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Elementary student experiences from digital safety immersion summer program

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ABSTRACT

Digital Safety refers to the knowledge and skills needed for the intentional protection of users in the digital environment. With children having access to digital devices at a young age, it has become essential for them to be educated on how to be safe in the digital world. Through a week-long summer camp on digital safety, elementary-age learners were introduced to four topics (digital identity and digital footprint, cyberbullying, netiquette, and digital security and privacy). This study found that the digital safety immersion camp was beneficial to elementary school learners based on the achievement, attitude, and behavior data that were collected. Posttest scores were statistically significant from the pre-test. Cyberbullying topic had the highest pre- and post-knowledge, whereas netiquette and online behavior, and digital security and privacy had comparatively lesser scores. Students demonstrated positive attitudes in the post-camp survey and they also included several lessons learned from the camp in the Pixton comic strip, which they created as the final project from the camp. The findings from this study contribute to the current literature on preparing elementary school students' knowledge and skills related to digital safety and have implications for students, teachers, administrators, and parents.

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KEYWORDS

Digital safety; digital citizenship; digital security; elementary learners; summer camp

1. Introduction

The rapid advancement of technology has led to an increase in digital access and online culture for children and adolescents in the early stages of their lives. According to the National Centre for Education Statistics, about 88% of fourth graders in the US public schools had access to digital devices and the internet by 2019 (National Center for Education Statistics, 2021). As young learners

become exposed to digital devices and online spaces, their vulnerability to digital threats also increases (Savoia et al., 2021). However, as much as digital access and online presence are susceptible to risks, their benefits are deemed crucial for nurturing 21st-century digital citizens (Hollandsworth et al., 2017; von Gillern et al., 2022). The way that young learners interact and engage in the digital world determines the value that they will reap from it. Research suggests that digital and online accesses at an early age comes with a multitude of benefits including the potential of enhancing learning opportunities, creativity, self-esteem, and the development of digital literacies and competencies (Dowell, 2019). Despite these benefits, the exposure comes with pitfalls, challenges, and risks. Digital threats are on the rise, and as students interact with personal devices such as computers, smartphones, tablets, and web resources, they become more exposed and vulnerable. The spectrum of digital threats includes cyberbullying, privacy concerns, defamation harassment, and the development of false identities. While for young learners, the prevention strategies can include a range of factors, one that is empirically supported is raising awareness of the risks and how to mitigate the threats. Digital safety education is crucial for nurturing engaged, responsible, and informed digital citizens (Hollandsworth et al., 2017; Isman & Canan Gungoren, 2014; M. Ribble, 2015).

1.1. Digital safety definition and topics

The term digital safety has been used interchangeably with other terms such as digital security, cyber safety, and internet safety. It refers to the knowledge, awareness, and intentional protection of users' personal identity against computer crime and risks of private information while in online spaces (Martin et al., 2020; M. Ribble, 2015). Studies have indicated that there is an urgent need of raising digital safety awareness among young learners in K-12 environments (Hollandsworth et al., 2017; Savoia et al., 2021). Most importantly, as studies have captured the experiences and perceptions of parents (Helfrich et al., 2020; Martin et al., 2021) and teachers in digital safety (Martin et al., 2022), there is a need of focusing on the experiences and perceptions of students as they engage with digital safety education and practices. Research highlights the need to teach digital safety topics and concepts for all K-12 school learners (Hollandsworth et al., 2017; Martin et al., 2023) including elementary-age students as they are increasingly using technology and are particularly susceptible to technology misuses and threats (Walters et al., 2019). In the United States schools, digital safety is often taught through the lens of digital citizenship. Ribble's framework on digital citizenship (M. Ribble, 2015) includes these digital safety topics and has been recommended as critical by K-12 educators (Martin et al., 2021). More details on Ribble's framework on digital citizenship are included in the conceptual framework section. These topics that focus on online behavior are reviewed in the section below.

1.1.1. Cyberbullying

Cyberbullying refers to “an aggressive, intentional act carried out by a group or individual, using electronic forms of contact, repeatedly and over time against a victim who cannot easily defend him or herself” (Smith et al., 2008, p. 377). Willard (2007) classifies cyberbullying into several categories including flaming, harassment, cyberstalking, denigration, masquerade, outing, and trickery and exclusion. Cyberbullying is an area that has captured the attention of scholars in recent years mainly due to its status as the most common type of online risk affecting young adults (Livingstone & Smith, 2014). The results of the National Crime Victimization Survey, taken in 2019, indicated that about 16% of the students in grades 9 to 12 experienced cyberbullying nationwide. An element that has led to the inclination toward cyberbullying is the increased digital access through readily available devices such as personal computers, tablets, and mobile phones. An extensive study done by Kowalski et al. (2019) reports that time spent online is positively correlated with involvement in cyberbullying activities and events. In addition, factors such as teacher and parental control, personal behaviors, and school climate are considered influential to cyberbullying victimization and perpetration (Kowalski et al., 2019). Cyberbullying trauma has been linked to psychological problems including suicidal ideation, depression, low self-esteem, and anger problems (Li, 2010; O’Keeffe et al., 2011). In addition to negative consequences, literature has indicated the significance and the need for prevention strategies. Cyberbullying is referred to as the intentional use of deliberately used digital media to communicate false, embarrassing, or hostile information about another person. It is the most common online risk for all teens and is a peer-to-peer risk.

1.1.2. Digital identity and digital footprint

Multiple studies show that as children engage with the digital world, they leave a trail of data and information that is linked to their personal identities (Buchanan et al., 2017; O’Keeffe et al., 2011). Digital identity has two origins, one relates to a retrievable data corpus for data-driven services (Thatcher, 2014) and the other relates to “coded entities in social and content networks (Feher, 2021, p. 193). Thatcher (2014) describes digital footprint as information that is generated by either purposeful action or passive recording. The cases of digital identities and footprint have been linked to surging numbers of online profiles that are most prevalent with the surging social media platforms. Positive digital profiles are associated with positive digital identities, and they can be valuable in accessing employment and networking opportunities in the students’ future endeavors.

1.1.3. Netiquette & responsible online behavior

Literature has suggested that there is an association between children’s online behaviors and the likelihood of encountering risks online (Adorjan & Ricciardelli,

2019; Savoia et al., 2021). Netiquette is a terminology for digital etiquette that relates to accepted rules or standards for online behavior, and it is an indicator of online morality and ethics (Park et al., 2014). Additionally, online behaviors and actions have implications on the student's future educational and employment opportunities (Hollandsworth et al., 2017). For instance, online abuse and misuse of technology in monitored school environments could place students in disciplinary actions and other punishments as per guiding policies. Self-knowledge and self-awareness in netiquettes have been regarded as potential drivers to reputable online behaviors.

1.1.4. Digital privacy & security

Vulnerability of students' privacy has always been a matter of concern for teachers, parents, researchers and policymakers. Ghosh et al. (2018) defines online privacy as one's personal control over information disclosure and visibility. Studies have indicated that young learners have limited knowledge about the value of their personal digital data and how it is collected and treated in digital environments (Agesilaou & Kyza, 2022; Livingstone et al., 2019). Student's awareness, practices and perceptions of personal data ownership are fundamental elements as they navigate digital spaces and smart technologies (Agesilaou & Kyza, 2022). Research that has focussed on students' privacy and security issues has highlighted the low level of awareness in regard to the inherent risk that comes with technology use (Livingstone et al., 2019). In the process of educating young learners on digital privacy, aspects such as internet searches, school records, biometric data and social networks are crucial aspects to be considered in the process of mitigating the risks.

1.2. Digital safety experiences of elementary school learners

Research related to elementary school-aged learners' experiences with digital safety education is limited as much of the existing work focuses on older learners (Vega & Robb, 2019). The few empirical studies that have covered the experiences of elementary school learners have mainly focussed on the concepts of digital literacy and citizenship, with digital safety being an embedded agenda within the two constructs. For instance, in the study exploring students' perspectives on school responses to cyber risk and safety, Adorjan and Ricciardelli (2019) argue that cyber safety directives should be internalized and emphasized in earlier grades. The interviewed high-school students indicated that as much as they experienced more threats during their high-school years, they believed that being exposed to digital safety practices during their earlier grades boosted their self-control and skepticism. The limited research studies in this area highlight the need for works that will provide insights into the experiences and perspectives of elementary school students in immersive digital safety programs.

Digital safety education for elementary school learners varies in frequency and delivery methods. In a national survey of K-12 educators, nearly 60% of the teachers reported addressing topics of digital privacy and security, cyberbullying, digital footprint and identity, and media balance at least monthly, but these findings do not distinguish between grade levels (Vega & Robb, 2019). Kumar et al. (2019) found that lessons related to digital privacy and digital security were typically delivered by school media specialists within a few isolated lessons, with educators in this study discussing a lack of time to devote to digital safety lessons. However, research shows positive outcomes for providing elementary students with digital safety learning opportunities even when implemented in isolated ways. Cuesta Medina et al. (2020) implemented a cyberbullying intervention program with 9- to 11-year-old students across several lessons during the regular school day and noted gains in students' understanding of cyberbullying as well as their confidence and self-efficacy related to addressing cyberbullying. Zahed et al. (2019) developed a digital safety game-based learning (GBL) experience specifically for elementary school learners. They found that students had greater knowledge related to digital safety objectives when engaged in GBL compared to peers learning about digital safety through traditional text-based instruction or interactive e-learning modules. Again, there are few studies that directly examine elementary school learners' experiences with digital safety education. Additionally, few studies explore changes in elementary learners' perceptions of digital safety and changes to the ways they interact online as a result of digital safety education.

Digital safety education is commonly taught through the lens of digital citizenship in the K-12 schools in the US, and there is no sufficient time for teachers to spend time on these topics extensively in the classroom. Teachers have discussed the lack of time as a challenge in teaching the digital safety topics (Martin et al., 2022). Therefore, in this project, a summer camp model was used to offer a digital immersion camp at a university setting. Summer camps bring students together for an extended period of time and in most cases for a week for students to be immersed in various topics including technology focused topics (McCashin et al., 2019).

1.3. Conceptual framework

This study draws from Ribble's framework on digital citizenship which identifies Respect, Protect and Educate as three core elements for digital users to use technology ethically, safely, and responsibly (Ribble, 2015, 2021). Digital citizenship is defined as "norms of behavior with regard to technology use" (Ribble et al., 2004, p. 7). It is further expanded as a concept, which helps teachers, technology leaders, and parents to understand what students/children/technology users should know to use technology appropriately (Ribble, 2021).

In the early works of Ribble et al. (2004), much emphasis was put on the importance of thoughtful, safe, and ethical use of technology in today's society by supporting young learners' knowledge and ability to engage, collaborate, learn and engage responsibly in digital communities. The framework on digital citizenship brings forward nine elements that are considered critical in teaching the ethical use of technology to students. The elements include digital access, digital commerce, digital communication, digital literacy, digital etiquette, digital law, digital rights and responsibilities, digital security, and digital health and wellness (M. Ribble, 2015). In this study, we focus on the elements that are specific to digital safety. The adapted elements from M. Ribble (2015) framework on digital citizenship (see Figure 1) informed the design and development of the digital safety curriculum, resulting in four core topic areas: Cyberbullying, Digital Identity and Footprints, Digital Netiquette and Responsible Online Behavior, and Digital Privacy and Security. Of the nine elements in M. Ribble's (2015) framework, only four were adapted as they better align with the goals of this study. These adapted elements are digital law, digital communication, digital etiquette, and digital security. Each of the four digital safety topics were directly mapped to Ribble's digital citizenship elements, digital law was mapped to cyber bullying, digital communication to digital identity and footprints, digital etiquette to digital netiquette and responsible online behavior, and digital security to digital privacy and security. These four areas guided the achievement of student outcomes, which are further evaluated in this study in the context of attitudes, learning, and knowledge transfer.

The adaptation of M. Ribble's (2015) framework for this study is informed by research that has positioned Ribble's conceptualization as potentially normative in the digital safety education (Örtégren, 2024; Richardson et al., 2021). In particular, Richardson et al. (2021) found that over 33% of the studies on digital safety and citizenship from 2009 to 2019 utilized M. Ribble's (2015) framework

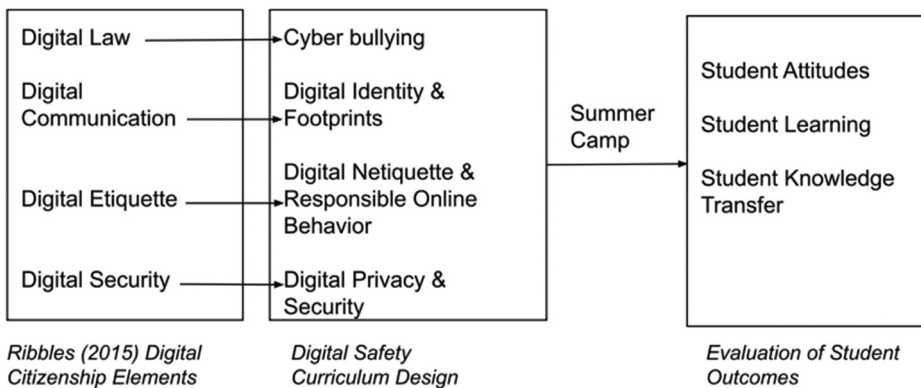


Figure 1. Adaptation of M. Ribble (2015) framework to inform the digital safety curriculum and evaluation of student outcomes.

to conceptualize the study. This shows the relevance of the framework as the basis for organizing digital citizenship-related knowledge areas.

The summer camp included three student outcomes which included student attitudes measured through a post-survey, student learning measured through a post assessment, and student knowledge transfer measured through Pixton Comics. In the post survey and post assessment, there were specific items on the five digital safety topics related to digital citizenship elements in the measure, whereas in the student knowledge transfer assessment through Pixton comics, students could select any of the five topics to develop their Comics on.

1.4. Purpose of the study and research questions

The issues involving digital safety have captured the work of researchers in the last several years. However, participation in an immersive experience presents new insights that have not been captured and brought to attention. There is currently a gap in the studies that focus on highlighting elementary learners' experiences in digital safety education. The study is therefore considered significant in closing the gap by examining the experiences of elementary school students as they navigate digital safety in the classroom.

The main aim of this study is to examine the perceptions and experiences of rising fourth, fifth and sixth graders as they navigated through digital safety concepts in an immersive summer camp. The camp involved four topics including digital identity and digital footprint, cyberbullying, netiquette and responsible online behavior, and digital security and privacy. Through the topics, students engaged in activities that were designed to build their knowledge and foster their critical thinking on issues related to digital safety. This includes peer-to-peer discussions, engagement with guest speakers, and comics designed to demonstrate their understanding and express their views on the application of the key concepts in real-life scenarios. The study is considered significant in highlighting students' experiences and in informing the future implementation of programs and resources to support their learning of digital safety concepts. This study addresses the following research questions.

- (1) To what extent did the digital safety immersion summer camp improve elementary student knowledge on digital safety topics?
- (2) What were elementary student perceptions of their experiences from the digital safety immersion summer camp?
- (3) What digital safety topical themes were identified from the final projects elementary students created?
- (4) What were some areas where students commented that they will change when they interact online?
- (5) What did students enjoy the most about the digital safety immersion experience?

2. Methods

This study used a mixed-method design approach including both quantitative and qualitative data collection methods to explain elementary school students' learning and experiences on digital safety through the summer immersion camp. We used a student knowledge, attitude and behavior model to study the outcomes of the summer camp. Student knowledge was measured through pre- and posttest, attitudes were measured through a post-camp survey that included open-ended questions, and learning behaviors were measured through the final Pixton projects they created. The convergent parallel design (Teddlie & Tashakkori, 2009) was used to understand and answer the research questions. Both quantitative and qualitative data were collected independently at the same time and interpreted together.

2.1. Summer camp immersion intervention

A week-long day summer camp on digital safety immersion was conducted in the Summer 2022. The camp was conducted at a university campus in the southeastern United States. The curriculum including one digital safety topic per day was designed for elementary-age learners. Four topics were included: digital identity and digital footprint, cyberbullying, netiquette and responsible online behavior, and digital security and privacy. The camp was advertised through the Camps on Campus program at this university, and parents were able to read the description on the topics when they signed the elementary learners for the camp. The camp was supported by funding from the National Science Foundation and was offered at a minimal cost. Two teachers in each classroom, one in-service teacher and one preservice teacher facilitated the camp. The teachers were trained through a digital safety online asynchronous professional development course on the same topics a month before the camp to facilitate the camp. The professional development was aligned to the same topics that they were teaching and was designed to provide them with the content expertise on digital safety. The teachers then participated in a day-long in-person training to meet their peer teachers and plan the logistics for the camp. Teacher outcomes and details of the teacher professional development are included in a separate manuscript.

A learner workbook was printed and distributed to each student participant at the camp. [Figure 2](#) includes a screenshot of the student curriculum focusing on the digital identity topic. Each module had goals and objectives and various activities for students to complete. The entire curriculum can be accessed at four Digital Safety Modules (Digital Safety Summer Camp, 2024) and was developed with funding support from the National Science Foundation.

Digital Identity

GOALS & OBJECTIVES:
 ISTE 2a Students cultivate and manage their digital identity and reputation and are aware of the permanence of their actions in the digital world.

Activities
 Students will be able to:

- Compare and contrast their online presence with real identity
- Describe strategies to maintain a positive digital identity
- Make smart choices about what to share with others online
- Make inferences about the identities of others based on online activity

Students will review videos about:
 -negative impacts of posting, commenting, & oversharing online.

IMPORTANT:
 Before students start the camp; they must complete the Pre-Assessment below.

[PREASSESSMENT](#)

DIGITAL IDENTITY

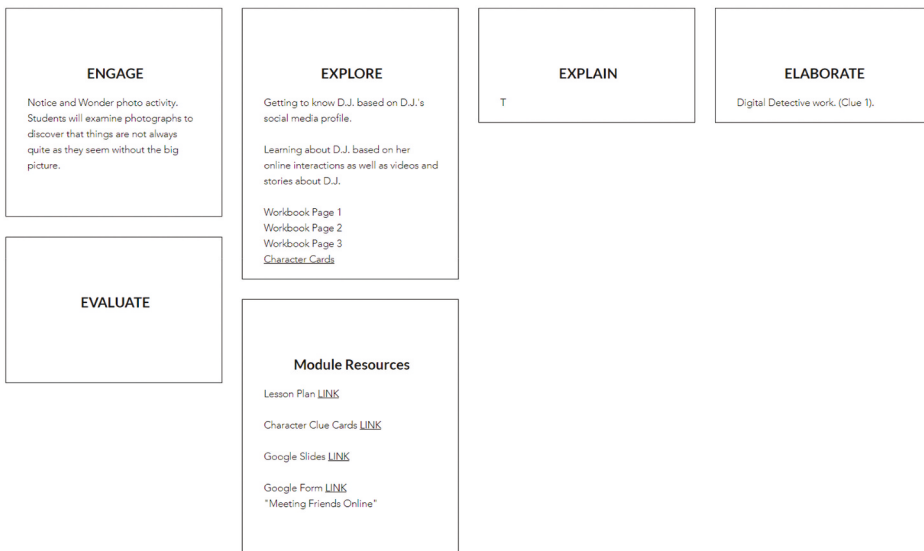


Figure 2. Screenshot of the Student curriculum.

2.2. Participants

Eighty-nine students who attended the camp that had parental consent to participate in the camp evaluation. The average age of the camp students was 10.03 with a range from 9 to 11 years old. The students had completed the following grade levels: 21 third- (35.6%), 15 fourth- (25.4%) and 23 fifth- (39.0%)-

grade students. The average number of days attended during the 5-day camp was 4.86 days with a minimum of 3 days and a maximum of 5 days. Fifty-two students (88.1%) attended all 5 days, four students (10.2%) attended 4 days and one student (1.7%) attended for 3 days.

2.3. Data collection

A pre- and post-tests were used to measure student prior knowledge and the growth at the end of the digital safety immersion camp. The pre- and posttests were the same test and included 14 items from all four topics. A sample pre- and posttest items included "To keep my information safe online, my passwords should be__". There was also a post-camp survey to collect student experiences. This included four items measured on a 4-point Likert scale, 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, and 4 = Strongly Agree. There were also two open-ended questions, "After participating in this camp, one thing I will change about the way I interact online is . . ." and "What did you enjoy most about your week at camp?" Data was also collected on their culminating Pixton projects at the end of the summer camp. Students were instructed to create a comic strip using Pixton on a digital safety topic.

2.4. Data analysis

For the pretest and posttest, the mean and standard deviation were reported for the overall test as well as by topic. Also, a paired sample t-test was used to determine the mean difference between the overall pre- and posttest. To examine the differences in mean score for each set of pre- and posttest module scores, a t-test was conducted for each set of module scores. Frequencies and percentage of student responses were calculated for the post-survey. In addition, the weighted mean was calculated for each of the items. For the open-ended questions, themes were identified. The analysis process was conducted in two phases. The first phase involved open inductive coding, where initial codes were identified as they emerged from the submitted responses. The two researchers enhanced the reliability and consistency of the codes by independently reviewing and discussing them, reaching consensus in cases of disagreement. In the second phase, for the context of reporting, axial coding (Corbin & Strauss, 1990) was applied to themes that emulated the topics covered in the program. The Pixton graphics were selected based on provided consent, ensuring that strips did not contain students' personal identifiers, such as their actual names. The thematic analysis involved the examination of textual and visual elements of the students' Pixton projects to identify recurring patterns. Two researchers independently coded the segments of the comics by labeling them with descriptive codes and grouped the Pixton comics based on the four broader digital safety themes aligned to Ribble's Digital Citizenship framework. The examples of analyzed comics are provided in the findings.

3. Results

The result section describes the results of the pre-post knowledge assessments, post survey, and the Pixton graphics themes.

3.1. Knowledge assessments

Sixty of the 89 students completed the pre- and posttest assessments. The pretest consisted of 14 questions with each correct item assigned one point. The average score was 10.93 (78.1%) with a range from 4 to 14 items correct and a standard deviation of 2.05. The posttest was the same assessment as the pretest. The average score was 13.43 (95.9%) with a range from 11 to 14 items correct and a standard deviation of .75. A paired sample t-test was used to determine the mean difference between the pre- and posttest. The difference between the mean pre- and posttest scores was statistically significant ($t = 8.75$, $df = 59$, $p < .001$).

Table 1 displays the results for each module for the 60 consented students that took the pre- and posttests. The highest mean for the pretest was Module 2; the lowest mean for the pretest was Module 3. All of the modules fell in the 90% range on the posttest. To examine the differences in mean score for each set of pretest-posttest module scores, a t-test was conducted for each set of module scores. The pre- and posttest differences for Module 1 ($t = 5.72$, $df = 59$, $p < .001$), Module 3 ($t = 11.68$, $df = 59$, $p < .001$) and Module 4 ($t = 4.81$, $df = 59$, $p < .001$) were statistically significant. The pre- and posttest difference for Module 2 was not statistically significant ($t = 1.10$, $df = 59$, $p = .28$).

Table 1. Descriptive statistics by module for pre- and posttest.

Module	Pretest				Posttest			
	Mean (%)	SD	Min	Max	Mean (%)	SD	Min	Max
Module 1: Digital Identity & Digital Footprint, 1–4	3.28 (82.0)	.88	1	4	3.93 (98.3)	.25	3	4
Module 2: Cyberbullying, 5–8	3.60 (90.0)	.69	1	4	3.72 (93.0)	.45	3	4
Module 3: Netiquette & Responsible Online Behavior, 9–11	1.57 (52.3)	.79	0	3	2.88 (96.0)	.32	2	3
Module 4: Digital Privacy & Security, 12–14	2.48 (82.7)	.65	1	3	2.90 (96.7)	.30	2	3
Overall	10.93 (78.1)	2.05	4	14	13.43 (95.9)	.75	11	14

3.2. Student camp attitudes

Among the students for whom we received parental consent, 59 students completed the post-camp evaluation survey with their attitudes. Students indicated that the camp taught them how to interact safely and protect their private information online (see Table 2).

Table 2. Summer camp attitudes.

	Strongly Agree		Agree		Disagree		Strongly Disagree		Weighted Mean
	F	%	F	%	F	%	F	%	
Camp taught me how to interact safely with people online	34	57.6	22	37.3	3	5.1	-	-	3.53
Camp taught me how to protect my private information online	37	62.7	21	35.6	1	1.7	-	-	3.61
Videos helped me understand what can happen if I am not careful online	31	52.5	21	35.6	7	11.9	-	-	3.41
Overall, camp taught me how to stay safe online	36	61.0	19	32.2	4	6.8	-	-	3.54

3.3. Digital safety topical themes were identified from the Pixton final projects

For their final project, students were assigned to develop a comic on Pixton focusing on any digital safety topic. The contents of the Pixton graphics demonstrated students' understanding of the four core topics taught at the camp. Among the students who submitted the comic strips, and we had parental consent, in total 20 Pixton comics were used in this analysis. The comics were submitted as part of the students' project deliverables and included a mix of definitions and real-life scenarios that unveiled their perspectives on how to approach digital safety in various contexts. Six out of 20 participants reflected on digital identity and digital footprint. In [Figure 3](#), the sample student work illustrates how the student defined key concepts such as "digital" and "footprint" and discussed the impact of social media on digital footprints. In the comic, the student uses an example of posting on TikTok and emphasized the long-term consequences of online posts. Through the comic, the student also proposed the "THINK" strategy for evaluating decisions before posting online. The THINK strategy encourages online users to reflect on several key questions before posting information online: The THINK acronym stands for T- Is it True? H-Is it Helpful? I-Is it Inspiring? N-Is it Necessary? K- Is it Kind?.

The second theme that was prevalent in students' graphics is netiquette and responsible online behavior. Six comics focused on best online practices and indicated the importance of staying vigilant while engaging with others in digital environments and online spaces. For instance, in [Figure 4](#), the student defines netiquette through a comic, explaining how it relates to respectful online engagement and communication. The student presents a dialogue about netiquette and demonstrates that one way to avoid online verbal conflicts is to report the incident and seek help and advice from an older person. In this case, the student reported an inappropriate message to her mom.

Cyberbullying was also among the topics captured in the submitted graphics. The students demonstrated knowledge about the topic both individually and



Figure 3. Student's comic on digital identity and digital footprint.

by integrating with other topics such as netiquette and digital footprint. Four out of 20 graphics reflected the concepts of cyberbullying and revealed students' perceptions on how to deal with cyber-attack scenarios in real life. Figure 5 presents a student's work highlighting an instance of cyberbullying in an online environment. The student advises that the appropriate action for victims of cyberbullying is not to respond, but rather to report the incident to the relevant authorities.

Four students reflected on digital privacy and security and one of the salient themes in this category was password safety. For instance, in Figure 6, the sample student comic addresses digital privacy. In this work, the student highlights the importance of having a secure password and provides tips on creating a strong one, capturing the essence of digital privacy and offering practical advice on password safety.



Figure 4. Netiquette and online behavior.

3.4. Areas that students wish to change when they interact online

As part of the student workshop evaluation, the elementary school students were asked to comment on areas that they will change when they interact online. Below are some of the comments that students provided for each of the digital safety topics.

3.4.1. Cyberbullying

Cyberbullying was one of the salient themes that came across from the analysis of students' responses. Six participants indicated that they will be careful with what they post and say to people online. For instance, student N mentioned, "Never be a cyberbully. Think about what you post and before you post". In addition to taking time to think about the content, respondents indicated that it is good practice to refrain from content that might be hurtful to other people. This is an important aspect since

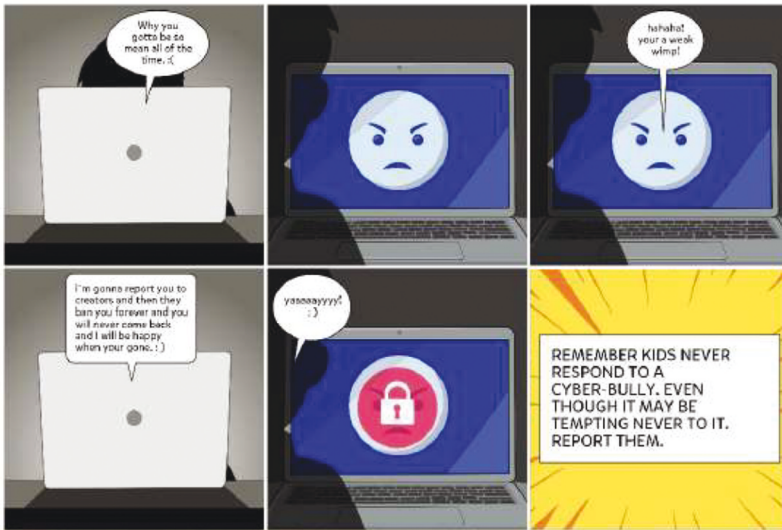


Figure 5. Cyberbullying.

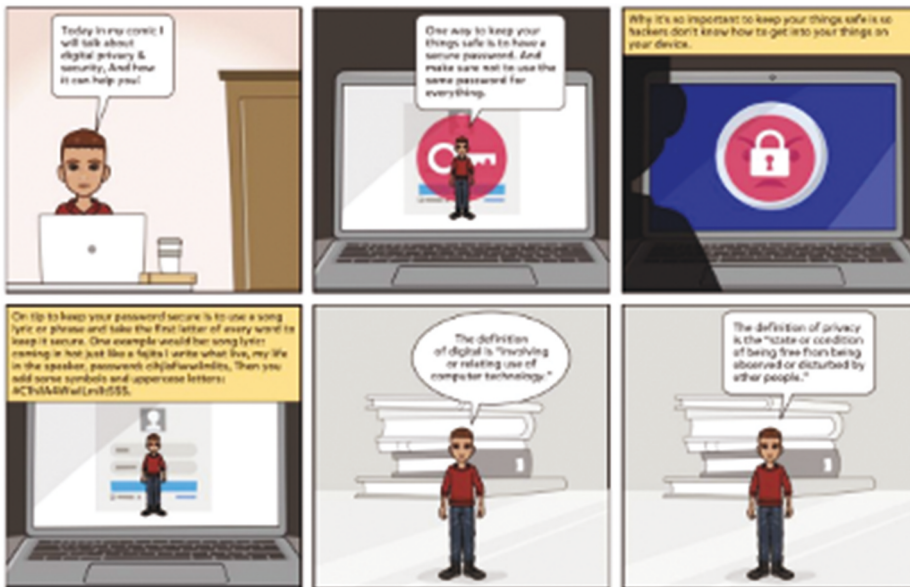


Figure 6. Digital privacy and security.

cyberbullying primarily involves threats, and mean and aggressive messages shared across digital spaces particularly social media platforms. Student O shares “I will not joke in a mean way online”. Additionally, students indicated the need for reporting unusual events they encounter online. One student noted, “if I see something suspicious, I will say something”.

3.4.2. Digital identity and digital footprint

Participants indicated that they would demonstrate responsible online behavior and be mindful of protecting their identities and the trail of data they leave behind from using the internet. Students expressed their awareness of the long-term consequences of digital footprint by describing the risk of their identities being jeopardized if they post or engage in unethical activities online. This includes the information they post on online messaging, social media and gaming platforms. Student Q responded, "I will be careful about the pictures I will post when I get social media". Additionally, respondents indicated that they would refrain from actions and activities that would lead to future consequences such as defamation of personal image and identities. For instance, participant D responded, "Not posting random things because that could lead to bad things when I am older".

3.4.3. Netiquette and responsible online behavior

From the analyzed responses, eight students expressed that they would observe netiquettes by being mindful of how they interact and engage with others online. This includes talking, messaging and asking permission before posting information about other people over the internet. Participants also expressed that it is ethical to ask permission before sharing personal information about other people. One of the responses stated, "I will ask permission before I post pictures with others". Other keywords that were common in this theme were permissions and reduced screen time. Students responded that after the camp, they would be seeking permission from their parents, before accessing the internet and other digital services. Quoting student C that responded, "To ask my parents if I can visit a site online".

3.4.4. Digital privacy and security

Practices corresponding to digital privacy and security were among the prevalent themes in the participant responses. In this category, 27 students described password safety as one of the practices that they would change after the camp. This includes a variety of responses including not sharing password information, creating stronger passwords and changing them regularly. For instance, student P stated, "I will make my passwords harder and change them regularly". Additionally, the respondents indicated that they would be keen on practices that foster privacy, specifically with personal information. Another theme that stood out in this category is being vigilant while using public spaces and digital equipment such as computers and tablets. Student W explained that they would be "logging out after apps in public". Additionally, the responses reflected safe browsing practices such as not clicking on pop-ups and being vigilant with click baits.

3.5. Areas that students enjoy the most about the digital safety immersion experience

Three themes emerged on what the elementary students enjoyed the most from the digital safety camp immersion experience. These included topics, Pixton projects, and instructors and guest speakers.

3.5.1. Digital safety topics

The students indicated that the choice of topics presented at the program was enjoyable and contributed to their overall understanding of digital safety. Seven students highlighted digital footprint, digital identity and cyberbullying as the most interesting topics from those presented by the instructors. One of the students wrote, "Learning about Digital Security, talking to the retired FBI agent, making friends, Ms. E and the teachers, and Pixton, so everything!"

3.5.2. Projects Pixton

Participants were asked about aspects of the program that were enjoyable to them. About 19 participants shared that they found the projects to be interesting and value-adding to their learning process. Pixton comics were the most prevalent topic in the analyzed responses, followed by educational games such as Kahoot, Blookets, and Gimkit. Student V explained "I enjoyed Pixton time and online games like Kahoots and Blookets. My favorite thing to learn about was strong passwords"

3.5.3. Instructors and guest speakers

The prevalent theme in students' responses about what they enjoyed in the program is the contribution of instructors and guest speakers. In this category, 17 students expressed their impressions about the expert guest speakers specifically on how they extended on the content by sharing real-life scenarios on digital safety. For instance, Student V shared "I enjoyed it most when we had guest speakers from the FBI come and talk to us about their crimes and how they solved it". This was an important element in the training program as students got to reflect and make connections to the topics by hearing from experts in the field. Additionally, students indicated that they enjoyed the presentations made by the main instructors in the program. In this theme, students also expressed the program served as platform for them to engage with other people, make new friends, and develop new connections. Some of the responses included "Making friends and the teachers" (Student E), and "hearing from Ms. G" (Student L).

4. Discussion

In this section, we discuss the findings from the digital safety immersive summer camp immersion. Overall, the digital safety immersion camp was beneficial to the elementary school learners based on the achievement, attitude and behavior data that were collected. Elementary students had low prior knowledge on Netiquette and Online Behavior, and Digital Security and Privacy topics in comparison to Digital Identity & Digital Footprint. At the end of the camp, posttest scores were statistically significant from the pre-test. Cyberbullying had the highest pre- and post-knowledge, and the two topics, netiquette and online behavior, and digital security and privacy were comparatively less. This shows the importance of additional instruction on these topics since the students came in with less prior knowledge to begin with and also scored less at the end. In previous studies where middle-school students' perception was collected on some digital safety topics, students had similar perceptions on digital netiquette and on digital security (Martin et al., 2020).

In the post-camp survey that was administered, students were positive and selected mostly agree or agree for three of the items "Camp taught me how to interact safely with people online", "Camp taught me how to protect my private information online", and "Overall, camp taught me how to stay safe online". However, there were seven students who disagreed with the item "Videos helped me understand what can happen if I am not careful online". This shows that even though this was an in-person camp experience, not all students enjoyed learning from videos.

The analysis of the Pixton graphics showed that the elementary learners paid attention to detail and had included several lessons learned from the camp in the comic strips. Students had varied interests on the topics, and the 20 students had chosen among the four topics. While six students had chosen two topics, four students had chosen the other two topics. When analyzing data on what students enjoyed the most, about 19 participants shared that they found the Pixton comic strip projects to be interesting and added value to their learning process. Overall, this was a beneficial hands-on activity for the students to apply their knowledge. Students understood the risks and benefits of healthy digital use and online behavior (Kim & Choi, 2018)

Elementary learners included various aspects that they will change when they interact online. These included items from all four topics and showed students understanding of the topics and how they plan to integrate them into their future online activities. Students discussed not being a cyberbully, thinking about what they post online since it has implications for their future, being mindful about how they engage online, and password and digital device safety. All these four are important topics and elementary students reflected on all four of them thinking about various ways how they change their online behavior. Also, the camp shows the value of educating elementary learners similar to Hollandsworth

et al. (2017) who recommended that digital citizenship initiatives should start as early as preschool and kindergarten.

Finally, to the last open-ended question, the digital safety topics, the Pixton graphics, and the guest speakers during the camp were the highlights of the week-long digital safety immersion experience. Overall, this summer camp assisted in student knowledge, attitude and behavior which are important factors in digital citizenship education (Kim & Choi, 2018). The elementary learners were interested in changing their online behavior and were similar to Kim and Choi (2018) recommendations including instituting self-identity, belief, protection, and healthy digital use.

4.1. Limitations

There were some generalization limitations to this study. First, this study occurred in one urban city in a Southeastern state so generalization to other locations should be considered. Second, although we had 177 students participating in the camps, receiving parental consent to use the data for research was a challenge. For the open-ended questions and the project, there were fewer responses in comparison to the students who completed the knowledge assessments and the post-camp evaluation. In addition, only 60 of the 89 consented students at the university location chose to take the pre- and posttests. It is possible these 29 students are in some ways different and would have responded differently than the 89 who elected to take the tests.

4.2. Implications and future directions for research

The findings from this study contribute to the current literature on preparing elementary school students' knowledge and skills related to digital safety. The multiple data sources in this study provide evidence that the digital safety summer camp contributed to students' knowledge and skills (pretest-posttest data) and students' self-report of their camp experience (survey data). This study brings to light implications that warrant further research. First, the population of elementary school students were signed up by their parents to attend the digital safety camp, and parents were required to provide transportation and the financial means to pay for the camp fees. There is a need to replicate these learning experiences with a diverse population of students, including those experiencing poverty or those with less parental involvement and parental interest in the topic. Further, the pretest-posttest design provides empirical evidence that the summer camp led to an increase in elementary school students' knowledge and skills on the assessment items that the researchers developed based on the content of the summer camp modules. For future iterations of the summer camp, subsequent learning experiences could include more authentic scenarios and cases in order to examine how students transfer

and apply their new knowledge and skills in novel situations that are relevant to their lives as elementary school learners. Lastly, the summer camp experience provided elementary school students with a week-long experience where the content on digital safety was their sole focus and it was isolated from other content. Pragmatically, scaling up the summer camp learning experience to reach more elementary school students is not practical unless the length of the modules and activities are modified. Future studies should consider if and to what extent the length of the learning experience can be shortened while still yielding a statistically significant outcome on learners' knowledge and skills.

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Data availability statement

Raw data are not shared due to the IRB protocol requirements that were used for the study.

Ethics approval

This project received IRB approval at the educational institutions of the researchers involved in this study.

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