Uncertainty posts tended to be associated with caregivers who were either new to homeschooling or facing challenges in keeping their children engaged.

Preference posts expressed a hierarchy in how caregivers perceived the value of different activities, typically looking to divert their child's inclination for playing video games to more "preferred" activities such as reading or playing outside. These posts often acknowledged some of the cognitive or sociocultural benefits of gameplay, typically more concerned with the amount of time their child spent playing games rather than the activity itself.

Lastly, *mitigation* posts viewed the child's desire to play video games purely as a distraction to mitigate and were more likely to be associated with controlling practices such as placing time limits on gameplay.

It should be noted that the practice of limiting screen time was associated with a range of perspectives, with one poster from the /r/unschool subreddit noting: "I want to encourage (my kids) to do other things without villainizing Youtube, cartoons, video games, etc... As a temporary solution I set a two-hour time limit and have been keeping their other devices away once that time is up." Another motivational practice that emerged across perspectives was the use of video games as a reward. For example, several caregivers described implementing an exchange system for their children, where they could earn additional screen time by doing chores, reading, and engaging in other activities deemed productive.

Sociocultural Functions

Lastly, 11 of the 65 posts expressed perceptions of the sociocultural function of games. A predominant number of these posts used Reddit as a tool for connecting game-playing youth with others who share similar interests. For example, the post titled "Minecraft Rollcall" sought other parents with youth aged five to nine to join their child's *Minecraft* server. Responses to such posts primarily included caregivers expressing interest in setting up online playdates, while other commenters pointed to resources that could also help connect homeschooled youth. Several commenters

recommended Outschool for finding virtual clubs (including *Minecraft* clubs) for youth to join, while others recommended communication tools such as Discord.

It is worth noting that while some caregivers expressed concern about the amount of time their child spent playing games, very few worried that this gameplay limited social opportunities. As one caregiver noted, “Our sixth grader is homeschooling just for this one year but spends too much time alone while both parents work full time and is therefore depressed” (phillyclaire, 2016). The caregiver expressed a desire for their child to have more social opportunities, to which one commenter suggested that they ask their child to teach them more about their favorite game (*Minecraft*). The original poster responded positively, recalling how they had previously connected with their child through games.=

While observing this category of sociocultural functions, it is important to highlight how the Reddit platform functions for homeschooling parents themselves. In addition to being a resource for parents to seek advice from peers and connect their children with other youth, posting to homeschooling subreddits appears to also benefit parents in connecting and sharing experiences with peers facing similar struggles. Posts seeking advice were often accompanied by descriptions of the caregiver’s frustrations, prompting several commenters to commiserate and validate the original poster’s feelings. These uses of the Reddit platform should be recognized as important strategies in parents’ support networks.

Considerations Affecting Perceptions and Practices

Additional coding included contextual factors that homeschooling caregivers noted when expressing their game-based learning perceptions and practices. Several caregivers indicated that COVID-19 lockdowns impacted their homeschooling practices. For example, one post depicted a caregiver who had just begun homeschooling during COVID-19 and sought suggestions from more experienced members of the /r/homeschool subreddit for continuing to provide social opportunities for their child. Other environmental factors included state requirements for homeschooling. Although only one post detailed the impacts of state regulations—requiring the caregiver to allocate 4 hours of learning time a day while providing documentation— is an important consideration when examining homeschooling practices more broadly. Meeting stricter state requirements can complicate the integration of gameplay into learning and playtime.

Other contextual factors included the qualities of the homeschooled child. Posts describing learners in early to middle childhood (between ages five to 11) often focused on educational game selections and strategies for reinforcing traditional subjects such as reading and math. In contrast, posts describing learners in adolescence (age 12 and older) more frequently expressed a desire to connect their child’s game interests with more specific social and learning opportunities. Learning and developmental disabilities also significantly influenced caregivers’ approaches to homeschooling, with 13 out of the 65 posts noting ADHD or autism as either challenges in teaching practices or factors contributing to the decision to homeschool. Importantly, caregivers were more likely to favor resources and strategies promoting autonomy in their child (i.e., harnessing their interests) when identifying ADHD or autism as a contributing factor. Conversely, caregivers describing their child as distracted or unmotivated (without an attached diagnosis) were more likely to express the use of controlling behaviors.

The analysis also identified contextual factors related to the homeschooling family. Caregivers new to homeschooling were more likely to seek general advice and strategies, while more experienced homeschoolers often sought specific resources to support existing strategies. Posts depicted a wide variety of family structures, ranging from married households with an only child to single-parent households with up to three children. Time appeared to be particularly valuable for single-parent households; however, posts from married households with two working parents also emerged in the data set. Balancing the educational needs of multiple children was notably challenging, with many caregivers

expressing difficulties managing different needs across age groups. Several posts described teaching strategies that proved effective for one child but not for another, prompting the caregivers to seek guidance from the homeschooling Reddit community.

Discussion

Addressing this paper's first research question, the findings indicate that homeschooling caregivers consider the cognitive, emotional, motivational, and sociocultural functions of games in numerous ways. Caregivers acknowledged the cognitive benefits of video games in supporting youth learning, yet implemented different practices based on their perceptions of a game's educational relevance. For instance, practices such as seeking educational-only software or requesting recommendations for activity ideas involving commercial games provided insight into how caregivers perceive the learning process and its relation to games and play. Although emotional functions were not prominently represented in the data, the findings suggest that homeschooling parents may perceive video games as emotional antagonizers. This perception could indicate a need for additional resources aimed at helping parents understand the emotional development opportunities associated with games. Additionally, there are opportunities for homeschooling caregivers to transform negative emotional experiences with games into opportunities for learning and emotional management.

Homeschooling caregivers demonstrated a strong awareness of the motivational functions of games, yet interpreted this significance differently. Their interpretations influenced the practices they implemented, whether to encourage gameplay, harness gameplay for productive ends, divert the child's attention elsewhere, or restrict gameplay entirely. Lastly, homeschooling caregivers expressed a favorable perception of the sociocultural functions of games, primarily using Reddit to create additional social opportunities for their children through online games such as *Minecraft* and *Roblox*. This positive view may stem from the perceived challenge of socializing homeschooled youth. Additionally, sociocultural benefits were noted for the caregivers themselves, as using Reddit allowed them to commiserate with and offer support to their peers in similar situations

The second research question sought to identify the contextual factors that might influence the perceptions and practices of homeschooling caregivers. The findings reveal several factors related to the homeschooling environment, the homeschooled child, and the qualities of the homeschooling family. Notable factors included the impacts of COVID-19 lockdowns, the presence of ADHD or autism diagnoses, and the variability in family structure. It is important to acknowledge that these factors are based solely on the content expressed by caregivers within their posts. Future research should consider additional contextual factors. For instance, although socioeconomic status (SES) was not expressly noted in the subreddit posts, it remains a consideration that could impact time, resources, and practices related to homeschooling (Guterman & Neuman, 2018).

Prior research on homeschooling has examined the role of structure (Guterman & Neuman, 2018) and autonomy/control practices (Bell et al., 2016). While these studies provide valuable insights, drawing generalized conclusions remains challenging due to the considerable variability in home education contexts and practices. Furthermore, research on the intersection of game-based learning and homeschooling is severely limited, with this study serving more exploratory purposes rather than aiming to produce generalizable conclusions. A limitation of this study is that the data only represents homeschooling caregivers who posted on Reddit and does not reflect the homeschooling population as a whole. Nevertheless, this study offers several insights into homeschooling parents' perceptions and practices regarding the use of games. These insights should be viewed as preliminary, and warrant further examination within the broader context of homeschooling perceptions and practices. Continued research is needed to explore how game-based learning can support homeschooling parents and to identify opportunities for the field of game-based learning to benefit from the experiences of homeschooling experts.

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2. Facilitating Connected Learning PD for Library Professionals through Design Cycles

LORA CAWELTI, KARLENA OCHOA, VANESSA N. BERMUDEZ, PHEBE CHEW, SANTIAGO OJEDA-RAMIREZ, & KYLIE PEPPLER

Abstract: Libraries serve as centers for learning, with library professionals playing a crucial role in delivering programs, activities, and resources to their communities. To facilitate learning in libraries, it is essential for library staff to participate in high-quality professional development (PD). This paper explores how PD using design cycles allows library staff to design ideas that incorporate connected learning (CL) principles. Findings indicate that design cycles are concrete mechanisms for centering patron needs and interests, as well as for developing activities and materials for the library. The design cycles highlighted assets for design, including community knowledge and librarian autonomy, as well as barriers to testing and implementation. This study answers a call to reconsider existing models of library PD and extends current understandings of designing for CL by first applying the CL model to library staff, encouraging them to connect their own interests and build their capacity as learning brokers, It then adopts an iterative approach to designing for CL in their library context.

Background

Libraries are centers for learning, providing a blend of resources, activities, and spaces for youth and adults. Within these spaces, librarians are key to the overall learning landscape, responsible for dynamic connected learning experiences tailored to learners' interests (Braun et al., 2014). Librarians contribute not just by providing books and materials, but also by facilitating active learning (Covin et al., 2021). As the library sciences field is constantly evolving, particularly around emerging technologies, library staff are challenged to maintain the knowledge and skill sets needed to deliver programs and serve their community members (Stephens et al., 2019). In order to facilitate this learning in libraries, it is essential for library staff to maintain and enhance knowledge through lifelong learning and high-quality professional development (PD) (American Library Association, 2007; Stephens et al., 2019).

The development of libraries aligns with connected learning (CL) principles, promoting peer-supported, interest-driven, and academically oriented activities (Ito et al., 2020). By embracing the principles of CL, libraries and their dedicated staff strive to create safe and engaging spaces for young individuals to learn, socialize, and connect, becoming crucial players in shaping future innovators and problem solvers (Larson et al., 2013). In prior research on library PD, library professionals emphasized a desire for opportunities to engage actively and share ideas with others (Stephens et al., 2019), as well as a need for creative, innovative, experience-based learning to appeal to their interests and motivation for learning (Leong, 2014). Using design cycles can be a powerful mechanism to meet this need, yielding active, context-specific, and engaging PD in library settings that builds capacity in the CL model. Design cycles offer experiential and collaborative learning opportunities, where library staff share expertise, learn new technologies and skills, and work together to create new programs, materials, and assessments.

In the 2020 report on a decade of CL scholarship, Ito and colleagues issued a challenge for the next phase of work in CL, articulating a need to incorporate community-engaged research and to reconsider existing models of PD, encouraging library professionals' development of "capacities as brokers and sponsors in addition to their roles as content experts" (p. 65). By bringing design cycles into CL PD for librarians and library staff, we aimed to answer this call. Our study

extends current understandings of designing for CL by first applying the CL model to library staff, encouraging them to connect their own interests and build their capacity as learning brokers, and then using an iterative approach to design for CL in their library. Our study is situated in the context of a PD series, *CL+Design*, which combines design cycles with CL in library spaces. We aim to answer the following research questions:

1. How can *CL+Design* PD cycles enable library staff to design ideas that incorporate connected learning principles around library spaces, programs, and assessments?
2. How can *CL+Design* PD cycles illuminate assets and barriers facing library staff agency?

Theoretical Framework

This study is rooted in the connected learning (CL) framework (Ito et al., 2020; Windman et al., 2020), an ecological theoretical perspective on learning that emphasizes the importance of CL experiences across home, school, and informal community settings (Ito et al., 2020; Windman et al., 2020). CL occurs when learning environments connect with personal interests, offer supportive relationships, and provide new opportunities to foster academic, civic, and career growth. CL informs not only the content, but also the design of the PD program by building on librarians' *interests* to select the topics of the PD sessions, forming positive *relationships* between librarians and researchers, and providing *opportunities* for librarians to learn about the CL framework and apply it in the design of programming for youth and families.

Methods

This study adopts community-based research (Bang & Medin, 2010) and design based research (DBR) as a collaborative, methodological approach that involves stakeholders and researchers working together to design solutions for educational problems (Subramaniam et al., 2021). We used an iterative DBR approach guided by core principles, such as building trust and rapport with community members and stakeholders, as well as recognizing and valuing diverse forms of knowledge (Bermudez et al., 2023; Leavy, 2017). DBR is a valuable approach for designing activities, materials, and assessments to enhance education (Edelson, 2002) and is particularly relevant to vibrant learning spaces filled with diverse educational resources and activities, such as libraries (Covin et al., 2021). Specifically, our PD program was designed to support library staff in dreaming, developing, designing, and evaluating programs and activities through a CL lens.

PD Program Design

The *CL+Design* PD program design is rooted in constructionism, understanding that individuals construct knowledge through the creation and sharing of artifacts, leading to learning that is personal, social, and cultural (Papert & Harel, 1991). Constructionism's synergy with technology and design is further demonstrated by its application as a framework in the design of school interventions and PD programs (Kynigos, 2015). We developed the *CL+Design* PD program to be responsive to librarian interests. The goal of the program was to build capacity around the CL framework to support library programs. We chose to lean into designing for CL so that PD activities had practical applications for library staff, imagining that they would be able to apply their designs to their respective library sections. Work around design cycles was continuous and scaffolded throughout the PD sessions (see Figure 1).

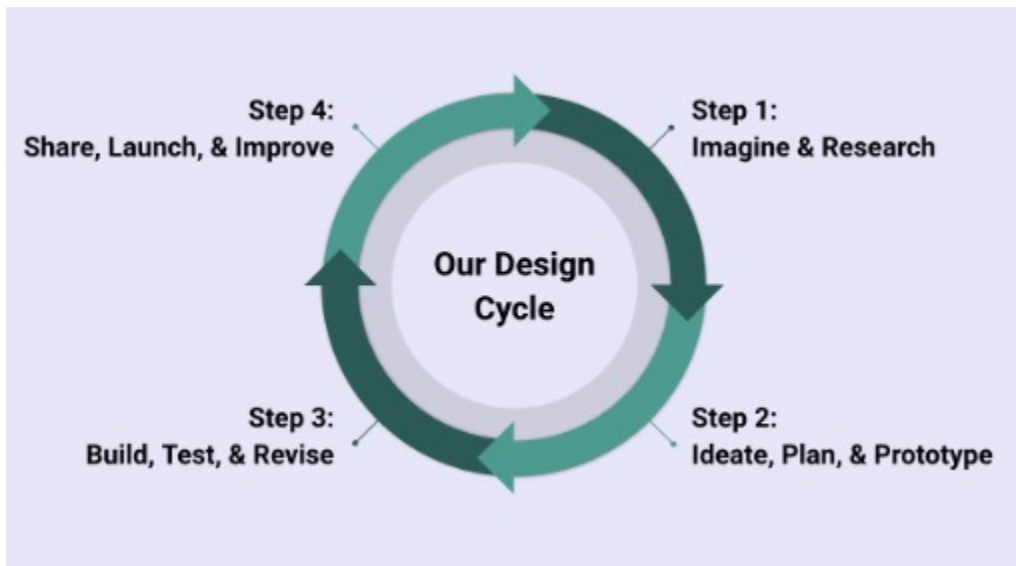


Figure 1. CL+Design PD design cycle in four steps.

A particular asset of CL is the centrality of participant interests. We incorporated librarians' interests at three points: (1) with a survey prior to beginning the PD series, (2) by aligning PD activities with the themes and topics from the design process, and (3) by providing direct choice. Discipline-specific content was selected to align with librarian interests, and to connect with technology, arts, and maker culture. Table 1 shows the sequence and description of the PD sessions. Figure 2 shows examples of the resulting artifacts.

Topic	Design Activities
(1) Visioning and setting design goals	Vision board and paper circuits Sticky noting of goals and clustering
(2) Designing toward youth interests	Generative AI for storytelling
(3) Designing toward relationships and networks	Community cultural mapping and dérives
(4) LatinoFuturism and restorying	Restorying, speculative futures artwork and writing
(5) Playful learning	Creating playful learning structures using arts and crafts

Table 1. Sequence and description of the CL+Design PD design.

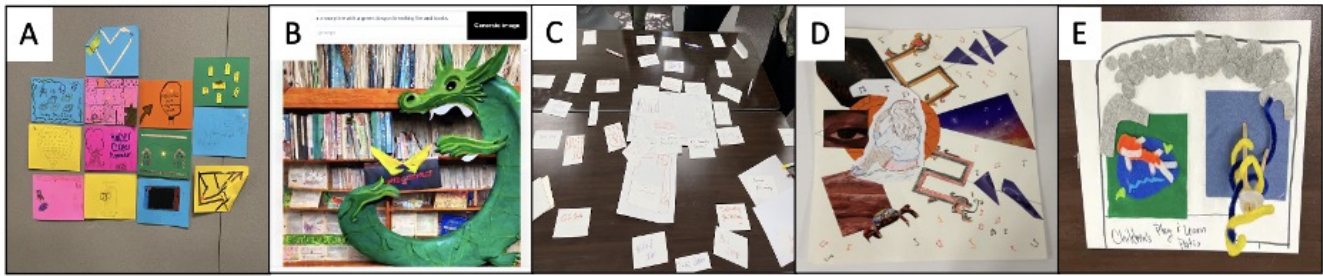


Figure 2. Physical and digital artifacts resulting from the CL+Design PD design activities. Note. The figure shows the shared vision board created (a), an image created by a librarian using stable diffusion for visual storytelling (b), network mapping activity (c), artwork based on LatinoFuturism (d), and playful ideas that could be incorporated in the library's playground to scaffold learning.

Data Gathering and Analysis

Five PD sessions took place monthly from February 2023 to June 2023, each lasting two hours. All PD sessions were held at a main branch public library in North Orange County, California, which predominantly serves Latine community members. Participants included a total of 14 librarians and staff from various library departments, including: children, youth/teen, book mobile, adult, and technology. The authors of this paper designed and facilitated the PD sessions, along with two additional doctoral students with relevant discipline-specific knowledge related to the PD series. Each session consisted of an icebreaker activity, a theoretical introduction related to the topic, a design activity where librarians connected the topic to their library space and shared these ideas out to the group, and summaries of the following: PD goals and upcoming sessions, CL theory, and librarians' themes of focus and project ideas.

We conducted qualitative analysis on two sets of researcher field notes from PD sessions, survey questions, constructed artifacts—including two written brainstorming activities (post-its and google slides)—and five making projects (see Figure 2). To study how the design process enabled librarians to generate CL design ideas while illuminating insights around structural assets and barriers, we used a mix of deductive and inductive processes (Azungah, 2018). To address our first research question, we deductively coded for librarians' incorporations of *interests*, *relationships*, and *opportunities* in their design ideas. We then surfaced the *assets* and *barriers* to library staff agency through inductive analysis across design cycles to address our second research question.

Findings

The CL Model and PD Design Cycles

The use of iterative design cycles in PD allowed librarians to consider the CL model on two levels. As the library staff learned about CL in the first PD session, they initially connected the model to themselves, starting with their own interests within the library (e.g., literary genres, maker spaces, or technology). By centering themselves in the CL model, they developed a deeper understanding of the theory, considering their own programmatic and spatial interests in the library, their relationships with one another and their patrons, and the opportunities they had to learn more about technology, to collaborate, or to build new programs. This step generated initial ideas around envisioning futures for the library that were aspirational and personal, but somewhat abstract. For example, ideas generated during the first PD session focused on “Visioning and Setting Design Goals” (see Figure 3). Before engaging in design cycles, librarians

participated in an initial visioning activity where they used paper craft and circuitry to highlight their ideas. The results were general outlines of the use of space.



Figure 3. Examples of visioning before introduction of design cycles.

After exploring the CL model on a personal level, librarians began to formulate design goals that centered their patrons in the CL model. From here, they shifted focus from personal interests to those of their community members, specifically toward patrons who visit and interact in their particular departments (e.g., children, teens, adult services). They began to consider who their patrons are, what they say they want and need, and what programs and resources might be lacking or underdeveloped in the library. As they formulated design goals, librarians generated more specific, community-centered themes that incorporated the CL model (i.e., inclusivity, agency, partnerships, addressing the digital divide, outreach, and attention to specific content areas around inclusion and technology), which seeded the design projects for the rest of the PD series (see Figure 4).

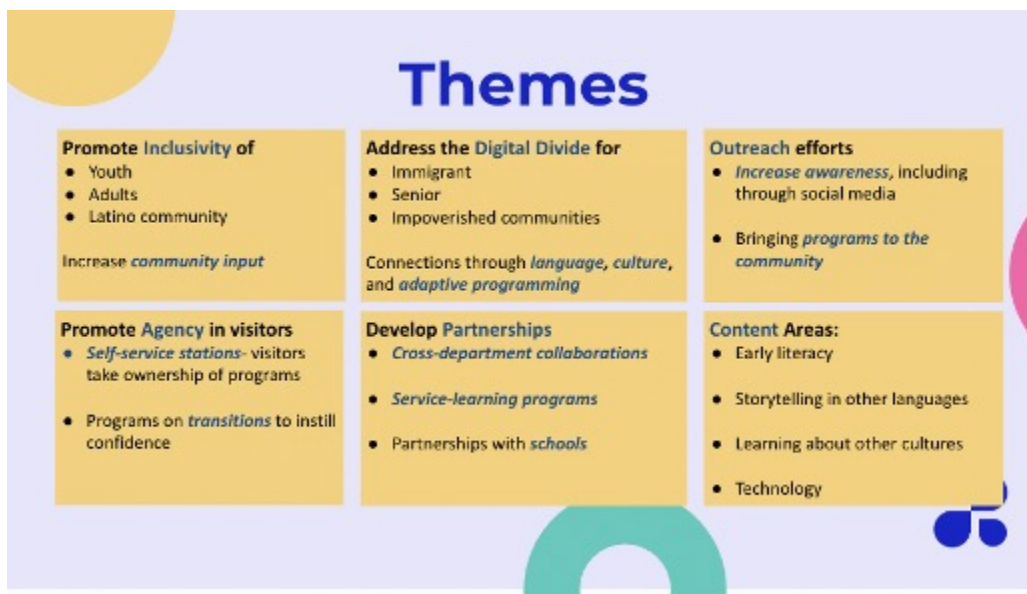


Figure 4. Themes and topics generated from setting design goals, after introducing design cycles,

Design cycles became an instrumental mechanism for transitioning ideas from abstract concepts to more concrete plans and for centering community needs. Library staff began to frame their own interests as areas of expertise, which they could use to address their patrons' interests, encourage relationships between patrons and librarians, and facilitate connections between patrons, their families, and their peers, as well as opportunities for learning (e.g., language, technology) and connecting to career resources. Using the first two steps of our design cycle (see Figure 1), library teams turned their visions into concrete project design ideas and plans that incorporated CL principles around library spaces, programs, and assessments (see Figure 5).



Figure 5. Project ideas and plans that emerged from the design cycle, in consideration of the CL model.

Design Cycles for Understanding Assets and Barriers

Assets. Engaging in design cycles, particularly the first two levels of the design cycle, provided opportunities for understanding the assets and barriers facing library staff, as well as how and where they could apply their ideas and designs to the library. One asset, the staff's knowledge about and connection to their community, became clear through stories shared about family and heritage connections. One librarian shared that her aunt had worked for the city in the department of parks and recreation, while another shared that they had gotten married at the courthouse next door. Many library staff also expressed a passion for supporting the most vulnerable members of the community. As one staff member noted, "Something that stands out is a lot of homeless people who are often overlooked. I've helped and engaged with them before. I've gotten a 'thank you for helping us, for seeing us.'" Design cycles surfaced librarians' deep knowledge, connection, and commitment to the community as a distinct asset in designing context-specific programs and materials.

Another asset is the high level of autonomy and creativity library staff have in creating programs for their sections and patrons. While there may be restrictions based on staffing and holiday or thematic directives, library staff are able to assert their own interests and choices into their department programs. For example, when the children's services team participated in the PD focused on AI generation, one librarian used ChatGPT to create and implement a St. Patrick's Day storytime outline, while a librarian in the teen sections developed a teen leadership skill building program using ChatGPT. Additionally, the library teams were keen to interact with and plan together, demonstrating an interest in cross-collaboration and connection to one another's interests.

Barriers. As we tried to move beyond prototyping in the design cycle to building and testing, we encountered barriers to librarian agency in designing and implementing programs, materials, and assessments for their departments. One such barrier is structural. Libraries, as public resources, are influenced by the interests of the public and of city officials (Colvin et al., 2021), which places them at the intersection of various budgetary, political, and public desires. One way this structural barrier manifests is in how information is disseminated or withheld from library staff. For example, one librarian expressed her frustration with being unable to access information about patron interests, saying, "People give good responses over social media but not many come in ... We need more community input so that we know what they

want.” She did not have the ability to learn from online patron assessments about her own programs. Library staff also shared that, while they are often consulted about new programs or facilities changes, there are so many stakeholders that the librarians’ ideas are often lost along the way when final decisions are made.

Another barrier that emerged was stakeholder resistance from patrons, community members, and city officials to evolving technology use. While librarians see changes in technology, including advancement in AI, as a learning asset requiring continued education, they encounter resistance from parts of the community. For instance, many parents in the children’s section reject Moxxy the learning robot due to privacy concerns; it’s difficult to reach out to seniors and teach them to use new technologies; local artists have concerns about AI’s infringement on creativity; and city officials worry about copyright infringement. These are meaningful public concerns, but are also real barriers to the library staff’s ability to advance programs and learning. For example, a technology librarian wanted to promote an art workshop and art show using AI image generation to engage tech-savvy teens and reduce barriers to creating skills-based art. Rather than being allowed to move forward and address complex issues with the art show, his efforts were halted.

Discussion

By designing *with* rather than *for* the library staff, we aimed to support them in developing and implementing programs that foster meaningful change within the community. Moreover, this collaborative approach allowed us to identify and address the assets and barriers faced by the librarians, leveraging their expertise in understanding the community and patrons to ensure the effectiveness and sustainability of the programs and activities. The use of design cycles holds practical applications for designing PD around CL, particularly in how librarians shifted from centering their own interests and experiences to those of their patrons and community. Using design cycles can afford library staff the chance to envision futures, discover where their collective interests and visions align, and determine concrete ways to develop and test their ideas. Furthermore, *CL+Design* cycles, using a constructionist approach to making and learning, provide a fruitful outlet for librarians to leverage their deep knowledge of community patrons and creativity while granting them autonomy in the design process.

While library staff showed enthusiastic engagement in the imagine and ideation steps, tensions arose when building and testing as they recognized the limitations to building or implementing some of the programs within the realities of their library contexts. Another limitation of the study was the short duration of the PD program and the scope of the project. Given the short PD duration, participants did not revise and iterate librarians’ programs for youth and families, which is an important aspect of a community-based DBR methodological approach.

PD design cycles using community-based DBR and building from participants’ interests allowed us to apply the CL model to educators in a library setting, helping them build capacity as learning brokers across the library and community settings, rather than merely developing them as content experts. This study answers the call set forth by Ito and colleagues (2020) to reconsider existing models of library PD and advances current understandings of designing for CL by first applying the CL model to library staff, encouraging them to connect their own interests and building their capacity as learning brokers, before then taking an iterative approach to designing for CL in their library. Finally, the study provides insights into the assets and barriers librarians experience in the full implementation of the CL model. PD programs that incorporate multiple stakeholders from the library systems and that provide support to librarians through the full design process, including launching and improvements, are promising venues for addressing hurdles and truly implementing *CL+Design* PD cycles in meaningful ways that directly affect programming for community patrons.

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3. "We want information to come to us"

young people's experiences of mis/disinformation in their daily lives

LAYLA COLEMAN & PROF REBEKAH WILLETT

Abstract: This study investigates young people's experiences with the consumption and production of mis/disinformation through participatory research projects with first-year undergraduate students. The study aims to (a) integrate young people's voices and perspectives in discussions about mis/disinformation and (b) provide a socially situated understanding of young people's consumption and production of mis/disinformation. Findings from the study indicate the limitations of current information literacy teaching, which takes little account of how sociocultural contexts and social identity can impact young people's experiences with mis/disinformation. Findings also highlight how schools currently employ a deficit model of teaching that ignores young people's experiences and underestimates their skills and abilities. Further, findings explore young people's understanding of media literacy skills, where they position themselves and their peers to be both highly skilled and vulnerable concerning experiences with mis/disinformation within social media ecologies.

Introduction

Working with a group of 18- to 19-year-olds at the University of Wisconsin-Madison, we heard a collective groan when we asked if they had studied "fake news" in middle or high school. They expressed frustration over being taught every year since middle school about fake websites, Photoshopped images, and untrustworthy new sources. So why study "fake news" in college? Various organizations, including PBS, *The New York Times*, the British Council, and numerous non-profits, have developed educational materials in response to current events and the legacy of Trump-era politics. Teaching media and information skills is seen as a key intervention in stopping the spread of misinformation and in making people less susceptible to mis/disinformation. However, young people are rarely asked to contribute to discussions about how media and information skills should be taught or how educators might draw on young people's media literacy skills and experiences with misinformation.

The quote in the title of this presentation comes from a discussion with first-year undergraduate students about their news-reading habits. Although they told us that they follow current events, they do not actively seek information; as one student said, "We don't go looking for news or information. We want information to come to us." Through their social media feeds, they have come to expect news stories to be fed to them alongside everything else that algorithms, friends, and followers send their way. Their feeds contain a variety of sources of information, some more trustworthy than others, and all teens in this study reported seeing mis/disinformation on social media. In our analysis, we argue that through daily encounters with misinformation on their social media feeds, young people have skills that are often ignored by adults or seen as irrelevant to teens' media or information literacies. These connected learning encounters with news media must be seen as starting points for building students' media literacy skills. By assuming that young people 'go looking' for news and ignoring their experiences of news and information, educators risk offering materials that are irrelevant to students and miss the chance to engage with important ideas in young people's lives. This study investigates young people's experiences of mis/disinformation consumption and production through participatory research projects with first-year undergraduate students. The study aims to (a) integrate young people's voices and perspectives into discussions about mis/disinformation and (b) provide a socially situated understanding of young people's consumption and production of mis/disinformation.

The literacies – theorizing young people’s interactions within media ecologies

Although literacy has long been recognized as a social practice, information literacy connected with consuming mis/disinformation is still framed as a set of skills to be taught and mastered (cf. Buckingham, 2019). Often, lessons focus on the discernment of mis/disinformation and are framed as an issue related to children and young people’s lack of knowledge and skills. As a result, the approach to teaching about these topics concentrates on “spotting” the mis/disinformation through techniques such as reviewing authors’ credentials, reverse image searching, inspecting URLs, and so on. This approach simplifies information ecologies as well as social aspects of consuming and producing information (Savolainen, 2010). Moreover, current methods take a deficit approach to children and young people’s information literacies, assuming that students have little to offer in understanding information ecologies (Folk, 2018).

Studying mis/disinformation has the potential to align with various areas of the school curriculum. However, it is most explicitly addressed as an “information literacy” (IL) or “digital citizenship” issue, signaling its place in school libraries and potentially in collaboration with other areas of the curriculum (e.g., English, history, computer science). A review of the literature on approaches to and definitions of information literacy reveals tensions and schisms. Various iterations of “information literacy” aim to address inherent problems with more “traditional” approaches. In an attempt to add more criticality to definitions of IL as well as incorporating concepts from media literacy, authors have suggested revised approaches such as critical information literacy (Kapitzke, 2003; Elmborg, 2006), media and information literacy (Leaning, 2014), and critical media and information literacy (Brayton & Casey, 2019). Numerous literature reviews and arguments for new approaches provide useful overviews of these iterations and often include critiques of IL. Tuominen et al. (2005), for example, summarize: “Many, or most, texts on IL consist of normative prescriptions of information skills needed in modern society. Most IL standards view IL as an attribute of individuals without attempting to account for how individuals interact with others and technical artifacts in their information environments” (p. 330).

This excerpt from Tuominen et al. (2005) highlights two major issues common across critiques of IL approaches: (a) IL is reduced to a set of skills that purport to lead to competency, and (b) literacy is framed concerning skills acquired by isolated individuals. More traditional IL programs adopt a competency-based approach that focuses on developing skills, such as the ability to locate information and assess its credibility and trustworthiness. Programs in middle and high schools focus on “tooling” students up with fact-checking sites and checklists of indicators to look for when evaluating an informational article. This approach suffers from numerous false assumptions: IL can be reduced to a set of skills, people who are IL will not be susceptible to mis/disinformation, and, more fundamentally, information is inherently true or false. New iterations address these assumptions by approaching with a more critical lens that considers the construction of information. As Brayton and Casey describe, Critical Information Literacy and Critical Media Literacy “share concerns (ideology, representation), influences (Gramsci, Stuart Hall, Freire, hooks, Giroux), and approaches from critical theory, critical pedagogy, and feminist theory” (2019, p. 121). A second broad category of critique centers on outdated and narrow conceptions of literacy that exclude any recognition of the social aspects of literacy practices. Citing well-established ideas from new literacy studies (Street, 1995) and situated learning theories (Lave & Wenger, 1991), authors argue that literacies are social practices that involve interpersonal processes of meaning-making shaped by social, economic, and political contexts. Applying a social lens broadens the definition of literacy by including a range of practices, including everyday encounters with various information sources, and considering how people understand a range of information within and through various social contexts.

The approach adopted in this research project aligns with media literacy and situated learning theories. We are interested in mis/disinformation ecologies, meaning the contexts in which mis/disinformation is produced, encountered, consumed, understood, and shared. By considering these ecologies, we explicitly frame mis/disinformation as being constructed within social, historical, economic, political, and ideological contexts. Further, we view “consumption” of mis/disinformation as constituting any number of practices including ignoring, sharing, gaining pleasure from, and changing behavior. Importantly, as our study focuses on young people, we see the social practices

of consuming mis/disinformation as particularly relevant. We aim to understand the meaning-making practices that young people engage in as they encounter mis/disinformation in their everyday lives.

Methodology

This study took place in the Fall of 2022, and participants were members of a specialized first-year undergraduate class focused on exploring mis/disinformation ecologies. The class approached the topic from various perspectives (history, journalism, law, education, and information studies), and all 18 students engaged in student-led research projects related to how young people encounter, find, and engage with mis/disinformation. The student projects involved a modest literature review as well as empirical research (conducting small-scale surveys of their peers). Projects were completed in small groups and covered topics of students' choice, including misinformation related to dieting, fitness, vaping and e-cigarettes, and vaccines.

During the student-led research component of the class, a non-participant observer collected observational data as the students compiled findings from their literature reviews, created hypotheses, developed survey questionnaires, discussed and analyzed findings from their survey responses, and produced 10-minute summary presentations of their projects. Data utilized included observations recorded during class periods, field note reflections from the non-participant observer and the second researcher (the instructor of the class), and materials from the student projects. Data were analyzed using an inductive, exploratory approach. Initially, both researchers read and reread the data set, individually noting emerging themes and creating a starting list of codes. The researchers discussed and compared codes and developed a code book. The two researchers applied these codes to a subset of the data independently, and then compared their coding of the data subset, further elucidating the codes. This process was repeated until researchers came to a consensus on the codebook and the meaning of each code. The dataset was then re-coded by each researcher and cross-checked for consistency and omissions.

This study focused on a student-led investigation into experiences with mis/disinformation. At the onset of the project, we questioned how young people's views of mis/disinformation might compare to educational approaches to "fake news" commonly delivered in school environments, and how they perceived key educational interventions aimed at addressing the spread of misinformation. Specifically, we sought to determine if students felt that these approaches were aligned with their own experiences and whether they found them relevant. With data gathered and these questions in mind, we crafted the following research questions to support this study:

RQ1: How do young people understand their experiences of mis/disinformation ecologies?

RQ2: How do young people perceive their own and their peers' media literacy skills related to mis/disinformation?

RQ3: How do young people view educational approaches to mis/disinformation?

Analysis

The analysis of the data set gathered in this study revealed two distinct themes: young people's understanding of their own experiences with misinformation and their understanding of their media literacy skills.

What shapes young people's experiences with mis/disinformation?

An initial finding in our analysis was that sociocultural contexts shaped how young people encountered and experienced mis/disinformation. Students reported that when misinformation was addressed in school settings, educators frequently used fake news articles or unreliable internet sources to teach about misinformation—a choice that often seemed out of touch. Students recognized that encountering misinformation within the context of one's own social media feed is significantly different from opening up a physical newspaper to an emotionally charged, potentially false headline or checking the credibility of a URL link during a teacher-led presentation in an academic classroom.

Within their own social media feeds, students admitted that their preference is to stay in-app and to continue scrolling. The different sociocultural contexts generated by their individual engagement with specific social media platforms, such as TikTok, Snapchat, and Instagram, shaped their experience with misinformation, including their interest in working to refute that misinformation. One student noted, "People do not fact-check about this kind of information. Most of them said that it was an extra step. And on social media, the act is that you are just scrolling vs. needing to go to a different page." By failing to recognize or utilize the sociocultural contexts that young people are truly experiencing mis/disinformation within, educators who are teaching lessons about misinformation within the confines of information literacy skills-based checklists miss the mark, and students know it.

As Parker and Smith (2022) mention in their work outlining the pedagogical potential of multiliteracies, how students are accessing information or spending their time is changing, and these changes have implications for how they build knowledge or make meaning. Therefore, fully acknowledging how young people engage with information and misinformation means expanding educational efforts beyond the current framing provided by traditional definitions of information literacy or media literacy. The multiliteracies framework acknowledges the challenges of a post-truth era and considers socially constructed aspects of meaning-making. In alignment with the work of Parker and Smith (2022), we agree that educators must acknowledge the changing nature of how students spend their time, as that has implications for how they build knowledge and make meaning in the world.

In a point that surprised both of us, students also shared and found that their peers frequently share misinformation because it is funny. Within certain sociocultural contexts—whether with a specific group of friends or in-app within certain feeds—young people will share fake news or misinformation as a source of entertainment. When we acknowledge that experiences with misinformation are shaped by sociocultural factors, we can easily see how a student might share something to be funny within one context while being skeptical of or ignoring mis/disinformation in another.

The second subtheme connected to young people's experiences with misinformation is that social identity is tightly entwined with young people's experiences of mis/disinformation. In a systematic review investigating how adolescents trust health information on social media, authors Freeman et al. (2022) found that for adolescents, engaging with content on social media is just as much about presenting and understanding identity within a social community as it is about finding factual health information. While moving through their research projects, our students also noted that young people focus on engaging with content that resonates with them, whether true or not. This aligns with literature showing that young people are more likely to share information if it connects to them and their interests, regardless of truthfulness (Herrero-Diz et al., 2020). Young people are motivated by the need to reaffirm their identity or to convey certain affinities or interests. This can lead them to share content that supports identity construction without considering whether the information is factual (2020). Our students clearly conveyed that who we are and how we view ourselves and the world shape our interactions with mis/disinformation as much as anything else.

Lastly, the analysis of this subtheme noted a specific relationship between young people's understanding of their own identities and their engagement with information or misinformation promoted by social media influencers. Students were highly aware of the prevalence of social media influencers in their feeds and discussed working to figure out

who they are in comparison to or in connection with these influencers. While students reported being skeptical about influencer content, they also frequently admired or emulated these creators. While discussing the formation of the survey questions they might ask their peers, one group chose to ask: “During the pandemic, how much pressure did you feel to ‘fix’ or change your health and wellness practices? [We were] engaging more with influencers during the pandemic and watching what they were doing every day—were they taking advantage of us?” This was an important question for the group to ask, as audience involvement or *identification* with celebrity influencers can further increase susceptibility to misinformation (Myrick & Erlichman, 2020). The idea that one’s identity is merging with a celebrity influencer’s persona is important to consider when acknowledging the connections between who we are or who we view ourselves to be and how we experience misinformation in social media spaces.

Young people’s reflections on media literacy skills.

The second major theme that emerged from the data examines how the students positioned their own media literacy skills and those of other young people about mis/disinformation. In this theme, we identified two major threads that appear contradictory: on the one hand, young people positioned themselves and their peers as skilled and able to spot misinformation, and on the other hand, they positioned themselves as vulnerable to misinformation.

Young people positioned themselves as having implicit knowledge about mis/disinformation gained through personal experience on social media. Students said they and their peers consume social media daily and have been doing so for some years. Importantly, they stated they develop skills as they engage with social media, which they describe as “inherent knowledge, inherent skills.” When discussing data from a survey they conducted with their peers, one student remarked: “97% of participants *had* viewed misinformation about fitness. This tells us that teens can identify misinformation due to our growing up online.” For the students, these “inherent skills” mean they know when to scroll past or simply laugh at things that are fake; they devalue content that is posted by people who have an obvious agenda; they are accustomed to seeing conflicting information and then investigating claims if the information matters to them personally; and they are used to seeing misinformation, so they are generally skeptical. This aligns with research from Ito et al. (2009) about the ways young people learn the norms and practices of online spaces partly from interacting in these spaces in different ways—for example, through ‘hanging out’ and ‘messaging around’ (Ito et al., 2009).

We are not taking these young people’s self-reporting claims at face value. Methodologically, self-reporting is problematic. Further, we are not supporting the view that so-called “digital natives” have innate skills that protect them from misinformation. We also know that young people (especially boys) overestimate their digital competencies, and their responses are sometimes more an expression of confidence than competence (van Deursen & Helsper, 2018). However, we are viewing young people’s discursive positioning of themselves as having gained some skills and knowledge concerning misinformation through experience on social media as partly a response to how educators have approached the topic and positioned young people.

The second subtheme connected with our participants’ understanding of their media literacy skills is that adults frequently underestimate young people’s media literacy skills. As one student stated, “Teens are not mindlessly scrolling through social media, students have more control over their actions than one may think.” Participants said that adults position teens as easily duped by fake news and misinformation online. This ignores their social media skills (including awareness of misinformation), and also dismisses the amount of agency teens have. Further, in the quote above, we see the students drawing on risk discourse about the addictive nature of social media and the deficit models of young people (Livingstone et al, 2012). This positioning of children and teens as vulnerable to online risk is prevalent in media panics, which then creates a narrow understanding of the skills children and teens need. For example, when framed through risk discourse, being digitally literate means being able to use the internet safely and responsibly (Haddon et al, 2020). Our students said they are interested in a much broader approach to media literacy.

Importantly, the students are not saying that schools have nothing to teach them. Somewhat contradictorily, young people also feel vulnerable and are concerned about the impacts of misinformation. They are particularly concerned about the impacts of misinformation on young people's lives, as one student articulated: "There is this focus on propaganda and fake news but not *why* we should care. Like, what does it actually mean or what does it make people do?" Given this stance, it is not surprising that most of the students in our study chose health topics. The students see themselves as more vulnerable to misinformation about health and well-being, in a way that has the potential to impact their health. At the same time, health and well-being are seen as areas in which they have agency—for example, they can choose whether or not to use vapes.

The students were very critical of the approach to misinformation in high schools, which they described as "surface-level education" that is "not at all applicable to the real world". It is in this context that they position themselves as wanting better media education. As one student said: "Young people and teenagers are vulnerable to feeling [uncertain about diet and exercise mis/disinformation] because there is so little curriculum about health disinformation." We think part of the reason students expressed this feeling of vulnerability is that media and information literacy is often framed by educators and other stakeholders as addressing risks. This positions children and teens as having deficits, and ever-changing not having skills to deal with online risks. Therefore, it is no wonder that our students expressed feelings of vulnerability. This duality might be a characteristic of Generation Z. In an analysis of how Generation Z presents themselves on TikTok, Cheng, Stahl and Literat (2022) found that young people portray themselves in contradictory ways, as "powerful yet vulnerable, self-assured yet damaged" (n.p.). This indicates that there are different ways of understanding why young people may be positioning themselves in apparently contradictory ways.

Conclusion

Findings from this study have implications for mis/disinformation educational efforts and indicate the limitations of current information literacy instruction, which takes little account of the ways young people are consuming and producing information. Our participants noted how irrelevant or even dismissive some examples of information literacy instruction lessons can be. Further, the findings highlight the ways schools currently employ a deficit model of teaching information literacy, in which young people's experiences are ignored. We believe that school curricula need to address mis/disinformation within the context of social media ecologies and recognize the impacts of sociocultural contexts, social identity, media literacy skills and knowledge that students hold, and the ever-changing dynamics within social media ecologies, such as the impact of influencer culture. Shifting away from framings of fake news and risk-focused discourse would support the realities of how young people are engaging with information and digital spaces and recognize that news and information often come to them in new and different ways. This study indicates that a socially situated view of information literacy needs to be employed in order for information literacy instruction to be effective with regard to teaching and learning about mis/disinformation. We feel that pedagogical approaches rooted in asset-based models would better recognize students' digital competence and support their particular vulnerabilities within social media ecologies.

While this is a small study, it also has the potential to inform a bigger project. Possibilities for further research might include a wide-scale youth participatory action project, with young people working with researchers and educators to develop a misinformation curriculum that could be taken back to schools and shared through peer-to-peer pedagogies. Additional research might also further examine how sociocultural contexts and social identity are shaping young people's experiences with specific types of mis/disinformation or forming additional strengths and skills within particular social media ecologies.

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4. Adolescent Near-Peer Mentorship

A YPAR approach to improving group chat etiquette

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Abstract: Digital citizenship education commonly used in schools is often developed by adults and does not sufficiently address youth experiences, their expertise, or the skills needed to successfully navigate digital interactions. Our research used Youth Participatory Action Research (YPAR) to explore teen group chat behaviors, positioning high school students as mentors and guides for younger middle school students. High school students conducted original research and identified several challenges to harmonious digitally-mediated communication (i.e., group chats). They then designed and delivered lessons to 8th graders on ways to avoid problems and promote positive communication. Results from the 8th graders' pre- and post-test surveys demonstrated increases in knowledge about specific terms and concepts (e.g., upstander, tone) and ways to avoid miscommunication. High school students also showed increases in their own understanding of effective digital communication via group chats, while noting greater interest in research and perception of self as resources for others. This pilot project demonstrates the effectiveness of near-peer mentoring in promoting digital citizenship, as both the mentor and mentee benefit.

Introduction

Digital technologies are an integral part of youth's lives. Almost all (95%) youth aged 13-17 years own a smartphone, and more children own a smartphone now than ever before (Rideout et al., 2022; Vogels et al., 2022). Adolescents also strongly value social connections and staying in touch with others in their lives, often through app-based forms of digital communication, such as WhatsApp, Facebook, Instagram, TikTok, and Snapchat (Toh et al., 2019) to foster a sense of belonging and prevent "FOMO", or a fear of missing out (Allen et al., 2014; Beyens et al., 2016; Guedes et al., 2016).

Problems can also arise through digital communication, including interpersonal drama and cyberbullying (Allen, 2011; Thomas et al., 2015). Conflict and cyberbullying are more problematic when they occur in digital group settings, such as group chats and on social media. Communication through texts in these settings allows bullies to act at any time without seeing the recipient's live reactions, making it easier to frequently cause harm online (Berne et al., 2019; Redmond et al., 2020).

Given the possible benefits and risks of digital-mediated communication and the unique patterns in group chats, we sought to identify how to support youths' healthful communication, including how to be better citizens in digital spaces. Using a Youth Participatory Action Research (YPAR) approach, this project involved high school students in developing educational lessons on digital group communication that they could share with 8th graders.

Background

Schools often address issues such as cyberbullying and positive online behavior through digital citizenship education, which focuses on the "ethical, safe, and responsible use of Internet technologies" (Lauricella et al., 2020). However, digital citizenship programming is often adult-designed, focusing on global topics such as plagiarism, misinformation,

and cyberbullying. The emphasis is on behaviors to avoid, rather than development of online social skills (Hollandsworth et al., 2017). Notably, students are rarely included in the creation and distribution of educational content, even though involving them is a promising way to promote digital citizenship and civic participation (Gleason & Von Gillern, 2018).

Youth involvement in digital citizenship education may be more effective than adult-driven programs. Research has shown that middle school students are more comfortable discussing issues with near-peers than with adults because these youth often better understand their experiences (Biernesser et al., 2023). Such findings suggest the potential benefits of incorporating a near-peer mentorship model in digital citizenship education. By centering youth perspectives and encouraging youth to share their knowledge, near-peer mentoring may provide more salient and timely guidance for online behavior. Thus, our research utilized YPAR (Ozer et al., 2020) to help older teens in high school (10th-12th grade: 14-18 years old) develop programming and teach younger teens (8th grade: 13-14 years old) about positive digital communication.

Methods

The partnership began when a professor at the University of California, Irvine (UCI) was approached by a K-12 private school regarding conflicts arising from group chats among middle schoolers. She offered to conduct a YPAR project with a high school social psychology course to help students learn about research and assist with digital citizenship learning in the middle school. The partnership focused on three main questions:

RQ1: What concerns and issues do youth identify with digital group communication? What strategies do they recommend for reducing miscommunication and conflict?

RQ2: Can a YPAR-developed and -delivered intervention improve 8th graders' knowledge of healthy digital communication?

RQ3: Could engagement in YPAR improve high school students':

- Knowledge of research methods?
- Critical thinking about their own digital communication?
- Perceptions of themselves as change agents/resources for their school?

Our research team involved a medical student, a PhD student, a professor, a high school teacher, and 15 high school students in 10th-12th grade (one of whom is a co-author of this presentation) who met during regular class time, 2-3 times a week for 3 weeks. YPAR is an "action-oriented" approach that cultivates younger generations' skills to not only recognize problems but also to become problem solvers. YPAR creates a space for a stronger community and more active change with topics most important to young people (Ozer et al., 2020).

The UCI team first administered an online survey to the teens about their group chat experience and their social media and texting behaviors (N=15). In the first meeting, we led discussions with the youth to define "group chats" and identify their benefits and issues. The teens opted to interview other youth (ages 12 to 19) about group chats and reported their findings to the class team to identify possible patterns and themes. Key strategies were then generated for younger students to help prevent, identify, and address problems in group chats. Drawing on a logic model of features, mechanisms, and processes, the teens split into groups and chose their desired topic to research and teach to the younger students.

The high school students created five lessons on tone, cyberbullying, miscommunication, group polarization, and power dynamics within group chats, using PowerPoint presentations, games, and skits to engage younger students. Each

group presented to the team, received feedback, and modified their lesson. The research team also drafted a pre/post knowledge assessment based on the content provided in the five lessons.

The high school teams visited different 8th grade science classes to facilitate their lessons. The 8th grade students were administered an electronic pre-test prior to receiving the lessons (N=51) and a post-test afterwards (N=30 completed). High school students also completed an electronic survey, which asked about their knowledge of research processes and group chat etiquette, reflections on their own texting behaviors, and any change in interest in research (N=14 completed). Both high school and middle school surveys included both closed-ended and open-ended questions.

Results

RQ1: What concerns and issues do youth identify with digital group communication?

Eighth-grade and high school students identified numerous benefits of group digital communication: connections with friends and family, open and readily available communication, exchange of ideas, easily accessible help or support, convenience, and the ability to talk to multiple people at once. Youth identified unique digital affordances for conveying meaning or tone, such as emojis, gifs, and in-message games. However, there were several concerns raised by high school students and reiterated by 8th graders.

Youth researchers identified five main problems in group chats: miscommunication due to ambiguous tone or phrasing, drama, exclusion/inclusion, sharing private content, and ganging up/group polarization. They selected concepts relevant to group chats and conflict to discuss with the 8th graders, including *tone* (information about mood/intention in written or spoken language), *bystander* (person who goes along with things without speaking up), *upstander* (person who provides support to others, speaks up when they see something bad, or cheers/encourages others), and *group polarization* (conflict where people take sides).

According to pre-test data, almost all 8th-grade students owned a cell phone (90%) and were part of at least one group chat (92%). Students mostly used iMessage/Android Messages, followed by Snapchat, to message peers. Almost all 8th-grade students (90%) had experienced some form of drama in digital communications. When asked about common problems on group chats, 83% reported at least one issue around miscommunication, drama, and bullying. Of these, miscommunication was reported most frequently (34%), followed by drama (11%) and bullying (11%).

Specific strategies to reduce miscommunication arose from the high school students' interview study and were incorporated into the lesson plans. Strategies included verifying information when making plans, prefacing messages to provide context, being specific with phrasing, adding emojis, and using appropriate punctuation. The importance of immediately asking for clarification when uncertain of tone, the benefit of one-on-one communication, and de-escalation strategies were also identified (see Figure 1 for youth-identified themes from the interview study).

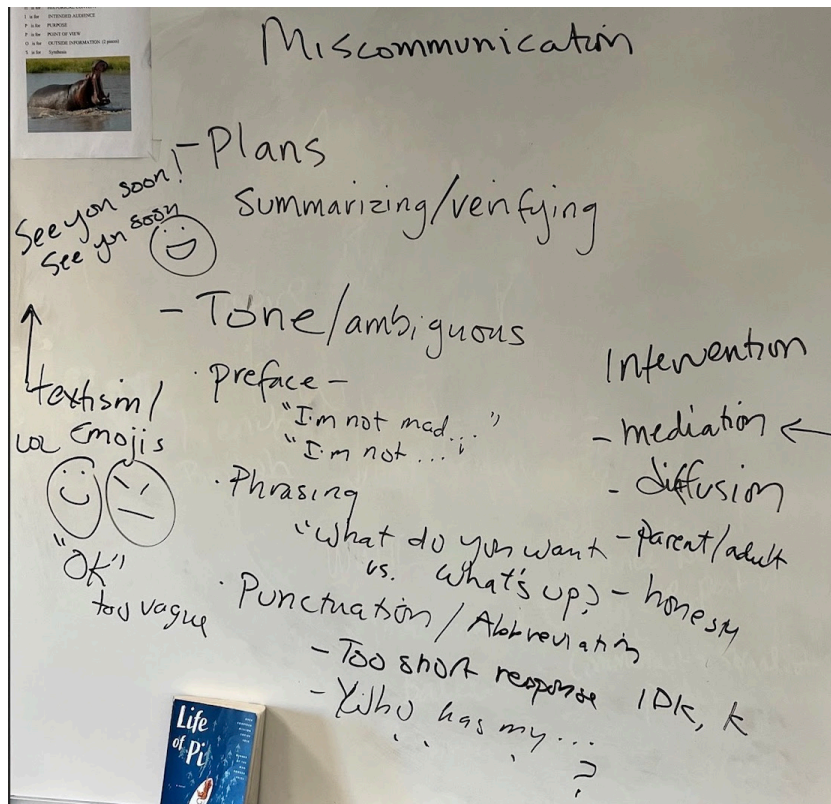


Figure 1. Strategies to reduce miscommunication in group chats identified by youth researchers.

RQ2: How can a YPAR-developed and -delivered intervention improve 8th graders' knowledge of healthy digital communication?

Comparisons of 8th-grade students' pre- and post-test surveys found significant increases in knowledge scores ($t(23)=-3.08, p=0.005$). After peer teaching, 86% of students identified miscommunication as a key component of problems in group chats, which was an increase from 60% in the pre-test.

Almost all (90%) of 8th grade students generated at least two strategies for preventing or reducing miscommunication. The most reported strategy (73%) included the use of tone indicators, emojis, gifs, and appropriate punctuation to convey a clear tone when messaging. This finding was further supported by increases in selection of these behaviors when asked how to effectively communicate tone (Figure 2). Other strategies included thinking before talking in-person when unsure or if a problem arose, asking for clarification, considering others' perspectives, and being an upstander. Greater understanding of strategies to address conflict was observed as well (Figure 3).

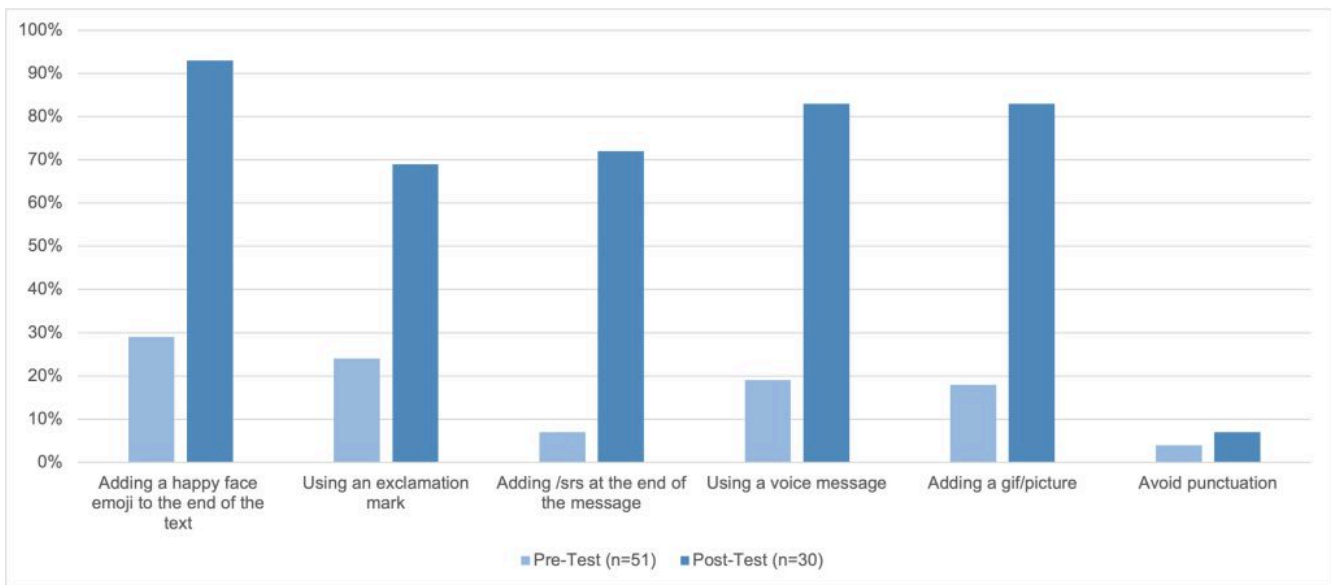


Figure 2. Percentages of 8th grade responses to: “Which are ways to effectively communicate tone?”

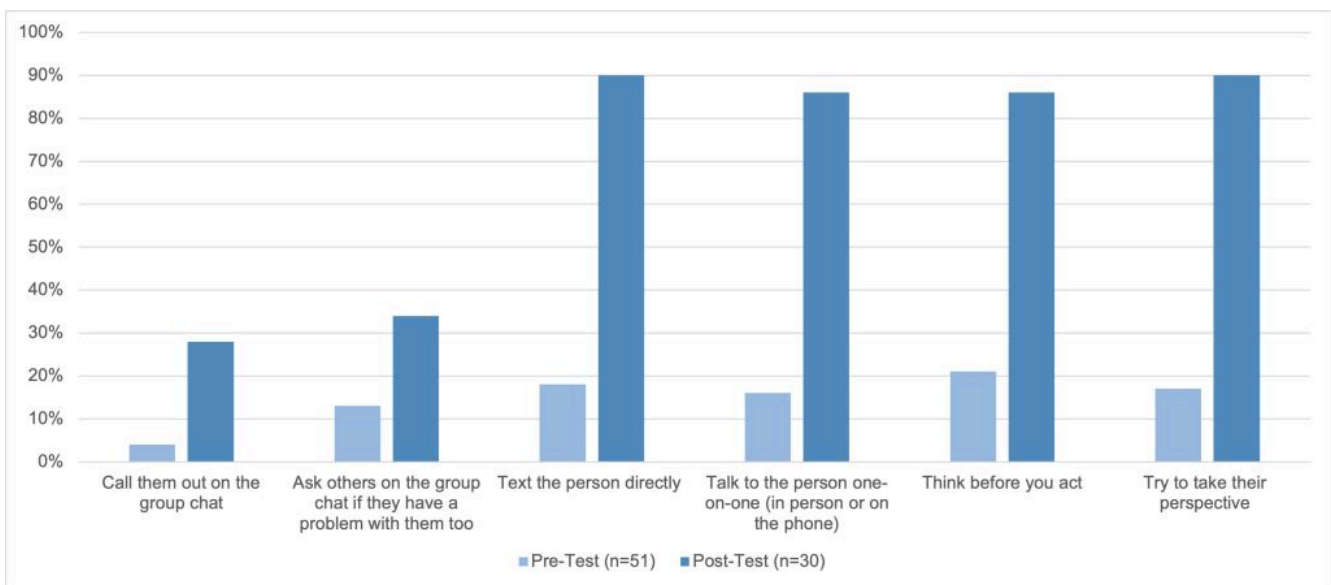


Figure 3. Percentages of 8th-grade responses to: “If you have a problem with someone on your group chat, what should you do?”

Students also knew more about specific terms after near-peer teaching (Figure 4). Most notably, all students correctly defined “upstander” and showed increased understanding about upstander behaviors in the post-survey (Figure 5). Four students noted that being an upstander was something new they had learned from their high school student teachers (“I learned that being an upstander is better than just staying out of it...”).

The 8th-grade students responded positively to peer teaching. When asked for feedback, students provided comments such as, “I liked the part when they showed us an example of an argument,” and “I liked how they used examples that looked like they were actually texting.” Another student noted, “I’ve always been told to try to avoid miscommunication in these ways; however, it was really nice to see it all laid out in one place.”

Several students highlighted the importance of having real-world and relevant examples of how to handle these issues (e.g., “I liked how there was an example of somebody cyberbullying on a group chat. This help [sic] us better understand when people are being cyberbullied”).

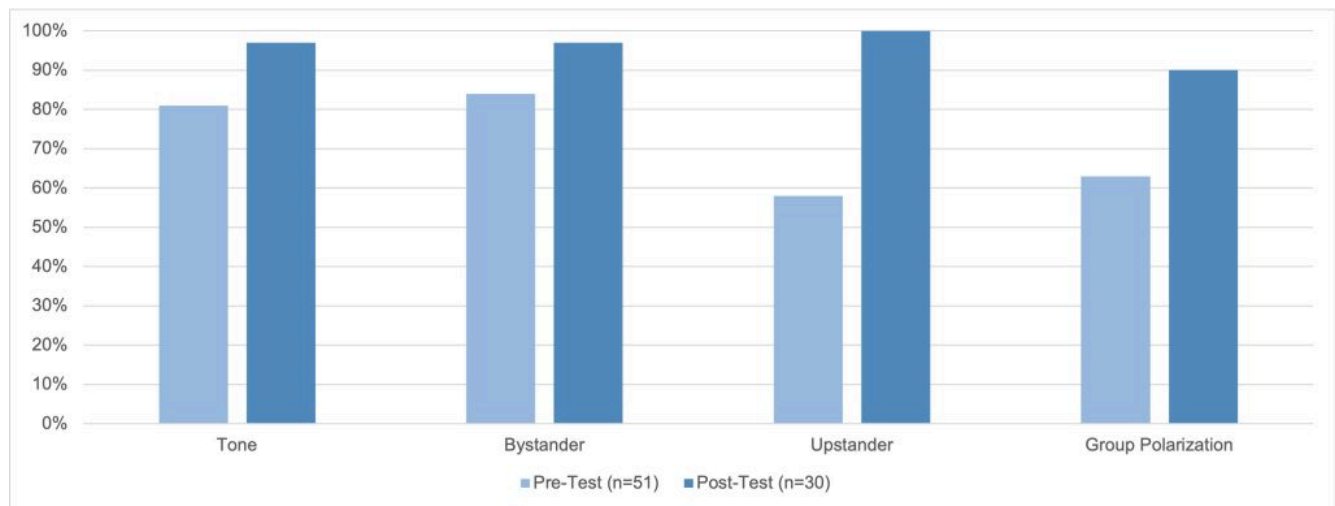


Figure 4. Percentage of 8th-grade students that selected the correct definition of each term.

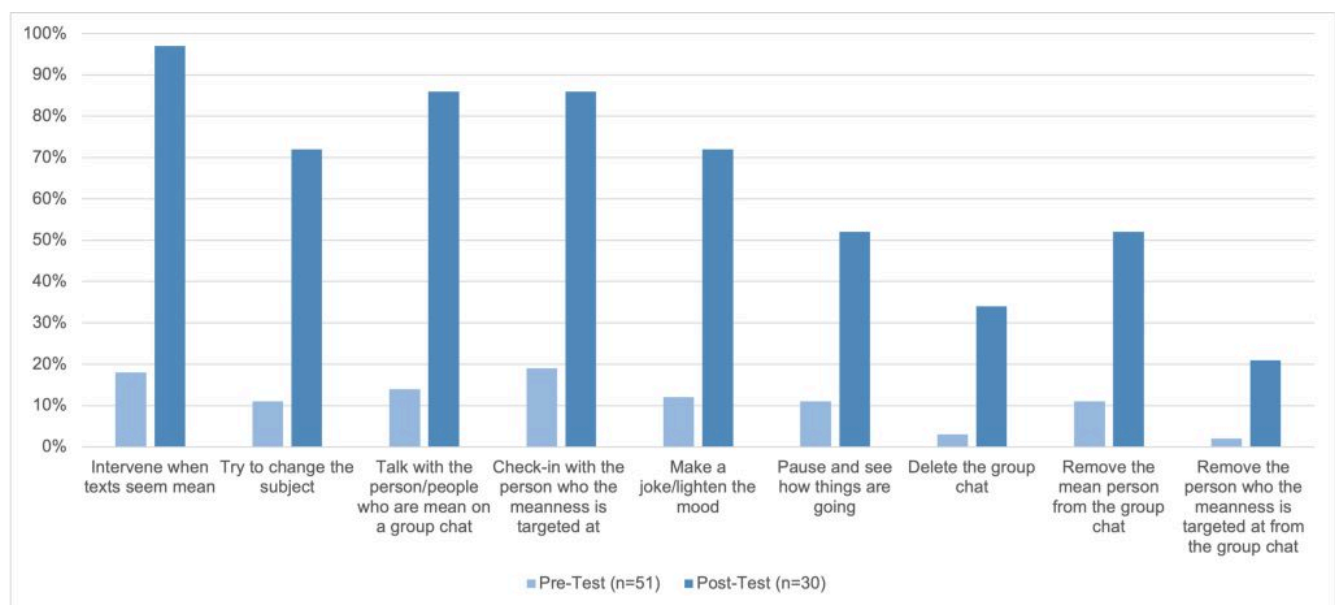


Figure 5. 8th-grade responses to: “What are some ways to be an upstander on group chats?”

RQ3: Could engagement in YPAR improve high school students’ knowledge of research methods, thinking about their own digital communication, and perceptions of themselves as change agents/resources for their school?

After participating in the YPAR project, high school students reported increases in both their knowledge and interest in research, with half of the students indicating greater interest in texting and media research. One student reported that they “learned about pre/post surveys, how to get answers from people during presentations,” while another commented that “it was helpful to learn to interview subjects to collect data.”

Teens also reported a better understanding of group digital communication, such as ways to avoid miscommunication. Open-ended responses demonstrated learning of “new ways to show tone through messages” and that “using emojis can change your messages.” There was an increase in understanding of behaviors to avoid on group chats, from 73% to 100%. In the post-test, students generated nine categories of behaviors to avoid (e.g., bullying, sending inappropriate things, abusing power dynamics, sharing images without consent, sending private information, causing drama, not considering others’ feelings, and being rude), which was five more than they listed in the pre-test.

Finally, students reported feeling they could be agents of change in their school, with 53% viewing themselves as a resource for others and 67% recognizing that they can impact others or their school community. When asked what they liked about the project, students reported they “liked presenting our work for the 8th-graders” and “how we all worked together.”

Discussion

Positioning youth as experts in digital citizenship education and utilizing them as resources for their younger peers proved valuable for both the younger learners and the older youth teachers. Extant media education is largely adult-developed and delivered (James et al., 2021; Supa et al., 2022), often overlooking the expertise of near-peers in identifying and addressing problems. This small but successful intervention provides evidence for the effectiveness of engaging youth in learning healthy ways to interact with media. Further, our YPAR approach demonstrated benefits for the youth partners involved. Previous research has found that increased agency and leadership are frequent outcomes for youth involved in YPAR (Anyon et al., 2018). Our high school partners reported similar benefits.

It is notable that the issues the high school students identified with digital communication were the same issues the 8th-grade students reported in their pre-test survey (e.g., miscommunication, bullying, and drama). This suggests that youth teachers may be more accurate than adults in identifying salient challenges and providing targeted guidance. Studies of near-peer mentoring find that mentees see their mentors as more relatable than adults and view their competence as comparable (Sun & Clarke-Midura, 2022; Jabor Al-Thani et al., 2023).

YPAR challenged students to think like researchers and adopt a more critical perspective of their own media use. Our high school co-author noted that the experience allowed her and her peers to develop the skills to communicate with younger students in a more professional setting while maintaining the connection with them due to both groups being close in age. She valued the project’s discussions about group chats and digital communication because it is rarely addressed in schools, leaving these lessons to be learned outside of the classroom through friends or siblings.

Our small study is not without limitations. The number of responses to the 8th-grade post-test survey was lower than the pre-test due to school absences. The sample size was small, limiting the power to detect effects. The study utilized a pre-/post-test design without a no-treatment comparison. Though the lessons mentioned that removal from a group chat was often viewed as hostile, we did see small increases in support for removing a mean person. Finally, the study focused on a narrow aspect of digital citizenship (i.e., digital group communication). Future research should explore a broader range of digital citizenship topics with more students over a longer period of time to determine the effectiveness of such programs.

Conclusion

Our findings demonstrate that youth-designed interventions have the potential to support learning for both the youth teachers and learners. Importantly, in the rapidly evolving landscape of youth and media, interventions designed by

those still in adolescence may be especially timely and effective. Near-peer mentorship should be considered in digital citizenship education. It is clear that both the creators and recipients of such interventions can benefit from the experience.

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5. Tracking emerging community of practice in hybrid studio units using Discord

JESS GREENTREE, JANE TURNER, & NICK KELLY

Abstract: As more universities offer online alternatives to existing creative subjects, students are at risk of disconnection from their learning and their peers due to the constraints imposed by online environments on their communication and collaboration. This paper examines the use of a Discord server in a design unit to create an informal forum of communication for both online and in-person students, as well as an environment for online studio activities. Augmentative and Alternative Communication (AAC) is used to gain insight into the interactions occurring on the Discord server, recognizing its role as both a collaborative platform and communication device. The students' interactions demonstrated a notable willingness to take ownership of the server and their own learning, showcasing the characteristics typical of a community of practice. Furthermore, students were open to engaging with each other outside of the structured education context, seeking organic and personal connection.

Introduction

In the wake of the COVID-19 lockdowns and subsequent shift to online, blended, and hybrid learning, Australian universities have made online alternatives to their existing subjects the new norm. Depending on the type of unit, these may be delivered in situ, combining in-person students with online students through specialist hardware and software in one stream, conducted in parallel with two separate streams, or a combination of the two. Creating blended and hybrid learning environments requires the time, attention, and creativity of the educator to adapt the technology to their pedagogical needs, significantly increasing their workload (Tynan et al., 2015). The technology chosen in each case may not be entirely suitable for the subject but may instead emerge from several other factors, such as familiarity, access, and institutional policy. Most Australian universities deliver these subjects using a combination of established learning management systems (LMS) such as Canvas or Blackboard, with video conferencing software like Zoom as the synchronous communication option. The COVID-19 lockdowns also necessitated the rapid uptake of platforms like Zoom across all subject areas and education levels, largely due to the philosophy that “it works” (Smeltzer et al., 2020). Since then, educators have had more breathing room to decide on alternative platforms, like those offered by social media or collaborative software.

The options for bridging the gaps between online and in-person students to provide equitable, if not similar, learning opportunities are varied. Previous ethnographic studies have examined hybrid classrooms with an emphasis on the technology's impact on learning outcomes. These studies have highlighted several challenges, including concerns relating to social well-being (Chakraborty et al., 2021), the need for multimodal communication that supports both synchronous and asynchronous conversations (Raes et al., 2020), and the communication ambiguity arising from the limitations of the software, such as the compression of tone and the lack of social cues from the environment and body language (Olt, 2018). These issues all relate to concerns about communication.

The present paper examines how students in blended learning situations communicate within the online, collaborative groups that support their learning. It focuses on a higher education unit of study in which the collaborative software Discord was used as the platform for intra-student and student-educator communication. The paper employs a framework adapted from Augmentative and Alternative Communication (AAC) (Beukelman & Mirenda, 1998) to guide

analysis of data from a semester of learning. AAC considers the goals and necessities of communication and encompasses not just high-tech interventions such as specialist communication devices, speech generators, and applications, but also low- and no-tech actions such as writing, gesturing, drawing, and pointing. This framework is useful for understanding not just *what* is communicated in online and hybrid classes and studios, but also *how* things are communicated through the technology and the activities.

Background

For years, educators have been leveraging online and digital tools—often referred to as online or networked learning—to facilitate connections between students and educators through information and communication technology systems (Jones, 2015). This approach encompasses not only the technological systems for delivering course content but also the communication channels among educators and peers, auxiliary content platforms, and collaborative digital tools utilized throughout the study period. Goodyear and Carvalho (2014) emphasize that a productive learning network is one that creates rather than just consumes. The creation Goodyear and Carvalho refer to could be tangible learning outcomes, or a transformation of social practices, in a demonstration of learned concepts. Similarly, commentary on networked learning assumes emergent communities as part of a larger network of tools and actors (Schreurs, Cornelissen, & De Laat, 2019).

Community is often cited as both a goal and byproduct in education environments. Whether formal or informal, learning communities share a defining trait: they create chances and opportunities for learning among participants through social interactions. One of the more popular frameworks for such communities is Wenger's (1998) concept of communities of practice, in which participants are aligned through a common or shared topic, practice, or understanding and develop their knowledge in the related field through their interactions with one another. At a purely academic level, learning communities potentially improve retention rates and increase overall student satisfaction in their university experience (Dagley et al., 2016). Beyond this, however, are the social aspects: these communities benefit students and teachers by providing social outlets and creating networks and connections that can be utilized within and outside the classroom (Page et al., 2021).

The ability to connect with peers is especially important in subjects and fields which rely on collaborative development. Goodyear (2020) discusses the importance of co-configuring learning objectives and outcomes through collaboration and negotiating the tools used for learning. Additionally, having a “trail” or evidence of students’ conversations in their learning journey can help them recognize the development of competence and autonomy, both with the content, and the platform itself. The ability to reference and recall past conversations and activities is essential for developing momentum and establishing new norms for communities and relationships (Wenger, Trayner, & De Laat, 2011).

To gain a comprehensive understanding of the communication and creation processes occurring on collaborative software, it is essential to explore not only the content and outputs but also the manner and method through which they are expressed. In this context, Augmentative and Alternative Communication (AAC) serves as a valuable entry point, enabling us to delve into the nuances of how information is conveyed and artifacts are generated within these digital collaborative environments. Through AAC, communication extends beyond speech, encompassing a variety of actions, forms, and methods to achieve connection between conversation partners and groups. Light (1997) emphasizes the importance of AAC in serving multiple needs, defined across four categories as communication “goals”. The expression of needs and wants is the first of these goals, covering the ways in which a person can ask for help or alter their environment or the behavior of others. Developing social closeness is another goal, wherein the purpose is the communication itself, aimed at developing a relationship with others. The third goal is exchanging information, which typically requires specific vocabulary relating to gaining more knowledge about a topic or area of interest. The final

communication goal is participation in etiquette, relating to the little rituals performed as part of everyday life, such as greetings and courtesy statements.

Methods

This study is part of a larger ethnography of learning communities on Discord. This paper focuses on the use of a Discord server in a second-semester iteration of an Interactive Narrative Design (IND) unit offered through the design faculty at an Australian university in 2021. The learning outcomes for this unit are designed to introduce students to interactive narrative and game design principles and processes. Since 2020, the subject has been offered through two delivery modes: in-person and online. In-person students have access to on-campus lectures, which were also streamed simultaneously for online participants, as well as studio tutorials conducted on campus. Online students primarily participate through the LMS's synchronous communication software, Blackboard Collaborate Ultra, for lectures and theoretical discussions, and Discord for activities and group work.

The subject is offered to a range of students across various degrees, from visual design through to games design and information technology. The assessment consists of large group work components to produce a significant design artifact: a highly visual guide to an original fictional setting for tabletop games and subsequent “adventures”, or stories, within that setting. The process depends on the studio model of learning common to design subjects, wherein activities are highly social, embodied, experiential, and work towards the creation of an artifact (Vyas et al., 2013). Studio-based units are vulnerable to the dislocation and distancing of students through online delivery due to the more freeform structure and the expectation that students work collaboratively on self-directed projects. What typically occurs in a design studio is serendipitous and contextual, with activities being process-oriented rather than outcome-based. Design and other creative subjects rely on the trust built between peers to engage in critiques and collaboratively support one another in their learning (Seevink et al., 2021). Discord was chosen as the location for studio activities in the online class, as well as the informal forum for the subject, due to the broad range of tools available for communication and collaboration, and because many of the students were already comfortable using it for communication outside of the university context.

Discord rests somewhere between *social media* and *collaborative software*. While social media is designed to host user-generated or curated content with some asymmetrical feedback features (Carr & Hayes, 2015), collaboration software instead enables users to complete a task or goal cooperatively through a combination of communicative and creative tools (Banker et al., 2006). Originally designed for gamers wishing to coordinate activities over group voice calls and text, Discord has since evolved to include tools for a variety of community needs through its key functions—servers. A Discord server is a collection of user-created voice and text channels, allowing users to communicate synchronously or asynchronously. Standard server architecture adopted by server creators (or colloquially, “admins”) typically breaks up voice channels by activity (e.g., a “lounge” for general conversation, a “meeting room” dedicated to focused meetings), while text channels are divided by topic (e.g., “games”, “sports”, “server inquiries”, “food”). Voice channels can be accessed via voice and video and offer basic screen-sharing capabilities. Text channels allow users to rapidly format and send text, images, videos, files, stickers, emojis, and GIFs. Users can also use “reactions” by responding to anything sent in a text channel with an emoji. Bots, which are automated users, can be added to a server to increase the existing administrative capabilities of servers or provide new actions or activities through text-based inputs.

Another feature that makes Discord servers a desirable platform for community cultivation and activities is server roles. These roles are assignable tags that admins can use to perform various functions, from changing the color of a user's display name to allowing and limiting access to various channels within a server. Creating both public and private channels can be useful across a variety of needs. For example, in a server created for a class, roles can be used to create private channels for group work, which remain present and leave artifacts even when not actively used, unlike Zoom's

breakout rooms. Servers are free to set up and run, with only minor cosmetic and functionality upgrades available through Discord's premium subscription service.

At the outset of the IND 2021 server, the basic architecture consisted of a collection of text and voice channels relating to both unit content and informal topics. As the semester progressed, students formed groups and were subsequently granted private channels intended for their group work and communication, across both online and in-person classes. Two bots were also present: *Mee6*, an administrative bot that allows students to self-select roles such as skill sets or tutorial groups, and *Dice Maiden*, which simulates dice rolls. Over the course of the semester, observations were recorded that related to significant events or phenomena, including changes instigated by both students and the teaching team, such as additions to the server in terms of emoji or channels, the frequency of use for each channel, and the messages and posts that garnered significant attention. After the conclusion of the semester and the release of final grades, the data from the server was scraped to CSV and HTML using the Tyrrrz Discord Chat Exporter (Holub, 2022).

Findings

The IND server was set up in readiness for the semester with several basic channels. These included unit-specific channels, such as *#unit-discussion*, and typical Discord general chat channels like *#ind-lounge* and *#kitchen* for off-topic discussions and pictures of food and pets respectively. Early in the semester, several changes were made to the server's architecture, prompted by the teaching team and by student requests. Figure 1 illustrates the new and existing public channels. A third bot was also added to the server: *Pokétwo*, a stripped-back version of the popular game Pokémon. This bot randomly "spawns" Pokémon based on the activity level in text channels across a hosting server. Students can catch these Pokémon by correctly identifying and spelling the related Pokémon's name in a reply. These spawn events in the IND server were isolated to a dedicated channel, allowing students the option to play if they wished or ignore it entirely.

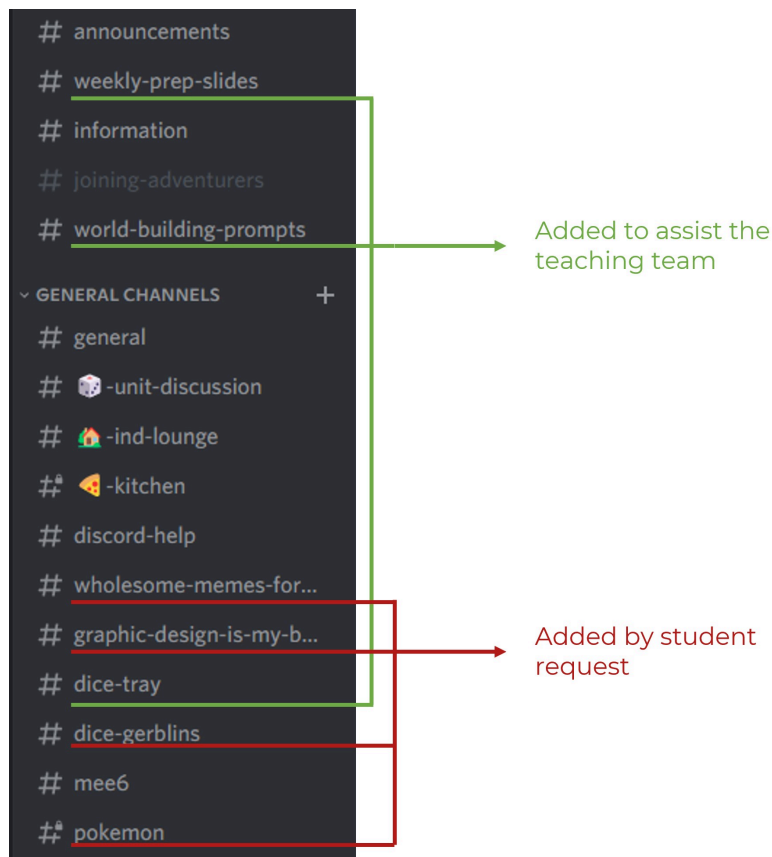


Figure 1. List of public channels in the unit Discord server

Some of the server channel names were tongue-in-cheek nods to popular internet references and memes, reflecting the shared vocabulary of students immersed in internet culture. Examples include *#dice-gerblins*, a play on the term “dice goblins”, commonly used to describe people who collect dice in hobbyist spaces, and *#graphic-design-is-my-burden*, referencing a popular meme “graphic design is my passion”). The public channels with the most consistent activity were *#general* (1,710 messages), *#unit-discussion* (649 messages), *#kitchen* (213 messages), *#wholesome-memes-for-wholesome-teens* (600 messages), *#lounge* (142 messages), *#dice-gerblins* (185 messages), and *#pokemon* (11,586 messages). The *#graphic-design-is-my-burden* channel, dedicated to providing feedback on assessment visuals and layout, was used sparingly and served more as an informal file-upload location than a conversational channel. The channels *#dice-tray* and *#mee6* were both used for bot commands, keeping the conversation channels free from clutter. The server had a total of 168 users, including the four teaching team members and the three bots.

A significant event or “ritual” that emerged on the server involved a series of images posted to the *#kitchen* channel across several weeks. These images garnered considerable attention in the form of reactions applied to the messages, both in quantity and variety. The images were screenshots of shared slides used for teaching, which had been “vandalized” by students in Blackboard Ultra while waiting for the studios to start. One of the tutors captured and posted them in the *#kitchen* channel, metaphorically placing them on the (imagined) “fridge” as shown in in Figure 2.

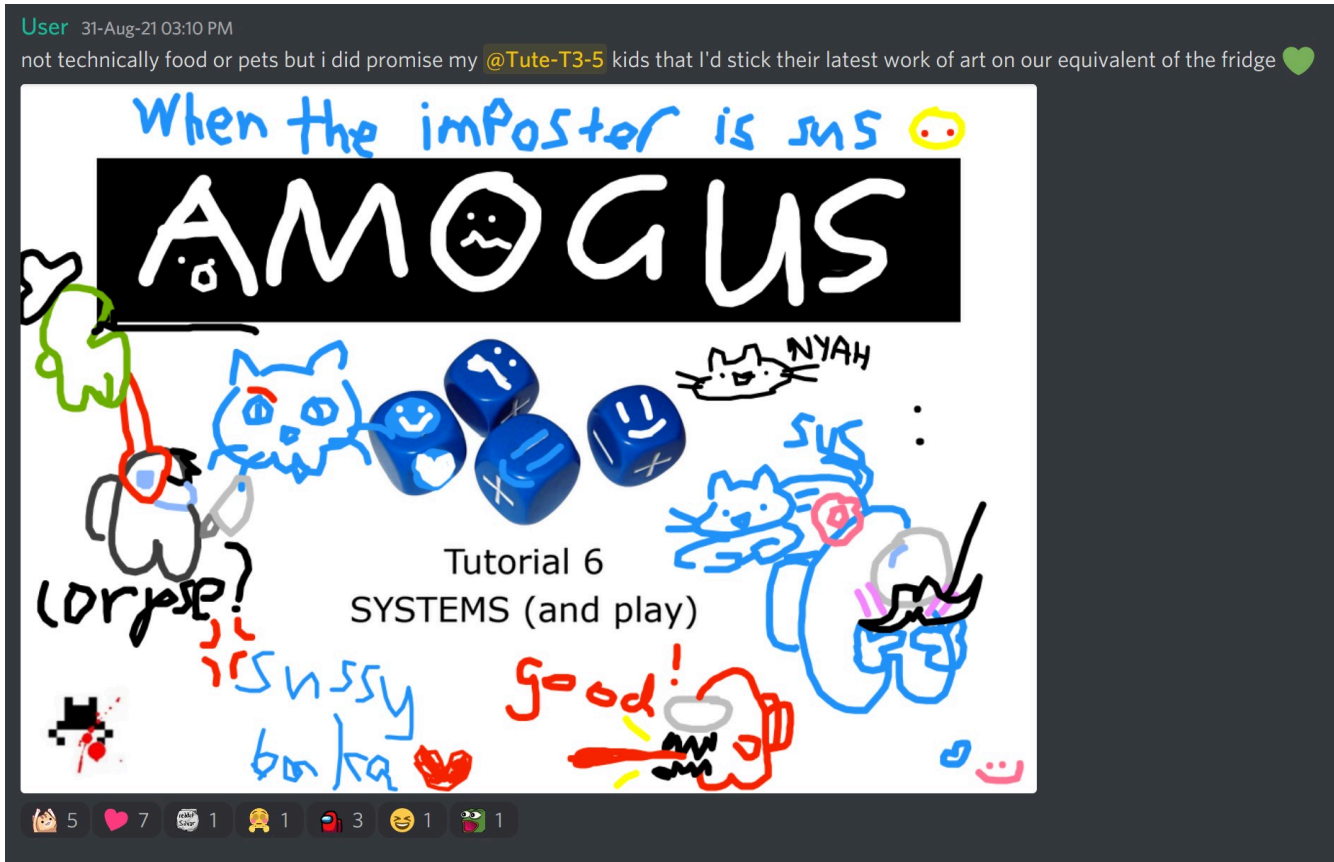


Figure 2. One of the first instances of the “fridge artwork”, a screenshot of the slide students “vandalized”.

The #general channel serves as an efficient “vertical slice” of the entire server, as it maintained frequent use. Conversational topics ranged from direct questions about the unit to more informal jokes and references. The data was analyzed through a hybrid thematic analysis to categorize phenomena and identify emerging themes (Fereday & Muir-Cochrane, 2006). The analysis of data began by breaking down exchanges based on their communication goals. These goals included the four highlighted by AAC (expressing needs/wants, developing social closeness, exchanging information, and participating in etiquette) as well as a fifth relating to “orienting”, based on the understanding of users and their operational competence of the platform. Once the broader communicative goals were identified within this channel, the conversations were further analyzed to identify themes that emerged from each of the exchanges. These themes included:

- *Off-topic*: Conversation unrelated to any unit content or topics.
- *Platform administration*: Announcements and assistance related to server changes or Discord itself.
- *Platform meta*: Exchanges relating to or inspired by the features of the server or Discord, such as custom emoji or channels.
- *Unit administration*: Addressing issues related to the running of the unit, such as dates and file locations.
- *Tangential*: Conversations that relate to or are inspired by the learning content at a surface level, but do not directly infer class activities or requirements.
- *Topical*: Directly relating to or addressing the learning content of the unit.

Themes are distinct from communication goals. A goal represents the purpose of the communication exchange, while a theme reflects how this purpose is achieved conversationally. For example, while an exchange might have a goal of

“developing social closeness”, the way this is conveyed is through an exchange about the content of the unit, making the theme “topical”. Exchanging information was the most frequent interaction goal (see Table 1).

	Participating in etiquette (20 total)	Exchanging information (54 total)	Expressing needs/wants (10 total)	Developing social closeness (53 total)	Orienting (10 total)
Off-topic	6 (30%)	4 (7.41%)	1 (10%)	21 (39.62%)	5 (50%)
Platform admin	1 (5%)	9 (16.67%)	1 (10%)	0 (0%)	0 (0%)
Platform meta	5 (25%)	4 (7.41%)	2 (20%)	9 (16.98%)	0 (0%)
Unit admin	3 (15%)	19 (35.18%)	2 (20%)	1 (1.89%)	1 (10%)
Tangential	4 (20%)	3 (5.55%)	1 (10%)	19 (35.85%)	3 (30%)
Topical	1 (5%)	15 (27.78)	3 (30%)	3 (5.66%)	1 (10%)

Table 1. Total occurrences of each communication goal and theme, with percentages relating to how much of each goal is comprised of the communication theme.

The goal of the analysis of communication in the unit’s Discord server was to determine whether the server’s design and usage facilitated the emergence of a community of practice. By examining students’ interactions and communication on Discord, this study seeks to gain insights into the emergence of community and how the multimodal communication opportunities through the platform are understood and utilized within the context of a studio-based unit. Much of the ambiguity faced by online students stems from a lack of clear understanding of when and how to act within an online environment. Some of this ambiguity is addressed and tackled through the nature of a Discord server’s architecture, providing direct channels for different communicative topics and purposes. Channel names align either with a theme (e.g., unit content or recreational) or a communicative goal.

The higher frequency of subject administration and topical discussions as themes for exchanging information points to the existence of a community of practice within the server. These exchanges between students contribute to developing their understanding of the learning content, whether through direct questions, activities, or more informal conversations. Just as noteworthy and nearly as frequent are the interactions that are not constrained or related to the educational setting. The presence of off-topic and tangential discussions aimed at developing social closeness signifies a willingness among students to establish relationships outside the confines of the subject matter. This is further supported by the significant level of engagement observed in the off-topic channels, particularly in relation to the *Pokétwo* bot, which facilitated the building relationships and rapport between peers. Interactions referencing the bot spilled out from *#pokemon* into the other text channels in the server, as well as into the classroom, reflecting a desire for interest-based connections beyond the learning material and a willingness to engage in activities with one another outside of the classroom. The creation of the artwork for the “fridge” was an activity that occurred outside of the server and persisted from its first iteration right through to the end of the semester. These creations, initially made in the synchronous Blackboard Collaborate Ultra environment, carried through meaning in the asynchronous communication forum of Discord, serving as a lasting artifact for online students representing their collaboration and relationships with one another and the platform.

In comparison to traditional forms of communication in a subject setting, such as emails or in-class questions, the usage of the server was more prevalent among students across both modes of delivery, showing a higher degree of participation. Moreover, the range of questions asked on the server were more diverse, covering a broader spectrum of topics. Students took the initiative to respond to each other’s queries, even those that would typically be directed to a member of the teaching team, demonstrating a sense of ownership over their learning. The request for and subsequent utilization of assignment help channels such as *#graphic-design-is-my-burden* further solidifies this trend of students actively engaging with and supporting one another in their learning.

The project is still in progress. Future iterations of this research could explore group communication in private channels,

analyze Discord's user interface and its impact on communication patterns, and investigate the influence of bots on community behaviors and conversations, considering the nature of activities and conversational input modalities.

Endnotes

- (1) Mee6 from <https://mee6.xyz/>
- (2) Dice Maiden from <https://github.com/Humblemonk/DiceMaiden>
- (3) Pokétwo from <https://poketwo.net/>

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6. Algorithmic Learning while Creating and Sharing Content on Social Media

ANNA KEUNE & SANTIAGO HURTADO

Abstract: Computer science continues to face inequitable access for all youth. Identifying youth practices that can be leveraged for computational learning can contribute to a transformed participation in computer science by leading to designs that a wider range of people can associate with. To address this, we investigated social media as youth-driven contexts for computational learning. We thematically analyzed semi-structured social media walkthroughs with girls (ages 13-18) in Latin America and Europe. We analyzed how everyday and repeating youth practices on social media related to learning about algorithms. We found three youth-driven ways that social media practices related to algorithmic ideas: (a) content sharing as flow control structures, (b) content curation as a loop, and (c) playing with algorithms. We highlight the practices with data excerpts to illustrate the possibilities of social media as a context for computational learning. We present implications for the design of computational learning opportunities that are promising for broadening computing cultures.

Introduction

To address disparities in representation within computer science (CS), it is crucial to foster learning settings that build on the practices and interests of young people (Kafai et al., 2020). Social media offers a rich space for interaction and is globally used by youth to create, share, and discuss content (Kapoor et al., 2017). Beyond that, social media presents an opportunity to learn about algorithms. For example, by questioning how social media algorithms work when they behave unexpectedly, people build an “algorithmic imaginary”, which encompasses their perceptions of algorithms, their ideal nature, functionality, and the possibilities they enable (Bucher, 2017). Engaging in social media practices builds knowledge about how social media platforms work, mediated by youth culture through evolving trends that prompt content creation, sharing, discussion, and evaluation of platform operations. Awareness and understanding of, and attitudes toward algorithms in social media, can be a step toward understanding algorithms more broadly within computer sciences (Hargittai et al., 2020; Hartl et al., 2024). However, it remains underexplored how everyday social media practices can create learning opportunities about algorithms.

Thus, we asked: *How does engaging in connected youth practices with social media involve algorithmic practices?* By building on the connected learning model (Ito et al., 2020), we explored youth social media practices through 13 online walkthrough interviews with girls from Latin America and Europe, during which participants shared their social media practices (i.e., content creation and curation, media consumption, and risk-related experiences and knowledge). We analyzed the video data based on connected learning design principles and inductive and iteratively refined codes for algorithmic practices. We found that youth social media practices involve complex decision-making processes that can be recognized as algorithmic. This has implications for research into social media as a generative space for algorithmic learning.

Background

This study investigates social media as a socially relevant and generative learning space for computer science (CS)

through algorithms from the experience of Latin American and European youth. Social media consists of diverse platforms that enable content dissemination, foster dialogue creation, and facilitate communication to reach a wider audience (Kapoor et al., 2017). On top of this, social media has become a context for supporting learning, including tools for distributing content and facilitating communication about that content (e.g., Lundgren et al., 2020). Yet, a systematic review of social media research underscores that studies often overlook experiences from developing countries (Erfani & Abedin, 2018). Surprisingly, 70% of studies on social media in school contexts are based in North America and Europe, while only 2% are based in South America (Dennen et al., 2020).

To promote engagement from underrepresented populations in computer science, it is necessary to create environments that promote personally meaningful educational experiences (Kafai et al., 2014; Turkle & Papert, 1990). The connected learning framework acknowledges learners' practices as catalysts for engagement (Ito et al., 2020) and highlights principles that can support research and design of computational learning opportunities. These principles consider youth's ongoing media practices as essential in developing meaningful and long-lasting learning experiences (Dahn et al., 2023; Ito et al., 2020; Keune et al., 2022).

Further, we build on Bucher's (2017) idea of "algorithmic imaginary"—how people consider the algorithms underlying digital tools and how they could be improved—to broaden understanding about how youth practices with social media are algorithmic learning opportunities. Algorithms are sets of steps executed in a specific order to achieve particular outcomes (e.g., Wilson & Keil, 1999; K-12 CS Framework, 2016). Algorithms are not exclusive to hardware and software; they are present in our daily lives as we perform routine tasks (Dasgupta & Hill, 2020). In digital spaces, algorithms deliver content and have the potential to influence people's actions (Swart, 2021). Developing an understanding of what algorithms are and how they work, frames people as agents in relation to algorithmic influences (Hargittai et al., 2020). Additionally, algorithmic learning and understanding serves as a basis to learn and understand complex computational concepts (Hutchinson, 1994).

Methods

This qualitative study conducted social media walkthroughs with girls and young women (self-identified) aged 13 and 18 years using a walkthrough method approach (Light et al., 2016). A total of 13 participants took part in this study: nine from Latin America and four from Europe. The participants were recruited through personal networks and educational institutions. During the walkthroughs, the participants shared their screens to show their social media accounts, explain how they used them, and describe how they created content. Nine walkthroughs were conducted in English, two in Spanish, and two in German. We translated the walkthroughs into English for the analysis.

Data sources

The data sources comprised screen recordings of 13 semi-structured social media walkthroughs, with an average length of 70 minutes each, totaling 903 minutes. We developed the walkthrough protocol through an iterative review process that included expert teams from the Technical University of Munich's Think Tank Re-boot Social Media Lab, which included educational psychologists, digital policy researchers, and technology researchers. Additionally, three experts in connected learning, computational learning, and digital literacy contributed to the development of the protocol. We revised the protocol after the first round of walkthroughs to increase questions at the intersection of connected learning and algorithms. The walkthrough protocol covered four themes: (1) Introductions (i.e., demographic information, social media experience, and a tour of the participants' social media accounts); (2) connected learning on social media (i.e., content creation processes, networks on social media); (3) algorithmic learning (e.g., experiences with and awareness of

recommendation and feed creation algorithms, advertisements), and (4) risks (e.g., overuse, bias, false information, fake profiles, data collection).

Data analysis

To answer the research question on social media-connected algorithmic practices, we transcribed the walkthroughs, conducted exploratory coding, and summarized the walkthroughs to develop a coding scheme. Then, we coded the walkthroughs deductively and inductively in the qualitative data analysis environment MAXQDA. For algorithmic practices, we included the following codes: (a) *Content sharing as flow control structures*, referring to the process of creating content for the participant's social media platforms, (b) *content curation as a loop*, including archiving or deleting content, and (c) *playing with algorithms*, including testing the algorithms underlying various features. To deepen the understanding of how these decision-making practices relate to algorithms, we further analyzed the data by visualizing the recurring patterns in how youth engaged with social media. This was achieved by translating youth practices into flowcharts that described decision trees for creating, sharing, and curating content. These flowcharts visualized the overall algorithmic engagement of youth on social media, enabling comparison and contrast of specific practices.

Findings

Content sharing as flow control structures

We identified that content creation involved complex decision-making processes similar to flow control structures, which established multiple conditional statements and were refined through repeated practice. Conditional statements are expressions that determine which action to perform based on whether a condition is true or false. For instance, Carmen, an 18-year-old high school student from Colombia, described her content-sharing practices using conditional statements. When posting, she decided on the type of content (e.g., stories or posts) and the reason for posting (e.g., a trip, a party, or a birthday). She then selected the pictures, chose the appropriate platform (e.g., Instagram or VSCO), crafted a caption, determined whom to tag, and considered other people's feedback based on particular selection criteria.

Carmen's practices resembled algorithmic flow control structures, which were not limited to sequential ones with one path, but also included single, double, and multiple alternative conditional structures. These structures execute the algorithm once an input (i.e., a reason to create content) is provided, with the output (i.e., the content being shared or not) dependent on these conditional statements. These statements are also mediated by youth culture, which motivated her to create this content. One example is the creation of a birthday story, a practice that recurred across interviews, in which youth created a social media story that included one or more pictures of a friend on their birthday (see Figure 1). Carmen, for instance, described creating birthday stories (output) every time one of her friends had a birthday (input). She would go through sequential control structures (e.g., selecting a font style) and conditional structures (e.g., deciding when to post, whom to include, whether to ask for feedback, and which platform to use).

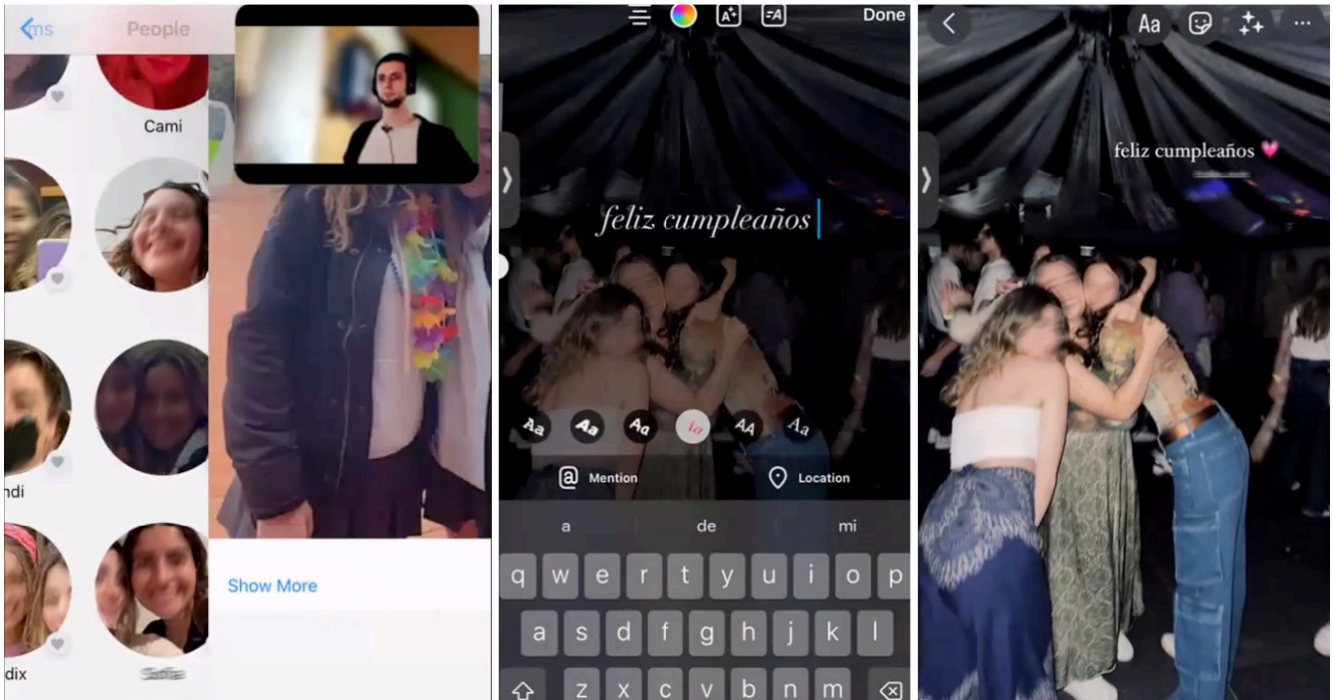


Figure 1. Carmen searched for people in her gallery (left), wrote a caption (center); birthday story (right).

Content curation as a loop

Participants described revisiting previously created content, evaluating it, and making decisions whether to delete or archive it when possible. This process is comparable to a loop, where participants continuously engage in revising and judging content based on evolving criteria. A loop is a flow control structure that runs repeatedly until a specific condition is no longer met. The loop can be a “for loop”, which specifies the number of times it runs, or a “while loop”, which continues until the condition is no longer satisfied.

For instance, Margarita, a 17-year-old high school student from Colombia, created different types of content on her Instagram account, including posts and stories. She may choose to delete a post (i.e., the output if the condition is not met) when her criteria are no longer met, as it will stay indefinitely on her account. In her walkthrough, Margarita shared that she used to have many posts related to art, as she liked painting. However, due to her consideration of audience preferences toward other content (the condition to be met), she chose to delete the art-related posts (ending the loop when the condition was not met). When we asked her why she decided to delete some posts, she said:

Wouldn't be completely sure. But I would say maybe those posts didn't get as many likes. And I decided to just constrain my profile to pictures of myself since maybe when people follow me, that's what they're looking for.

Margarita explained the conditions (i.e., number of likes) that needed to be met in order for her to delete content and how this influenced what content she posted. She judged the performance of her posts and then decided if she should keep them online (i.e., the loop continues) or take them down depending on the number of likes they received (i.e., the loop ends). After some time passed after posting, she turned off the like count on her posts (the loop ends for this criteria), because she did not want to be attached to the number of likes. This meant that no one would be able to see the number of likes the post received (see Figure 2 for a post example where she turned off the like count).

Margarita's curation processes are similar to “while loop” flow control structures, as they involve a constant evaluation

of one's own online footprint, mediated by youth culture. This involves taking into account the speculated audience expectations (one condition to be met) and accommodating these expectations as the social media profile evolves (new conditions that may develop). This process is always preceded by the content creation algorithmic practice, which integrates the multiple alternative conditional flow structures preceding this algorithm. We highlight content curation as a separate practice as it can involve different motivations (evolving conditions) and criteria based on the platform and personal analyses. Nevertheless, this short example showcases the complexity of this practice, as it creates an ongoing loop of evolving criteria.



Figure 2. Margarita showcasing a post with the view count turned off

Playing with algorithms

Playing with algorithms involved various approaches to algorithms in social media, similar to debugging, as participants explored their platforms with an inquisitive approach to develop an understanding of embedded algorithms of social media. Participants described being aware of social media algorithms, but not understanding how they work. They hypothesized, tested these algorithms, and used insights gained to utilize social media for their convenience. Not all participants displayed the same level of involvement with social media algorithms, as disruptions of expected behavior (bugs) from the social media platforms initiated personalization attempts (debugging), and these disruptions are not always present.

For instance, Sonia, an 18-year-old high school student from Colombia, engaged in playing with social media algorithms in various ways. She developed an understanding of how networks of people are connected on social media and created hypotheses as to how being part of a network prompts social media algorithms to recommend contacts. She extended this understanding into how her feed and advertisements work on social media:

I feel like most of the time, I'm in control. So I kinda know how to use it in my favor. So for example, yesterday, I had a minor obsession with Shakira and Piqué, because it was like this song. And I was like, 'Oh my gosh, so cool.' So what I did, I was like I went into TikTok. I looked up Shakira and Piqué, and liked three videos, and then my whole For You page was full of Shakira and Piqué. Like, I kind of know how to work it.

Sonia described how she filtered her feed to curate the content she wanted by experimenting with the algorithms of social media. This process entangled her practices with the algorithm and was her initial way of imagining how the social media platform worked to present content. Although she did not fully understand how the algorithm worked, she believed it was based on recognizing behavior patterns within these apps. Later in the interview, she described testing the TikTok algorithm with a friend, where they placed their phones side by side and started swiping through videos. Eventually, she said, the videos started to sync, and they had the same videos showing up at the same time. She suggested that it could be because she and her friend have similar patterns, but noted that it seemed too coincidental.

Sonia showcased how playing with algorithms engaged her in investigating and creating hypotheses about social media algorithms. She became aware of the algorithms that impacted her daily on social media and developed strategies that allowed her to navigate the way she wanted to navigate online. She developed an imagined awareness of algorithms while engaging in complex step-by-step processes, and refined this approach to efficiently achieve the desired results. This process is similar to debugging, where she developed strategies through experimentation to “fix the bugs” (i.e., not showing the videos she wanted) she encountered, thus creating an “algorithmic imaginary” of the social media platforms she uses.

Discussion

The analysis reveals that social media can be a rich context for practicing algorithmic ideas, such as conditional and sequential flow control structures, loops, and debugging within contexts that young people perform frequently and on the go. Investigating how algorithms work, like Sonia's video syncing tests, and generating decision paths, like Margarita when she is curating content, are practices that youth perform repeatedly throughout the day. They happen alongside other aspects of their lives, like nurturing a friendship through a birthday story. Framing youth practices on social media as algorithmically relevant holds the potential to generate awareness about how everyday practices are connected to and shaped by algorithms of complex digital tools, as well as how youth practices can make a difference in how algorithms can be learned.

The algorithmic practices identified on social media suggest possible designs for learning activities. For instance, young people could be encouraged to identify, represent, and articulate their algorithmic practices online and to consider their awareness of algorithmic disruptions (e.g., to avoid commonly considered risks or changing one's clicking and scrolling behavior to receive wanted content). Additionally, the findings point to the possibility of designing social media interface and platform features that are informed by youth-practice-based imaginations about how social media algorithms work and how they might be improved. It is important to build on youth practices that are often understudied (e.g., Latin American youth populations on social media) in the design of algorithmic learning opportunities to contribute to a broadening of accepted and recognizable knowledge practices.

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