Understanding Children’s Perspectives on Computing:
How School Libraries Empower Students Through Technology Infused Curriculum

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Action Research Project

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# Table of Contents

Abstract .................................................................................................................. 3

Introduction .......................................................................................................... 4
  - Significance of Research: .................................................................................. 4
  - Research Question: .......................................................................................... 6

Historical Context and Literature Review ......................................................... 7

Methodology .......................................................................................................... 20
  - Description of the School, Community, and Students ........................................ 20
  - Data Collection Procedures .............................................................................. 23
  - Process of Participation: ................................................................................... 25

Data Analysis and Findings .................................................................................. 29
  - Statement 3 Analysis: “I can use technology to learn new facts” .................... 30
  - Statement 4 Analysis: “I can use technology to think about what I am learning” .................. 34
  - Statement 9 Analysis: “I want to learn more about technology” ....................... 38
  - Analysis of Significance: .................................................................................. 42
  - Statement 1 Analysis: “I can use technology to tell others my ideas” ............... 43
  - Statement 2 Analysis: “I can use technology to create new things” .................. 46
  - Statement 5 Analysis: “I can use technology responsibly” .................................. 49
  - Statement 6 Analysis: “I can be a good digital citizen” ..................................... 52
  - Statement 7 Analysis: “I can use technology safely” .......................................... 55
  - Statement 8 Analysis: “I feel comfortable using technology” ............................ 57
  - Statement 10 Analysis: “I like using technology” ............................................. 60
  - Statement 11 Analysis: Finish the sentence: “When I use technology, I feel…” . 62

Reflections and Recommendations: ...................................................................... 67

Summary and Conclusions ................................................................................... 71

Action Plan: ........................................................................................................... 72

Appendix A “Student Perception Survey” .............................................................. 77

Appendix B “Parental Consent Form” ................................................................... 80

Appendix C “Minor Written Assent Form” ............................................................ 83

Appendix D “Second Grade Library Technology Curriculum Map” ....................... 85

Works Cited ........................................................................................................... 94
Abstract

In the 21st century, libraries are often under scrutiny to determine their value and worth. By aligning the school library curriculum with the goals of the school district through the integration of technology instruction, school libraries will be able to impact student learning and demonstrate the validity of school libraries. Establishing the library as a participatory space for implementing, designing, and creating new ideas and conversations will empower and engage student learners. Blue Ridge CUSD 18 has situated itself as a leader to make these opportunities possible, and it is important to actively research and collaborate to identify the best way to move forward to continue providing students with the skills necessary to use and engage with technology.

For many rural districts, being able to provide students with access and resources to engage in a digital world are also vital for providing access and addressing the digital divide. Often rural students are left out of being able to participate online because they lack the resources to connect at home or the district cannot afford the tools necessary to make online engagement possible. As Melissa P. Johnston states, “despite the increase in digital technologies for teaching and learning, scholars still indicated very little inclination to conduct research in this area” (Johnston, “Still Polishing” 27). Therefore, this action research project is part of the larger agenda to highlight how integrating technology into the school library curriculum can impact students. The research adds to the growing area of focus and highlights the library as a jewel of the educational system as school libraries empower learners. At Ruth M. Schneider elementary school, this research was best accomplished by assessing the integration of technology into the library curriculum as the faculty and staff collaborate with the district librarian to develop a technology curriculum map. This effort was supported by the district superintendent, elementary principal, and district curriculum coordinator.

The fundamental research question “How does technology integration in rural, elementary school library curriculum impact second grade students?” sought to understand the library as a participatory space for implementing, designing, and creating new ideas and conversations, and to understand the impacts of empowering students as creators. Twenty-seven second grade students self-assessed their engagement and feelings about the library using a pre and post-test model. The research investigated how integrating technology into the school library impacted students.

The pre-self-assessment survey was given early in the second semester to second grade students and provided a gauge for how students felt about using technology prior to their experiences during computer instructional time. The second survey, the post-self-assessment, was given during the end of the second semester after the second grade students had engaged with various online tools. The two surveys were compared and analyzed to develop an understanding of children’s perspectives related to students’ computing experiences with computers in the elementary school library. The results determine the impact of computing experiences on student learning, assist rural elementary school librarians in understanding the strengths and weakness of integrating computer instruction into library curriculum, and aid in the development of a standards-based curriculum map.
Introduction

Significance of Research:

In the 21st century, libraries are often under scrutiny to determine their value and worth. By aligning the school library curriculum with the goals of the school district through the integration of technology instruction, school libraries can impact student learning and demonstrate the validity of school libraries. By seeking to establish the library as a participatory space for implementing, designing, and creating new ideas and conversations students become empowered and engaged learners.

At Ruth M. Schneider elementary school, this research was completed by assessing the integration of technology into the library curriculum as the faculty and staff collaborated with the district librarian to develop a technology curriculum map. This effort was supported by the district superintendent, elementary principal, and the district curriculum coordinator. Additionally, the action research project was tied to the district’s mission statement and current focus on technology and curriculum needs. As a rural district, being able to provide students with access and resources to engage in a digital world are vital for providing access and addressing the digital divide. Often rural students are left out of participating online because they lack the resources to connect at home or the district cannot afford the tools necessary to make online engagement possible. However, Blue Ridge CUSD 18 has situated itself as a leader to make these opportunities possible, and it is important to actively research and collaborate to identify the best way to continuously provide students with the skills necessary to use and engage with technology, so they can become empowered learners.

In addition to the rural district’s focus on technology, the American Association of School Librarians (AASL) recently developed new standards to which libraries should map their curriculum and the International Society for Technology in Education (ISTE) standards for
students have been updated to reflect the changes in the technology needs of students. Therefore, as the district continues to move forward to meet its goals, the library can utilize this research to establish its integral role in providing instruction and technology for students. Furthermore, “school library researchers from around the world agree that additional research is needed to determine what effects school library programs have on student achievement” (Gavigan 38). Currently, there is a growing trend to research the impact of school libraries on student achievement, but there is much more to be done. As Melissa P. Johnston states, “despite the increase in digital technologies for teaching and learning, scholars still indicated very little inclination to conduct research in this area” (Johnston, “Still Polishing” 27). Therefore, this action research project is part of the larger agenda to highlight how integrating technology into the school library curriculum can impact students. The research adds to the growing area of focus and highlights the library as a jewel of the educational system as school libraries empower learners.

By “empowering students to be creators they will be encouraged to become increasingly self-directed as they create digital products of their learning that engages them in critical thinking, collaboration, and authentic, real-world problem solving” as described in the “Empowers Students as Creators” category of the Future Ready Librarians Framework (FRS_Librarians 2). This practice is also reflected in the AASL Standards Framework for Learners (AASL-Standards 4). Through increased incorporation of technology instruction based on this ideal and the AASL standards, student engagement, participation, and success will increase as students learn digital skills, and the library will be situated as an integral part of the schools’ system. To help understand where Blue Ridge CUSD 18 is situated, a study was
conducted where two self-assessment surveys to were given to assess the impact of computing experiences in the library on student learning.

Currently, student computer instruction is often lacking in rural school libraries. Often, student computer instruction is simply having students go on Lexia (a research-based reading program) or Zearn (an online digital platform for mathematics instruction) with little teacher led instruction or development. Furthermore, student computer instruction is not mapped out, tied to curriculum, or aligned to standards. By having students use the technology tools, mapping out a curriculum with teachers, and aligning the curriculum to the standards, rural elementary school libraries will have a better understanding of the implementation process and a rationale for integrating technology into the library curriculum. Further, by assessing the pre and post self-assessment surveys, school librarians and teachers will have a better understanding of the best tools and methods to use with students to engage them in learning and participating in online communities. This wider context leads to this study’s research question.

Research Question:

The fundamental research question of this action research project is “How does technology integration in rural, elementary school library curriculum impact second grade students’ computing experiences?” For this study to assess this research question, technology integration is defined as the process of integrating computer and technology instruction into the curriculum. Whereas, computing or “the action or practice of using computers” relates to individual student interactions with computers (“computing” 1). Therefore, for this study, technology integration and computer instruction are assessed through the lens of students’ computing experiences. By surveying students’ perspectives on computing, the research topic assesses the impact of technology infused library curriculum on rural, elementary school student learning.
The overall purpose of the study was established with the goal of empowering students as creators. The research seeks to examine the library as a participatory space for implementing, designing, and creating new ideas and conversations. By surveying twenty-seven second grade students and assessing their engagement and feelings about the space and activities within it, the research will show how student computing experiences in the school library impacts students. By understanding students’ perspectives on computing, this fundamental question will help inform the design of future technology integration and computer instruction in school libraries by assisting rural elementary school librarians in determining the opportunities and challenges of integrating technology into the library curriculum.

Throughout the study, the research team expected students who were engaged with technology instruction, digital products, Science Technology Engineering and Math (STEM), coding, and makerspace resources would feel empowered as creators. The team expected students would feel as though they had more of a voice in a participatory environment. Overall, the research team sought to examine the library as a participatory space for implementing, designing, and creating new ideas and conversations.

Historical Context and Literature Review

Historically, elementary school library research has focused on the need for elementary libraries and the importance of staffing them with certified librarians overseeing collection development (Gaver vii). While much research continues to be released regarding the role of school libraries, conversations about the services provided by the library have continued to evolve (Johnston, “Still Polishing” 9). Threads of research have emerged regarding the increased use of technology in school libraries and the installation of computer labs (Morris 22).
Recently, an emphasis has also been placed on ascertaining the link between libraries and student achievement (Johnston, “Still Polishing” 22).

These threads are all connected by a desire to understand student learning and technology use in the school library environment. The research focuses on assessing the value of participatory culture to engage students in their learning and the impact of learning on students’ understanding and their perceptions of themselves. By examining the history of the conversation surrounding libraries and technology, researchers can see how digital tools can impact students’ understanding and perceptions. They can see how emergent technologies move elementary students beyond being consumers towards becoming digital creators. Overall, by understanding the role of the elementary school library and student perceptions, researchers can see how libraries have changed from being centralized locations of information to creative spaces of innovation.

As early as 1963, librarians were researching the importance of having centralized elementary school libraries. In her book, *Effectiveness of Centralized Library Service in Elementary Schools*, Mary Virginia Gaver and her team of researchers sought to develop a plan to evaluate the value of a centralized elementary school library collection and a certified librarian. Gaver’s study demonstrated the importance of having a central location for resources which students could access to obtain knowledge and understanding (Gaver 119). The focus of the data collection was on things, materials, and services and less on the impact of student achievement, success, or comprehension. Indeed, there was little mention of the students’ perceptions or analysis of their learning.

The Gaver case was the standard practice for many years in school library research. Forty years later, in Delia Neuman’s article *Research in School Library Media for the Next*
Decade: Polishing the Diamond, she revisited the research of the past years and developed a vision for the future of elementary school library research. In this vision, she advocated for future research to address four essential questions which would allow school library research to not only focus on the need for effective school libraries but would tie the library program directly to the educational focus of the school (Neuman 504). In an analogous comparison of the library to a diamond, she suggested her four questions were the four sides to the diamond (504). By focusing on the “direct relationship of library media programs and library media specialists to learning,” library science would be able to “advance its own theory and practices” and contribute to “the field of education as a whole” (Neuman 517-518). Rather than seeking to justify the creation of a centralized elementary library, Neuman pointed the conversation towards student learning and achievement.

In 2013, to measure the progress of Neuman’s research vision, Melissa P. Johnston and Lucy Santos Green examined all school library media research conducted between 2003 and 2013 in an extensive literature review. In their aptly entitled article Still Polishing the Diamond: School Library Research over the Last Decade, they sought to examine school library research under the lens of Neuman’s diamond analogy, determine any gaps, and provide a focus for future research (Johnston, “Still Polishing” 2). Through their systematic review, they found 11 percent of the studies focused on the impact of student achievement, while 52 percent of the studies related to the role of the school library media specialist (21, 23). Their study also reviewed a change in the focus of how school libraries addressed electronic devices and technology use within their programs, and noted an “increase in the use of the school library space for computer labs, technology-rich learning activities, and an increased desire on the part of K-12 students to use the library as a physical spot for interacting with their own devices” (24). However, only 5
percent of the articles in their review “examined technology-enabled learning occurring in the school library space for evidence of its impact on student learning” (25). Johnston and Green concluded there was a need for “research on technology-enabled learning conducted by school library researchers” to “measure methods over media, discovering what pedagogical components or learning structures supported by technology are best suited to foster student learning and, consequently, are most worthy of school librarian’s efforts and program investment” (25). Libraries as spaces and the role of librarians are both important to understand, but future research must connect student learning, understanding, and perceptions of knowledge and technology to fully understand the effectiveness of school libraries and align them with the values of the field of education.

In Karen Gavigan’s Knowledge Quest article School Library Research from Around the World, she reiterated what Johnston and others had found. She revealed the focus of new trends in library research regarding “advocacy, collaboration, impact studies, reading and reading programs, and technology” (Gavingan 34). Under the technology category, her team of researchers found articles specifically regarding digital learning resources, technology integration, digital storytelling and digital textbooks and gaming (36). While still indicating a desire to research the role of librarians in these technology endeavors, Gavingan also stated, “school library researchers from around the world agree that additional research is needed to determine what effects school library programs have on student achievement” (38). Once effective, centralized libraries had been developed, researchers wanted to see how libraries impact students. The conversation moved away from Gaver’s original message of needing research regarding the establishment of a centralized library space and now librarians called for research to connect school libraries and student success.
The research revealed a need to not only investigate the role of the school librarians, but also the impact libraries and librarians have on student achievement, learning, and understanding. In 2001, Keith Curry Lance, Director of the Library Research Service at the Colorado State Library collaborated with the University of Denver to publish *Proof of the Power: Quality Library Media Programs Affect Academic Achievement*. The study indicated school libraries impact student achievement by clearly using the data to show schools with libraries “almost always outperformed” schools without libraries (Lance 20). The Colorado study was and is a landmark study in affirming the importance and impact school libraries have on academic achievement. Fortified by the Colorado findings, similar research studies were conducted across the nation from New York to Illinois to Oregon (Loertscher, “Keeping Up” 6-8). Research highlighting the connection between student achievement and school libraries continued to build and Scholastic published their compilation of research in 2016 called *School Libraries Work! A Compendium of Research Supporting the Effectiveness of School Libraries*. While the research was conducted separate and apart from the Scholastic corporation, the compilation of research gathered into one document strengthened the theory that school libraries impact student achievement.

However, studies often monitored reading test scores, national tests, and the role of the librarian rather than directly focusing on student perspectives and learning within the library space. In studies where student perspectives were addressed, such as the study conducted by the Baltimore Education Research Consortium (BERC), the focus centered not on individual student learning, but rather analyzed how principals, teachers, librarians, students, and community partners perceived the library space (Sheldon 6). While the BERC Library Project findings
encouraged further development of the library as a space for learning, more research was still to come regarding the impact of the learning occurring within these creative learning spaces.

Other studies assessed perspectives by investigating how teachers and administrators viewed the library and the role of the librarian within their schools (Branch-Muller and DeGroot 25; Subramaniam et al. 161; Massey et al. 389; Johnston, “School Librarians” 1). In Jennifer Branch-Mueller and Joanne DeGrott’s study, they measured the educators’ levels of confidence in using Web 2.0 technologies, but not the students’ experiences (Gavigan 36). While setting standards for measuring and surveying perceptions, the studies only accounted for the librarians’ and educators’ perspectives and did not reveal the students’ understandings of computing. These examinations left out the question as to whether students were comfortable using technology, whether students themselves felt tech savvy, and whether students knew what to do with the technology available at their fingertips.

To obtain student perspectives, Halit Karalar and Sabri Sideli specifically asked second grade students how they felt about using tablets (Karalar and Sidekli 966). Their research showed students had positive perceptions regarding tablet use, preferably for entertainment, though the research team believed “students’ positive attitudes and interests [could] be transferred into educational purposes” (970). The research team concluded, “students are ready to work with tablets in the classroom” and future research could be conducted in rural areas (970). The research suggested an investigation into how rural elementary students perceive themselves as users of technology before and after integrated technology instruction would enable researchers to affirm their theory. These developments set the stage for libraries to conduct research into investigating students’ understandings and perceptions of computing within rural, elementary school libraries.
In conjunction with this conversation regarding student perspectives on computing and how libraries impact student learning through technology infused curriculum, it is important to reflect on how technology instruction has evolved. At first, technology was used to for productivity and drilling knowledge rather than building knowledge and creation. Since the initial integration of technology into the classroom, the mindset has shifted as educators gain confidence using technology and seek to use technology to allow students to represent understanding rather than memorization (Jonassen 10-11). A constructivist framework allowed educators, librarians, and technology instructors to engage students in using interactive Web 2.0 computing tools. As students’ and educators’ confidence in using the technology tools grew, researchers wanted to know how computers would help students think, grow, and authentically experience meaningful learning through the integration of technology into the curriculum (Keengwe et al. 46).

During early implementation of computers into the classroom, the need to understand student perceptions towards computing was not the first inclination of many technology researchers. Instead, the preliminary research focused on determining the benefit of using technology tools (DiBella and Williams 75). As early forms of technology were pushed into schools, texts such as Larry Cuban’s *Oversold and Underused* argued schools were flooded with computers they did not need and were not able to adequately use (Cuban 178). The central research question was “Does technology really make a difference?” (Loertscher, “Does Technology” 48). The debate even incited tech-giant Cisco to launch its own investigation into the effectiveness of technology in schools. Their report “Technology in Schools: What the Research Says” pushed back on the idea of schools not needing technology for educational purposes. And while biased from the technology creator’s perspective, the report did bring to
light emergent trends in educational technology use and encouraged more studies to develop reliable assessments on the value of using technology to facilitate student learning and understanding (Fadel and Lemke 4).

To understand how technology could be integrated to achieve a positive impact on students, educators began testing various ways of integrating technology into their classrooms. One technology integration plan opted for a “bottom-up” approach where students were trained in using the technology in the library first and then transferred their skills to the classroom (Hruskocy 12). Educational and technology researchers eventually began to delve into the question by surveying teachers and students to learn their perspectives towards integrating technology into the school curriculum. Some research questioned the benefit of incorporating mobile tablets (Miller 58). While others investigated the impact of using blogs and digital video technology to provide language instruction (Chuang and Rosenbusch 871; Al-Qallaf and Al-Mutairi 523). These explorations moved the conversation from educators asking, “do we need technology?” to educators asking, “how does technology facilitate learning”? (Jonassen 10). As educators began to see technology as more than a productivity tool, they were finding technology could transform the educational landscape.

While the methods of incorporating technology often varied from teacher to teacher. In the book Amplify by Katie Muhtaris and Kristin Ziemke, the authors state, “technology is as transformational as we make it. It’s not the tool that counts’ it’s what we do with it” (Muhtaris and Ziemke 13). While articles describing the best apps and websites to use in the classroom such as “Back to School with Best Apps” continually appear in magazines such as School Library Journal, educators have realized it is not about the individual technology tools (Ishizuka 20). Rather it is about the learning process and the discoveries and conversations made along the
way (Muhtaris and Ziemke 34). Rather than transferring pencil-and-paper activities to digital devices, teachers want to augment their students learning experiences (112). In seeking ways to integrate technology tools, it is paramount for educators to engage students with the learning.

As educators sought to find ways to transform the learning experiences for their students, one of the best strategies for them to see how the technology impacted students was by asking students to share their experiences. Qing Li investigated student and teacher perceptions of technology integration into schools and found “technology may help weak students…by increasing their confidence level,” indicating technology integration into math and science curriculum improved students’ learning experiences (Li 292). Similarly, Leow and Neo investigated the constructivist-collaborative learning environment and through an analysis of students’ perceptions found the collaborative nature of Web 2.0 platforms enhanced student learning (Leow and Neo 325). In 2019, using teachers’ and students’ perceptions of technology instruction in elementary classrooms to identify characteristics of good teaching, a research team found technology integration should following content knowledge and pedagogical knowledge (Han et al. 114). Furthermore, the research showed “seamless integration is only possible when students actively engage in the learning process” and “technology is employed to facilitate meaningful interaction, respond to individual learners’ needs, and nurture a respectful environment” (114). The research revealed a profound impact on student learning when technology is respectfully infused into school curriculums.

As technology is embedded in curriculums, the question then arises to how libraries are involved in this transformative, technological learning. The merger of learning new technologies and building knowledge through integrated technology instruction in the library is where conversations regarding the historical role and the future role of the library begin to intertwine.
R. David Lankes was one of the first to investigate this new connection in his *Atlas of New Librarianship*. In the *Atlas*, he states libraries are “about learning, knowledge, and social action” (Lankes 1). Librarians are called to navigate this new world in which libraries are centered and calls librarians toward the practice of participatory librarianship (2). The *Atlas’s* central focus reverberates around the concept that “the mission of librarians is to improve society through facilitating knowledge creation in their communities” (13). This key concept of conversations, perspectives, and understanding is at the core of what school library researchers are challenged to investigate. “Conceptualizing school libraries as knowledge commons and not information places shifts the instructional program from accessing and locating and evaluating information, to providing students with the essential knowledge-developing competencies” (Todd 30).

The new research focus is less about the role of libraries, materials, collections or even things. It is now imperative to question how the library can contribute to the facilitation of knowledge within its community. Lankes asks librarians to question whether students are learning how to create knowledge, because it is the central mission of the library, not things or books or materials. Librarians want students to reflect on what they are learning by having students create and demonstrate their understanding. To achieve this goal, librarians can measure students’ views, competence, and assess them on completion of these tasks (Varner et al. 355). By evoking librarians to accept this new mission, Lankes’s *Atlas* shifts the focus onto learning.

By combining information literacy and technology skills, librarians can emphasize participatory learning by embedding technology into the library curriculum. For example, one research team demonstrated the integration of technology could foster learning by assessing 27
unit plans for incorporation of technology into instruction and found technology tools could be effectively integrated to promote student learning objectives and student learning (Palakk et al. 364). While the units they investigated resulted in variation by individual teacher and style, the successful integration of technology into the curriculum fostered student learning. Librarians can replicate these practices for technology integration by aligning library curriculum units to the National School Library Standards for Learners, School Librarians, and School Libraries, state standards, and ISTE standards for students. By embedding technology instruction, librarians can build technology rich curriculums which promote student learning. This process enabled one school librarian, Mary Lou O’Conner, to empower her first-grade students (O’Conner 18). The results allowed “students hungry to learn … to gain the knowledge and understanding they need to apply technology to become fully digitally literate citizens” (18). By utilizing Lankes’ map and aligning library technology curriculum to standards, libraries are no longer engrossed solely on centralized collections and services, but rather on the conversations surrounding knowledge creation.

As the vision of the centralized library and librarian has shifted over the last sixty years, libraries continue to be spaces of conversation, collaboration, and creation. Now new research needs to be conducted which addresses the best methods to incorporate technology in the school library and more conversation is needed to understand the impact on students (Hew and Brush 247). One method of researching best practices would be to examine the factors which impact learning in technology infused classrooms (Baylor and Ritchie 396). For example, in one study, researchers investigated virtual reality’s impact on 27 elementary school students (Han 420). In Henry Jenkins’s MacArthur Foundation study, “Confronting the Challenges of Participatory Culture: Media Education for the 21st century,” the research team outlined obstacles and benefits
to using new medias to foster participatory learning (Jenkins and John D. and Catherine T. MacArthur Foundation 3). In another work by Jenkins, *Reading in a participatory culture: remixing Moby-Dick in the English classroom*, the educators combine traditional literature and reading classes with innovate technology which enabled the students to create knowledge.

Other schools have introduced Genius Hours in the library, STEM Labs, and makerspaces outlaid with the latest technology, robots, and software to engage students in creating knowledge (McCoy-Parker et al. 100; Kilickaya and Krajka 161; Rush 26). While others have investigated the attitudes and perceptions of student learning through the implementation of an integrated STEM robotics curriculum (Ching et al. 590). Educators and technology innovators are seeking the best methods to improve student learning through the integration of technology into the curriculum (Övez and Kiyici 160; Marttinen et al. 206). By understanding these perceptions, technology integration barriers can be overcome and pedagogically sound, technology rich curriculums can emerge.

Researchers’ investigation of the impact of these views and policies on students allows them to analyze the implementation of participatory, knowledge creation activities in the library and classroom (Hopkins et al. 12). As the research continues, the question becomes less about the role of the librarian and the library and more about how students perceive themselves as users of library technology (Karaca 56). By reviewing students’ perceptions of technology use in the library, researchers can evaluate the library’s role in impacting students’ perspectives towards computing and can analyze the students’ perceptions of computing as learners and creators (Wishart 346; Ngan et al. 268). Attempts to allow for student voice will “effectively contribute to the optimization of the learning experience and the fostering of a setting where digital natives will share the same language with the teachers” (Neokleous 127). Together students, teachers,
and librarians can converse about what they are learning through enhanced technology instruction.

“The implementation of digital learning has changed the potential of school librarians and libraries” (Wolf et al. 1). The shift in use of technology as a transformative tool allows “school libraries [to] become sophisticated 21st century learning environments that offer equal opportunities for achievement to all students, regardless of the socio-economic or educational levels of the community” (1). They are spaces designed for collaboration and participatory endeavors where students can create and share new ideas. The authors of the Alliance for Excellent Education report metaphorically described the shift by stating, “libraries used to function more like grocery stores, but now their role more closely resembles that of kitchens” (6). Libraries are no longer only storehouses of stocked goods. Instead, they continue to be spaces of creation and innovation where students can access new recipes to mix and remix ideas and create knowledge.

As librarians seek to engage students with new tools which allow them to engage in the learning, researchers must strive to understand the impact the technology tools have on the learner. The conversation should continue to examine the question as to whether students feel comfortable using the technologies, whether students feel tech savvy, and whether they feel they know what to do with the technology available to them. By focusing on the answers to these questions, libraries will be able to connect library media programs and librarians and “show the centrality of student learning to the library media field, polishing the diamond and increasing the value of the library media programs both in their own right and within the larger field of education” (Neuman 517). This measurable impact will allow librarians, teachers, administrators, and researchers to understand the value of the library as a space for technology instruction and its
significance in contributing to student achievement and success. To address this gap in the conversation, this action research project examined children’s perspectives and experiences of technology integration within an elementary school library.

Methodology

Description of the School, Community, and Students

Ruth M. Schneider Elementary is the PreK through 3 building for the rural, consolidated Blue Ridge Community Unit School District 18. Schneider Elementary is a small, rural school in Illinois and serves approximately 244 students who reside in the counties of DeWitt, Piatt, and McLean. According to the 2018-2019 Illinois At-A-Glance Report Card, the student body is 93% white, 1% black, 2% Hispanic, and two or more races 3% (Illinois Report Card 1). Of these students, 42% receive free and reduced lunches, 18% have an IEP, and 1% of students utilize ESL services (1).

The Ruth M. Schneider elementary school library is in Blue Ridge CUSD 18’s PreK through 3rd grade building. The Titlewise collection analysis reports the library includes a collection of 12,098 books with an average age of 1992, 36% of the collection is fiction, and 64% of titles are nonfiction. The library also houses a computer lab of 25 Chromebooks which are connected to the district network. The library is managed by the Blue Ridge CUSD 18 district librarian who provides information literacy, digital literacy, and media literacy instruction and services for students in grades K through 12. The district librarian meets with K through 3rd grade students once a week for 25 minutes for direct instruction. A library clerk provides daily management of the library by overseeing circulation and cataloging. Students have weekly checkouts, use the library for Accelerated Reader, and twice a week have 25 minutes of computer lab time.
The PreK-3 school library is in the Ruth M. Schneider Elementary School in Farmer City, IL. The surrounding area is rural and composed primarily of farming communities. Blue Ridge CUSD 18 is the largest employer in the area with three schools. For many families, the parents are employed in either Bloomington-Normal or Champaign-Urbana. Local job opportunities and school-work experiences are limited. Since there are no county seats within the school district, area families are eligible for some health and mental health services, but other supports are limited.

As a consolidated school district, Blue Ridge CUSD 18 spans 212 square miles in three counties: DeWitt, McLean, and Piatt, and includes three rural communities, Farmer City, Mansfield, and Bellflower. Each community has its own public library services provided by the Farmer City Public Library, Blue Ridge Township Library, and Bellflower Community Library. While the Blue Ridge CUSD 18 school libraries (Blue Ridge High School, Blue Ridge Intermediate Junior High School, and Ruth M. Schneider Elementary) and Farmer City Public Library are in the Reaching Across Illinois Library System (RAILS) library consortium, the Blue Ridge Township Library is a member of the Illinois Heartland Library System (IHLS). The Bellflower Community Library is not part of either system.

Blue Ridge CUSD 18’s mission states “Blue Ridge Community Unit School District 18, in partnership with our students, parents, and the community, will promote individual and shared excellence for all students by providing every child the opportunity for a quality education in a safe, supportive learning environment in order to cultivate the knowledge and skills that will enable them to become lifelong learners and productive, well balanced citizens.” As a part of this mission, the district has been working to integrate technology, provide opportunities for students to gain 21st century skills, and align the curriculum with state and national standards.
Blue Ridge CUSD 18 has been incorporating technology consistently for the last two decades by offering networked computer labs in every school, providing network connections in all classrooms, and employing a technology director and teacher. Since 2000, the district has employed a technology director and provided technology professional development to faculty and staff, and installed SMARTboards or LCD projectors in most classrooms. Faculty and staff consistently have access to Chromebooks, iPads, computer tablets, and laptop computers. PreK classrooms have access to tablets, K-2 grade classrooms have ASUS tablets and Chromebooks, and 3rd through 12th graders are 1:1 as Chromebooks are individually assigned to students.

For the 2017-2018 school year, the district committed to the Future Ready Schools Initiative and employed a curriculum coordinator. The curriculum coordinator has worked with each of the buildings to map curriculum to the standards and update and adopt new curriculums which incorporate online resources and materials such TCI (an engaging K-12 science and social studies curriculum with stimulating online educational components available at https://www.teachtci.com/) and the Code.org introductory course in computer science (www.code.org). Efforts have also been made to incorporate more STEM curriculum by providing opportunities for students through the Students Involved with Technology (SIT) conference, coding instruction, and teacher STEM professional development. As the opportunities and STEM instruction are being incorporated, it is essential to have the technology curriculum aligned and mapped to the ISTE and AASL standards. This will ensure high quality education for the students and enable educators to assess and avoid gaps in student learning.

Therefore, the Blue Ridge CUSD 18 technology coordinator, district curriculum coordinator, district librarian, and administrators have a vision to provide a map for technology curriculum and instruction. The Blue Ridge CUSD 18 district librarian, Ruth M. Schneider
elementary administrator, Blue Ridge CUSD 18 district curriculum coordinator, and K-3 teachers are collaborating to develop a K-3 technology curriculum map tied to the once a week 25-minute K-3 library skills instruction time and twice weekly 25-minute sessions of computer lab time. By aligning these instruction times and opportunities with the *National School Library Standards for Learners, School Librarians and School Libraries*, and the ISTE Standards for Students, the district aims to raise the bar for student empowerment.

**Data Collection Procedures**

To investigate student perceptions, the *Understanding Children’s Perspectives on Computing* research team set up an action research plan for Blue Ridge Community School District 18’s elementary school library located at Ruth M. Schneider Elementary. With approval from the University of Illinois at Urbana-Champaign Institutional Review Board (IRB), a pre-and post-self-assessment survey approach was designed and implemented at the beginning and end of the spring semester. Students would be given a paper copy of the self-assessment survey to complete with paper and pencil. After completion, student answers to the self-assessment would be entered in a Google Form for data collection and exported to Excel for analysis.

The self-assessment survey was comprised of ten statements to which students could respond using a visual scale informed by a Likert scale and one open-ended question about technology (see complete self-assessment survey in Appendix A). For the visual scale, emoticons were used in place of numbers to aide students in associating emotions connected to their perceptions of using technology. The self-assessment choices students had for each statement were “I cannot,” “I can do it with help,” “I can do it by myself,” and “I can teach someone how.” The self-assessment reflections were the same for the first eight questions, and modified for questions nine and ten which both read “I do not,” “I have questions,” “I want to learn,” and “I want to teach” and “I do not,” “I have questions,” “I like technology,” and “I love
technology.” Statement eleven was an open-ended sentence where students were directed to complete the phrase, “When I use technology, I feel…”. The open-ended sentence allowed students use their own vocabulary to share their feelings toward technology. By allowing students to self-assess their confidence levels in using technology, the research team would be able to understand the impact of the library and librarian on students’ computing self-confidence.

At first, the team considered asking students to rate their perception of competence in using the specific technology tools used during library instruction. Their ratings would be a self-assessment of competence and whether they felt comfortable using the new technology. However, in the process of developing the self-assessment survey, the researchers realized they were more interested in knowing how students felt about using technology to create, share, learn, and reflect. Therefore, instead of asking students if they could use World Book Online, the self-assessment survey was designed to ask students if they could find information online. Instead of asking students if they could use Flipgrid, they were asked if they could create and share their ideas online. These questions enabled the research team to engage with bigger concepts than simply asking if a student knew how to use a specific tool.

With these broader questions, the team could analyze students’ perceptions rather than competence using specific technology tools. This alteration allowed the team to evaluate how students perceived themselves as technology users as they interacted with a variety of tools within the library setting. Therefore, the results of the study and students’ answers do not measure competence, mastery, or provide an overall assessment of their skills. The results though do show how students’ perceptions of technology, use of technology, and confidence were impacted through shared learning experiences in the library classroom. This reflection on
their understanding is a key element in understanding the impact of the library and librarian on students’ success and achievement.

**Process of Participation:**

Once the concept of the action research plan for *Understanding Children’s Perspectives on Computing* project was developed, the research team could move forward with examining how young children (second graders) understand computing and how library instruction in computer use impacts their perception of their computer skills. The *Understanding Children’s Perspectives on Computing* research team submitted a research proposal and received Internal Review Board approval from the University of Illinois Urbana-Champaign Office of the Vice Chancellor for Research. The action project as described in the IRB submission involved having students take two surveys, one administered prior to technology instruction and one administered post-instruction. The application included an explanation of the research process and letters of support from the elementary principal, curriculum director, and superintendent. There was no renumeration provided to anyone at any point.

Once approval was received, the survey was administered in two identical sessions where students were asked to rate their level of skill with various computing tasks. By administering the same survey after students attended library technology and computer instruction, the researchers sought to gain an understanding of the change in students’ computing perceptions. By assessing the change before and after technology instruction, the research team would be able to evaluate library instruction techniques and develop strategies to better educate children in technology and computer skills.

Students were invited to participate through a letter sent home to parents and guardians which included a parental consent forms [see the consent form in Appendix B]. Parents and guardians were able to review the permission documentation and sign the consent form at home.
Guardians who had questions could contact the lead researcher or librarian with additional questions or concerns. Students who returned a signed permission form were invited to participate. To emphasize participation would not impact the students, the librarian read the following statement from the assent form: “This is a research study to learn more about what 2\textsuperscript{nd} graders think about computers and what you can do with them. We are interested in what students like you think. But it is totally fine if you do not want to do this, or if you change your mind later and want to stop. Even if your parents [guardians] said yes, you get to decide yes or no. This is separate from your school work and won’t impact that at all. If you don’t want to, you’ll be able to do free reading when we do the survey, and it will be no problem” (see the assent form in Appendix C). If the student chose to participate in the survey, they signed an assent form and were given the survey to complete. For the second survey, students were again invited to participate. If they agreed, then they completed the survey. Students who did not have a permission form or declined to sign the assent form had the opportunity to participate in free reading in the library while the survey was being administered, which was a standard activity for students at this school who complete work early.

During the first regular class visit to the library in the spring semester, students who had returned parental consent forms were asked to complete a ten-minute survey on how they felt about technology. Prior to completing the survey, the librarian provided instruction to students on why the survey was being administered, what they needed to do to complete the survey, and explained how the rating system worked. For example, a sad face meant they could not use technology, a questioning emoji meant they had questions about technology, the smile indicated they could use technology by themselves, and the sunglasses meant they could teach someone
how to use technology (see Figure 1).

<table>
<thead>
<tr>
<th>I can not</th>
<th>I can do it with help</th>
<th>I can do it by myself</th>
<th>I can teach someone how</th>
</tr>
</thead>
<tbody>
<tr>
<td>😞</td>
<td>😕</td>
<td>😊</td>
<td>😎</td>
</tr>
</tbody>
</table>

Figure 1: Example of student self-assessment survey visual responses

The survey consisted of ten questions using a visual scale informed by a Likert scale design for evaluation and one open ended question about technology (see full self-assessment survey in Appendix A). Students were instructed to read the sentence and circle the statement and face which best matched how they felt about the sentence. The four choices were “I cannot,” “I can do it with help,” “I can do it by myself,” and “I can teach someone how.” These choices were the same for the first eight questions, and modified for questions nine and ten which both read “I do not,” “I have questions,” “I want to learn,” and “I want to teach” and “I do not,” “I have questions,” “I like technology,” and “I love technology.” The open-ended sentence for them to complete started “When I use technology, I feel…”.

Emoticons were used instead of numbers to help students associate emotions connected to their perceptions of using technology. The open-ended sentence allowed students to insert their own word choice into the survey to indicate their overall feeling in respect to technology. The content students provided in this section enabled them to express their own thoughts and reactions to the anticipation of using the new technology and their reflection after using the technology.

Students who were willing to participate were given a survey to complete with a unique indirect identifier, so student names were not attached to the form. Students then completed the form individually. The only assistance given was reading or defining terminology, otherwise,
they were self-directed. When those completing the survey were finished, they joined the others in independent reading. All surveys were returned to the district librarian, no one else had access to the materials, and no student names were linked to the indirect identifier beyond a key accessible only to the research team.

Once the paper surveys were collected, the district librarian entered responses into a Google Form to be recorded. Over the next few months, students were introduced to various new technology tools. During the following library instruction times, students were instructed on how to access the library catalog and e-book platform to access materials and given time to practice using the tools. They were introduced to the Google Extension Stop Motion Animator which allowed them to create stop motion videos using Chromebooks. Students were also instructed in how to use World Book Online, an online encyclopedia reference database and given time to conduct research. The other types of tools students were introduced to were Flipgrid videos and Ozobots. Flipgrid is a secure website were students record individual videos, and Ozobots are small robots students can program using black, red, blue, and green markers. For each of these tools, the district librarian provided tutorial instruction, planned literacy lessons tied to the tools, and allowed time for students to practice using the tools.

After learning how to access online library resources, make stop motion videos, research using an online database, record their reflections, and program Ozobots, students were asked to complete the same self-assessment survey as a follow up to their instruction. As before, students who did not have parental permission or declined to participate were asked to read quietly in the library. After being directed on how to complete the survey, those who agreed to take the follow up survey completed their answers individually. If they needed assistance reading or defining vocabulary, they were given aid, but otherwise they were self-directed.
Student responses to the post-survey were also entered in a Google Form. The data comparing the pre and post self-assessment surveys was then aggregated, complied, analyzed, and visualized using Excel. In comparing the results, only responses from twenty-seven students who had parental consent, provided assent, and completed both the pre and post self-assessment surveys were used. In analyzing the results, a repeated-measures t-test was conducted to evaluate statistical significance of the changes. The software was then used to create charts and graphs depicting students’ responses.

Data Analysis and Findings

The study’s contributions include responses from twenty-seven rural, elementary students in second grade. Of the forty-eight second grade students, thirty-nine students in second grade returned consent forms. On the days the pre and post surveys were administered, twenty-one students were either absent, declined assent, or did not have a parental consent form. In total, forty-eight second grade students were invited to participate in the survey. 81.25% of the students (thirty-nine students) students returned parental consent forms. Therefore, when given the opportunity to complete the survey, they opted to read quietly in the library until others were finished. Of the thirty-nine students who returned parental consent forms, 69.23% of the students (twenty-seven students) completed both the pre and post surveys. All the responses received were freely given and express the sole ideas and feelings of twenty-seven second grade students in a small, rural elementary school.

The purpose of this study was to evaluate students’ perceptions of technology. Once the surveys were completed and the data was collected, the research team ran a repeated-measures t-test on the students’ responses. A repeated-measures t-test was appropriate for this data, because it was collected from the same group with a pretest and posttest scenario (Mertler 186). This test
enabled the researchers to evaluate one group that was measured twice. The results of the t-test are seen in Table 1.

<table>
<thead>
<tr>
<th>I CAN STATEMENTS</th>
<th>p value (significance p &lt; 0.05)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statement 1: I can use technology to tell others my ideas.</td>
<td>0.102138</td>
</tr>
<tr>
<td>Statement 2: I can use technology to create new things.</td>
<td>0.077872</td>
</tr>
<tr>
<td>Statement 3: I can use technology to learn new facts.</td>
<td><strong>0.000924</strong></td>
</tr>
<tr>
<td>Statement 4: I can use technology to think about what I am learning.</td>
<td><strong>0.022723</strong></td>
</tr>
<tr>
<td>Statement 5: I can use technology responsibly.</td>
<td>0.059469</td>
</tr>
<tr>
<td>Statement 6: I can be a good digital citizen.</td>
<td>0.181475</td>
</tr>
<tr>
<td>Statement 7: I can use technology safely.</td>
<td>0.116001</td>
</tr>
<tr>
<td>Statement 8: I feel comfortable using technology.</td>
<td>0.189577</td>
</tr>
<tr>
<td>Statement 9: I want to learn more about technology.</td>
<td><strong>0.047557</strong></td>
</tr>
<tr>
<td>Statement 10: I like using technology.</td>
<td>0.270863</td>
</tr>
<tr>
<td>Statement 11: Finish the sentence- When I use technology, I feel ___.</td>
<td>0.092418</td>
</tr>
</tbody>
</table>

By determining the p-value, the research team could have a higher confidence level in the results. Therefore, the research team specifically looked to determine where p < 0.05. As a result, the questions which proved to be statistically significant included question 3, 4, and 9 [See Table 1]. While the other questions showed a variety of changes, these three questions were statistically significant in their results. Therefore, for questions 3, 4, and 9, since the p-value from the t test was visibly less than 0.05, the research team concluded students perceived an increase in their ability to learn new facts, think about what they were learning, and desire to learn more about technology over the course of the spring semester.

**Statement 3 Analysis: “I can use technology to learn new facts”**

One of the tools students were introduced to was [www.worldbookonline.org](http://www.worldbookonline.org), an online, interactive encyclopedia where students can use search terms, keywords, or images to locate information on a wide variety of topics. For this informational literacy instructional unit, the district librarian demonstrated how to access the page via the school library website. Students were then instructed on how to navigate the website, search for terms, and use the built-in
features to guide their investigation. After walking students through the tool, the district librarian and students collaborated to investigate the answers to research questions about a famous person. Students used the World Book Online Kids database to select a person using the “Important People” search tool (https://www.worldbookonline.com/kids/home#impeople: a K-2 guided search with image-based navigation and drop-down menus) and answered questions about their selected famous individual.

By working together to learn the search steps, the district librarian was able to model the process for students. Once the students had an opportunity to ask questions, they were directed to the computer lab where they could use the library lab Chromebooks to access the site, research the famous person of their choice, and record their answers. Through observation and formal review of students finished worksheets, students were successful in locating and researching famous people. Students who finished early either assisted other students or used the time to independently research another famous person of their own choosing.

A few weeks later, one student had the opportunity to share research at a local school board meeting. The student presented findings to the school board, district administrators, superintendent, district families, and numerous district teachers and staff members. After learning of students’ confidence in researching, a second grade teacher developed a plan for students to complete additional research for class using www.worldbookonline.org. By the end of the semester, students were researching various topics, creating Google Slide presentations, and sharing the presentations with their teacher, librarian, and library clerk.

Students were eager to share what they had learned with others. The second grade teacher was able to meet CCSS.ELA-LITERACY.RI.2.1 which states students should be able to “ask and answer such questions as who, what, where, when, why, and how to demonstrate
understanding of key details in a text” (English Language 1). Additionally, the district librarian was able to monitor students’ progress towards Illinois Standards Aligned Instruction for Libraries (I-SAIL) Standard 1 “Access information efficiently and effectively to inquire, think critically, and gain knowledge,” elements of AASL standards I, IV, and V, and ISTE standards 3: Knowledge Constructor and 6: Creative Communicator (“I-SAIL” 5).

However, the real impact is seen not just in the formal assessment of students, but in their shared perceptions and increased level of confidence for finding information online. According to the results of the pre and post survey statement 3 “I can use technology to learn new facts,” the research team saw a significant rise in the students’ confidence. At first 41% of students responded “I can teach someone how” [see Figure 2], and at the time of the post survey, 81% of students responded “I can teach someone how” [see Figure 3].

![PRE SURVEY STATEMENT 3: I CAN USE TECHNOLOGY TO LEARN NEW FACTS](image)

*Figure 2: Pre-survey Statement 3*
This statistically significant ($p=0.000924$) change in perception indicates students had not only mastered the skill, but they also internalized a confidence in their ability to locate credible information online. Whereas, many students seemed to be confident about finding the information themselves, or at least find information with help at the beginning, by the end of the semester students felt they could teach others how to find information online [See Figure 4].
There has been much research on the importance of library, technology, and information literacy skills. By examining these elementary students’ perceptions, the research team connects all three of these elements. The district librarian provided technology instruction regarding an online resource and allowed students to practice using the tool by navigating the website and utilizing the Chromebooks in the library lab. Students were then able to access reading materials at their level, research online, and finally they were able to create and share their findings with others and had the confidence to teach others how to do the same. This ability to locate, access, and use information as part of the research process and information literacy instruction is a key element of work in the library. By recognizing the impact on students, we can see the value of libraries and librarians coupled with technology instruction.

Statement 4 Analysis: “I can use technology to think about what I am learning”

Another tool introduced to students was Flipgrid (www.flipgrid.com). Flipgrid is an online video recording tool students and teachers can use for a variety of activities, assessments, and reflections. Teachers set up a video grid on Flipgrid which students can access using a code and record a video. The video could be a reading, response, or even a song. For use in the elementary library, students were introduced to Flipgrid as a tool for reflection. After reading *The Water Princess* by Susan Verde during library instruction, students watched videos from UNICEF, WorldVision, or WaterAid about children who walk to get water. Then, students were asked to pair and share with their peers how they would feel if they were walking with the children to obtain water.

After class discussion, students were asked to use Flipgrid to record their response to the question “How they would feel and how they could help” and share their ideas with peers. When students finished recording their thoughts, they were encouraged to view others’ posts and provided reactions to others’ ideas. These Flipgrid reflections and videos allowed students to
share their ideas with others and think about what they were learning beyond a think-pair-share in class. Now they instead of only sharing with a partner, they could share with everyone in their class and the entire second grade could hear and reflect on their ideas.

The significance of this accomplishment was found in the students’ responses the statement “I can use technology to think about what I am learning.” In the pre-survey, 26% of the students responded “I can teach someone how” [see Figure 5]. Whereas on the post assessment, 56% of the students responded “I can teach someone how” [see Figure 6]. This shows more students felt they could use technology to think about what they were learning and felt more confident in knowing how to use tools like this after library technology instruction.

Figure 5: Pre-survey Statement 4
However, it is important to note, 7% of students (two students) did feel less confident in using the technology and responded to the post survey with “I cannot.” While most students were feeling more confident, it is important to note some students who struggled in the process became less confident in their ability. Therefore, it is essential to provide support and encourage students throughout the learning process.

However, it is interesting to see how students who at first felt “with help they could use technology to think about what they were learning” were later able to feel capable of “showing someone how to use technology to think about their learning” during the post-survey [See Figure 7]. The number of students who felt they could show someone how grew while fewer students felt they needed help. After receiving instruction, using Flipgrid, and being given time to practice using the technology, students felt more comfortable using the technology too.
The impact of the school library in encouraging students to reflect and think about what they are learning reflects another facet of a library. A glimmering jewel of the importance of libraries in engaging students in ways to reflect and think critically about what they are learning, as stated in I-SAIL Standard 1 “Access information efficiently and effectively to inquire, think critically, and gain knowledge” and AASL V. EXPLORE “Discover and innovate in a growth mindset developed through experience and reflection” (“I-SAIL” 5; AASL- Standards 5). By continuing to use technology platforms such as Flipgrid, Seesaw (https://web.seesaw.me/ a portfolio tool with video capabilities), or other online video tools for sharing ideas and reflecting, libraries will be able to foster lifelong learning through reflection. Librarians can also model its use for teachers and encourage them to use these tools in the classroom. This will make a positive impact on students and situate the library as a learning center for technology, thereby making the library a crown jewel of the school, a true gem.
Statement 9 Analysis: “I want to learn more about technology”

At the start of the school year, students are introduced to the expectations of the school learning environment and the tools they will need to access to be successful. Students learn expectations for using the school computer lab, logging into their Chromebooks, and specific passwords for online class accounts. Classes practice these expectations in the computer lab or in their classrooms with technology available to them. While each classroom teacher provides a variety of online tools, expectations, and instructions, the district librarian was able to provide a consistent introduction for each class.

When students attend library instruction, the district librarian provides students with consistent directives for using technology in the library. At the start of the school year, the second grade students involved in this action research study were introduced to using the school provided Chromebooks, introduced to using the school’s Accelerated Reader software, and accessing a classroom websites and links. The librarian would assist students in learning how to use the mouse, touchpad, or access bookmarked resources. After learning these fundamental operations of using the computer, one of the tools students also experienced was the Code.org online curriculum where they could practice coding. Through these activities, students had the opportunity in both the library and classroom to begin to understand how the technology tools worked.

When the action research project began during the second semester, students had already had experience with these technology tools. Students had been able to use technology available at home, such as a parent’s phone to record videos, or used an online website such as Lexia (https://www.lexialearning.com/; an evidence-based online reading program) to practice literacy skills in the classroom. Consequently, the exposure of students to technology was not an
experimental study where variables were controlled. Instead, students had a wide range of experiences and background knowledge of technology.

Therefore, building on students previous technological understanding was an important piece of this action research project. Considering students previous experiences, the librarian developed a school library webpage using Google Sites where resources used for the library technology instruction could be curated with Symbaloo (https://www.symbaloo.com/: an online tool for bookmarking and managing online tools). Then, throughout the second semester, students were able to use this online portal to access the materials shared during library technology instruction.

The technology tools students accessed through the library homepage (https://sites.google.com/blueridge18.org/br18library) during this second semester of instruction included: Axis360 (the school’s e-book platform), Destiny Quest (library online catalog), Flipgrid, Google Stop Motion Animator Extension, Google Forms, World Book Online, and Ozobots. Using these various tools, students accessed materials online, created videos, voted for their favorite book, researched information, and programmed robots. Sometimes students worked in pairs and sometimes students worked individually. The second grade students had the opportunity to connect online with their peers and a few had the opportunity to present their creations. The technology lessons and activities provided by the district librarian were all related to literature, information literacy, and digital learning and based on national and state standards.

During this second semester time frame between the pre and post survey, students were exposed to a variety of technology tools specifically within the library environment. After experiencing some tools first semester, 17 students responded to the pre-self-assessment survey with an interest in learning more about technology. By the end of the action research project, 16
students wanted to teach others about using technology [See Figure 8]. Even though they came into the library with a high level of confidence, they ended the year feeling as though they wanted to learn more about and teach technology to others.

![I want to learn more about technology](image)

*Figure 8: Statement 9 pre-survey and post-survey results comparison*

Overall there was a significant change from pre to post survey \(p=0.047\). At the beginning of the semester, 63% of students wanted to learn more about technology and 26% wanted to teach others how to use technology [See Figure 9]. They had high confidence and wanted to learn more. By the end of the semester, the number of students who responded “I want to teach” technology to others had risen to 59% [See Figure 10]. Their confidence in knowing how to use the technology had grown and now students believed they could show someone else how to use the tool.
While students who responded “I have questions” went from 11% down to 4%, it is also important to note 4% of students also responded with “I do not” want to learn more about technology on the post survey, whereas 0% of students indicated not wanting to learn about technology on the pre-survey. However, the difference stemmed from one student who struggled with technology and indicated a response of “I do not” want to learn more about technology [See
Figure 8]. However, most of the results shifted from saying yes to giving a definite yes and fewer students responded with a negative response.

The results for statement 9 suggest future lessons based on I-SAIL Standard 2 “Evaluate information critically and competently” and Standard 3 “Use information accurately, creatively, and ethically to share knowledge and to participate collaboratively and productively as a member of a democratic society” could be aligned with technology instruction to enable students to learn more about computing in the library. Information literacy and technology instruction should also address AASL V. EXPLORE to encourage students to discover a growth mindset and develop through experience and reflection. Pairing these skills with computer science skills would also address ISTE 5 Computational Thinker and provide students with opportunities to partner with peers, persist, and problem solve.

Analysis of Significance:

The findings of this action research project show libraries can introduce students to new types of technology and instill an inquisitive mind in students. Students learn how to navigate resources online, reflect, and problem solve. Second grade students can learn skills for which they may not be formally graded on during library instruction, but skills which will make them more successful in the classroom and throughout their lives. They learn by trial and error. The research team recognizes the elementary school library’s importance and how libraries can provide a trove of experiences to explore and experiment. By practicing in the library, students can enter the classroom more confident in their tech abilities and have the confidence to succeed.

While the three changes explored in statements 3, 4, and 9 proved to be statistically significant, it is important to also analyze the results of the other questions. While the results of the following statements were not shown as statistically significant, the results’ descriptive statistics reveal additional trends and provide direction for instructive changes.
Statement 1 Analysis: “I can use technology to tell others my ideas”

Students were primarily instructed to share their ideas online using www.flipgrid.com. As a class, students listened to the district librarian read aloud one of the titles on the elementary state reading list. After listening to the story, the students discussed the plot and characters as a class. When the class was finished with discussion, students were directed to post their response to the question “Do you think the characters were tough or nice? What tough nice thing could you do for someone?” on Flipgrid. The computers were set up in the elementary computer lab with the Flipgrid webpage bookmarked and ready for students to log in. Students clicked on the appropriate button to start recording their video. They had access to headphones to help reduce noise across the computer lab. When they were finished, they could watch and listen to peers’ responses.

Since the webpage was bookmarked, students were able to successfully navigate to the website. If students encountered difficulties or struggled with logging in, the district librarian would assist them. Most students were able to create a video and post it to the secure library Flipgrid account. Students enjoyed adding images prior to submitting their video for peer sharing. Some students took extra time in recording their videos to elaborate on the question or pose as though they were a famous Youtube personality. The main difficulties students encountered were being able to hear their video recording play back through their headphones or have time to publish their video to the library account. In both cases, the district librarian worked with students to assist them in troubleshooting and working through any issues.

When asked about their ability in using technology to share their ideas with others on the pre-self-assessment survey, 44% of students responded, “I can teach someone how” [See Figure 11]. Their initial reaction was one of confidence. Perhaps because they had previous experience using electronic devices to record videos on a parent or guardian’s electronic device 30% of
students answered, “I can do it by myself.” Even so, there was a small percentage (7%) of
students who acknowledged “I cannot” when asked if they could use technology to tell others
their ideas. The introductory numbers for student’s perception of confidence in using technology
to tell others their ideas indicated they felt highly competent.

![Pie chart showing student responses to statement]

**Figure 11: Pre-survey Statement 1**

However, it was interesting for the research team to note in comparing students pre and post
survey results after being instructed on how to use Flipgrid in the library classroom, the
percent of students who felt they could “teach someone how” grew to 59% and only the percent
of students who felt “they could not” went to 4% [See Figure 12]. While the results did not
prove to be a statistically significant change, the post-self-assessment survey results showed
students who were already confident grow more confident in being able to share their ideas with
others.
In future studies, it would be good to add an open-ended sentence attached to this statement. Students could share which technologies they felt competent in using to share their ideas. The research team could use their responses to see if students grew in their understanding of using the specific tool the library was using or if they felt more confident in creating recordings in general.

Designing lessons where students feel confident in using technology to tell others their ideas will aide in building students’ competence. Lessons based on AASL’s Standards I INQUIRE, II INCLUDE, AND III COLLABORATE could help students answer the essential question of how they can use technology to tell others their ideas. Elements of being a good digital citizen online should also be embedded into the lesson and incorporate I-SAIL Standard 5 “Understanding and practice Internet safety when using any electronic media for educational, social, or recreational purposes” as well as ISTE Standards: 1 Empowered Learner, 2 Digital Citizen, and 6 Creative Communicator (“I-SAIL” 5).
Statement 2 Analysis: “I can use technology to create new things”

While these second grade students were encouraged to create multiple products during library skills instruction, the main technology tool students used for creation was the Google Extension for Stop Motion Videos. During other lessons throughout the school year, students had been asked to draw or write descriptions of plots, settings, and characters using traditional paper and pencil methods. However, for this library lesson, students were instructed on how to use the technology tool to create a Stop Motion video.

First, students participated in a class read aloud about a Claymation character in the book *Claymates* by Devorah Petty and Lauren Eldridge. Afterwards, the librarian demonstrated how to create a stop motion video using PlayDoh and googly eyes by using the software on the Chromebook to take a series of pictures. With each picture, the PlayDoh would change shape. When the recording was replayed through the video creator, the PlayDoh shape would appear to move across the student’s table.

After demonstrating how the tool worked, students worked with a partner to create their own stop motion video. One partner oversaw controlling the computer and mouse, and the other student was the director who moved the ball of PlayDoh. When they finished, they saved their video, switched roles, and created another stop motion video.

There were multiple opportunities for troubleshooting with this project including collaboration, learning to use the technology correctly, and saving their video. However, with patience and teamwork, students were able to create a short stop motion video. The videos were saved, compiled, and even shared with their elementary principal. Students were able to take an idea and concept they had read about and turn it into a short video.

In a later lesson, students were again provided an opportunity to create a stop motion video. This time they listened to a read aloud story *After the Fall* by Dan Santat, a retelling of
the nursery rhyme Humpty Dumpty. As a class, students discussed the plot of the story and what happened to the egg. Then, each pair of students were provided a plastic egg with a paper bird inside, a large piece of construction paper, and a marker. Using the marker and construction paper, they recreated the setting of the story. Then, they used the plastic egg and their stop motion creation tool to record a retelling of the story’s plot. Using the technology, students had the plastic egg climb the wall, crack, and turn into a bird which flew away.

This project required more time than their previous attempt at stop motion. Therefore, determining roles between partners and using the technology in a timely matter sometimes became problematic. However, students were encouraged to persist and use teamwork to create a successful final project. After their projects were completed, their videos were again saved and shared.

Due to the detailed task of learning how to use the technology, creating a video, and saving their videos, the research team was interested to learn how students understanding and confidence in using technology to create new things would be impacted. On the pre-survey, 37% of students responded they could “teach someone how” to use technology to create new things [See Figure 13]. On the follow up survey, 59% of students felt they would be able to “teach someone how” [See Figure 14]. While this seemed to show growth, there was not a statistically significant change.
However, while the percentage of those who felt they could not and those who felt they could do it by themselves, did not fluctuate more than a few percentage points. Those who felt they could do it with help decreased from 30% to 11%. Therefore, with instructional modeling, working with a partner, and practicing multiple times, students may become more confident in
their ability to either use technology to create new things by themselves or even to teach someone how.

In the future, it may prove beneficial for the district librarian to allow time more time for students to share their creations authentically. It would also appear to be helpful for students to be able to practice teaching others how to use the technology. By working with their partners, they learned together. Additional opportunities to teach others, such as younger students, parents, teachers, or community members, would provide students with opportunities to share what they had learned.

To provide opportunities for students to create new things, librarians can develop lessons based on the standards AASL III Collaborate, AASL VI ENGAGE, I-SAIL Standard 3 “Use information accurately, creatively, and ethnically to share knowledge and to participate collaboratively and productively as a member of a democratic society” and ISTE 6 Creative Communicator, ISTE 1 Empowered Learner (“I-SAIL” 5). By infusing the curriculum with technology based on these standards, librarians will provide students with opportunities to share collaborate with others and share what they have learned.

Statement 5 Analysis: “I can use technology responsibly”

This statement was difficult for the librarian to address during a typical library instruction given the time constraints of the study which began in the spring semester. Students had previously been given classroom, library, and computer lab expectations on how to use technology in the library appropriately. However, while students understood expectations for using the Chromebooks, headphones, and computer mice in the library computer lab appropriately, they would still need to learn how to use the technology resources responsibly while utilizing the new tools they would be introduced to over the course of the semester.
For this research project, there was not one specific lesson on using technology respectfully. Rather, the district librarian embedded the ideas into each technology instructional unit. If students were going to use the Chromebooks and headphones in the library to record a Flipgrid video, then the district librarian would have students review expectations for using the materials. If students were going to be moving the Chromebook around the room and using the computer mouse to record a stop motion video, then the district librarian would review expectations for using the technology outside of the computer lab space. If students were going to be using Ozobots (miniature, programmable robots), then the district librarian would make sure students knew how to handle the robots and use them responsibly. In these cases, telling students to use materials responsibly was not a one and done set of instructions. Rather it was a reminder lesson embedded into weekly and daily use of technology.

The most noticeable change between the pre-survey and the post-survey regarding student’s perception of using technology responsibly was seen in the change between 4% saying responding “I cannot” in the first survey to 0% saying “they could not” in the post survey [See Figures 15 and 16]. Furthermore, while not a statistically significant change, in the first survey 44% of students felt they teach someone how to be responsible using technology. In the post survey, 67% of students perceived themselves capable of teaching someone else how to use technology responsibly. Even though most of the students began with a high level of confidence, the continual opportunity to interact and use technology responsibly appears to have strengthened their confidence.
In future planning, it will be paramount to ensure students start the year with expectations for using technology safely. While continually integrated into the library curriculum, AASL VI Engage, I-SAIL Standard 3 “Use information accurately, creatively, and ethically to share knowledge and to participate collaboratively and productively as a member of a democratic
society”, and ISTE 1 Empowered Learner and 2 Digital Citizen should be implemented early in the first semester and scaffolded throughout the school year (“I-SAIL” 5).

**Statement 6 Analysis: “I can be a good digital citizen”**

As with the statement concerning using technology responsibly, teaching students to be good digital citizens was not a one time, set apart instructional lesson. Rather, digital citizenship lessons were embedded into the regular classroom, library, and technology instruction. Some of the lessons provided by the librarian began before the initial survey was introduced to the students in the second semester using picture books, such as *Nerdy Birdy Tweets* by Aaron Reynolds. By introducing the title and reading the story together, students could discuss the story and how the characters interacted with each other using technology. The conversation could then be applied to various technology tasks in the library classroom.

For example, when students were later instructed on how to use the online library catalog to search for materials online, they were also introduced to the ‘friends’ feature of the catalog. Using this ‘add a friend’ feature of the online catalog, students were able to add friends, send book recommendations, and review books. As students added friends and shared materials, it was an opportunity for the district librarian to remind students how to be good digital citizens online. As a class, they could discuss appropriate ways to respond to friends and post messages online. Through conversations such as these, students not only had the opportunity to think about what it means to be a digital citizen, but they were also given the opportunity to be good digital citizens.

In elementary schools, students are often given awards for good citizen of the week or month, so students understand what it means to be a good citizen. However, sometimes they do not understand how being a good citizen in person translates to acting as a good citizen when using technology. This can be true of students and people of all ages. Therefore, it essential to
discuss digital citizenship and impart positive behaviors and online etiquette to students through embedded lessons and reminders.

To measure students’ perception of being a good digital citizen, the research team developed the following statement, “I can be a good digital citizen.” Students were then asked to respond by indicating their perception of how well they could be a good digital citizen. In the pre-survey, 44% of students responded they could “teach someone how” and 45% of students said they could “do it by myself” [See Figure 17]. In the post survey, 70% of the students responded they could “teach someone how” [See Figure 18]. While the t-test did not show the change to be statistically significant, an increase in 26% of students feeling they could successfully teach someone how to be a good digital citizen is a positive increase. In a world where cyberbullying and other detrimental actions take place, it is encouraging to see students feeling confident in their ability to be good digital citizens. Furthermore, it is important to note this confidence came not from one singular good digital citizenship lesson, but rather from embedded lessons and reminders to be good citizens when they use technology.

![Pie Chart: Pre Survey Statement 6: I can be a good digital citizen.]

Figure 17: Pre-survey Statement 6
As in Statement 6, it will be essential for librarians to begin the year discussing what it means to be a good digital citizen. Aligned with expectations for technology safety, digital citizenship lessons integrated with technology can be developed based on standards AASL VI Engage, I-SAIL Standard 3 “Use information accurately, creatively, and ethically to share knowledge and to participate collaboratively and productively as a member of a democratic society,” and ISTE 1 Empowered Learner and 2 Digital Citizen (“I-SAIL 1). These lessons should be implemented early in the semester to build a foundation and then embedded in across curriculums throughout the school year. As Kristen Mattson states in Digital Citizenship in Action, “oftentimes, digital citizenship education is relegated to isolated lessons, events, posters, or messages presented to students outside of the context of their typical, daily learning experiences” (Mattson 8). While this may be true, it no longer needs to be the standard. Rather than being set apart as an individual lesson, digital citizenship instruction should be embedded into the daily lessons and instructions experienced by students. As students grow and become
active participants in a democratic society digital citizenship should be an integral aspect of their character.

Statement 7 Analysis: “I can use technology safely”

In many ways, the statement “I can use technology safely” is related to both using technology responsibly and being a good digital citizen. Here the district librarian wanted students to not only use the tools responsibly and to be kind to each other online, but also to be careful in what they shared with others while online. In an elementary school, all online settings are monitored and filtered for student safety. However, it is vital students understand the importance of being safe while online, so they can be safe outside of the school environment as well. This can be taught through various means, such as teaching students to make secure passwords and how to access and login to appropriate school e-resources. Therefore, in many instances during this action research project, students were taught how to use passwords to use online resources such as the library online catalog and Flipgrid class grid.

Among the students surveyed, there was little change between the pre and post-survey. Initially, 63% responded they could teach someone how, 33% indicated they could do it by myself, and 4% said they could be safe with help [See Figure 19]. In the follow up survey, the main difference was zero students needed help. Instead, 78% of students could teach someone how and 22% believed they could do it by themselves [See Figure 20].
While it is good to see slight growth, even if not significant, it would be interesting for future research to examine students understanding of using passwords between the start of the school year and the end of the school year. When students completed the pre-survey, it was already second semester and students would have learned about passwords towards the beginning of the first semester. There might be more growth and more of a significant change in
their perceptions if they had been asked earlier as opposed to after they had been using technology throughout part of the school year.

Therefore, as with statements 5 and 6, lessons which reaffirm safe technology use will increase students’ self-confidence in believing they can use technology safely. As librarians develop technology curriculum maps, it will be important to ensure students begin the school year with expectations for safe technology use. By continually integrating safe technology use into the library curriculum, AASL VI Engage, I-SAIL Standard 3 “Use information accurately, creatively, and ethically to share knowledge and to participate collaboratively and productively as a member of a democratic society”, and ISTE 1 Empowered Learner and 2 Digital Citizen will be met (“I-SAIL” 5).

Statement 8 Analysis: “I feel comfortable using technology”

After all the technology instruction, tutorials, demonstrations, modeling, and experience with technology tools, the research team wanted to know how comfortable students felt when using technology. Students today grow up in a technology rich society where many of their parents and guardians have and use electronic devices daily. Students themselves also have access to technology devices throughout their day whether at home or at school. In initially asking this question, the research team wanted to know how students felt about the tools used in the library classroom. However, with the pre-survey, students’ results indicated a high familiarity with technology in general.

In the pre-survey, 48% of students felt they could do it by themselves, 33% responded they could teach someone how, 19% felt they could feel comfortable using technology with help, and no students felt uncomfortable using technology [See Figure 21]. However, in the post-survey, this changed. In the post-survey, 48% still felt they could do it by themselves, 44% responded they could teach someone how (an increase), and only 4% said they would need help
[See Figure 22]. While not statistically significant, it is important to highlight 4% of students feeling frustration after using the new technology and responding, “I cannot.”

**Figure 21: Pre-survey Statement 8**

**PRE SURVEY STATEMENT 8: I FEEL COMFORTABLE USING TECHNOLOGY.**

- I can not 😞 19%
- I can do it with help 😐 33%
- I can do it by myself 😊 48%
- I can teach someone how 😎 4%

**Figure 22: Post-survey Statement 8**

**POST SURVEY STATEMENT 8: I FEEL COMFORTABLE USING TECHNOLOGY.**

- I can not 😞 4%
- I can do it with help 😐 4%
- I can do it by myself 😊 44%
- I can teach someone how 😎 48%

No students had previously felt they could not use technology. After being introduced to an array of technology tools, 4% of students felt they no longer felt comfortable using technology. There were no open-ended responses or follow up questions to ask why the students
felt less comfortable but based on the students experiences the uncertainty of using new technology may play a part. In the future, it will be important to librarians and technology instructors to remember to provide support for students who struggle so they can build confidence in using new technologies, even for students who initially feel comfortable using new technologies. Simply because students grew up with technology and are familiar with technology does not mean they are going to feel comfortable using new technologies. Therefore, in addition to learning about new technologies and how they work, it is crucial for students learn how to troubleshoot and problem solve. This could be accomplished through opportunities to partner more when using the technology, allowing time for students to ask questions of the librarian or their peers, and providing more time for students to reflect on using the new technology tool. By allotting for time for students to reflect, question, and share, students will have the chance to think about the technology tools they are using and overcoming misgivings and feelings of frustration.

Arranging for students to feel comfortable with technology might often start with the librarians’ technology comfort level. However, by designing lessons based on standards AASL VI Engage, I-SAIL 3 “Use information accurately, creatively, and ethically to share knowledge and to participate collaboratively and productively as a member of a democratic society”, I-SAIL 5 “Understand and practice Internet safety when using any electronic media for educational, social, or recreational purpose”, and ISTE 1: Empowered Learner, librarians will ensure their students gain familiarity with technology and increase their own comfort levels (“I-SAIL” 5). By integrating these standards early in the year, students will feel more comfortable learning and using new technologies.
Statement 10 Analysis: “I like using technology”

Throughout the second semester of the school year, the second grade students were introduced to a plethora of technology tools within the library classroom setting. They used the online library catalog and e-book platform to search for physical and electronic materials. They listened to stories and reflected about what they were learning using Flipgrid videos. The students partnered together to create stop motion videos, voted online for their favorite state award book, researched famous people using an online encyclopedia, and coded Ozobot robots. Even though they had previous experience with technology at home and in the school, their experiences in the library allowed them to learn about additional types of technology. They were able engage in authentic learning experiences to share their creations and knowledge. Together they engaged with conversations with one another to think about what they were learning and collaborated to make new creations.

To understand students’ perceptions surrounding these experiences, the research team asked students to respond to the statement “I like using technology.” With an understanding, many of the students had previous technology experiences, the research team believed students would respond positively. Indeed, they did. In the pre-survey, 70% of students felt they “loved technology” and 30% of students said they “liked technology” [See Figure 23]. Their reaction to the statement showed a high level of confidence and enjoyment in using technology based on their previous experience.
After using the various technologies in the library, students’ reactions were slightly different. In the post survey, there was 15% increase in the number of students who “loved technology” and a decrease of 19% of those who said they “liked” technology [See Figure 24]. Here the research team saw a trend of students changing their perception of “like” to “love.” This seemed to be a positive trend. Students who appreciated using technology and wanted to learn more began to enjoy using it even more.
While this is a positive trend, it is also worth noting the student who felt unhappy once they learned more about technology. It is the same individual who felt discontented in responding to statements 8, 9, 10, and eventually statement 11. In this case, the student felt they did not like using technology. Again, this student may have been frustrated with one specific tool or all technology in general. Either way, it is important for teachers, librarians, and technology instructors to remember to provide support and continually engage in dialog with students about how they are feeling about technology. It may appear all students are feeling positive about the technology learning experiences, however there maybe one or two students who are quietly struggling. By being aware of how they are feeling, instructors can reach out to them and help engage them in enjoying the benefits of learning new technology.

To allow students to positively interact with technology, librarians should align their curriculum to the state and national library and technology standards. By aligning the curriculum to the standards and providing scaffolding, students will be able to enjoy the benefits of using technology and be more self-confident when using the technology in the classroom or at home. Furthermore, the construction of a curriculum map will ensure all the standards are addressed and the library curriculum is standards-based.

Statement 11 Analysis: Finish the sentence: “When I use technology, I feel...”

Finally, the last statement posed to students through the survey was an open-ended question. Students were asked to finish the statement “When I use technology, I feel ____.” This was the only open-ended question on the survey and was the one place where students could insert their own vocabulary into their participation. The research team wanted to know how they would describe their experiences. Perhaps students would respond with feelings of being scared, confused, or overwhelmed. Or perhaps students would respond with positive feelings of
confidence and capability. The open-endedness of the question would allow second grade students to put their own feelings about technology down on paper in their own terms.

In the pre-survey, the students’ overwhelming response was some version of proclaiming happiness. Many students responded with answers such as “exied, happ, wierd,” “happy energetic and excited,” and “happy because I love it” [See Table 2]. One student responded with “soooooooooooooooooooooooooo Haaaaaaaaaaaaaapppppppppyyyy!!!,” while another conditioned their happiness by stating “Im happy but not to happy.” There was one student, who wrote in “fine” and crossed out “I like technology” to insert “not that much.” Even with the qualifiers, their responses indicated a general positive tone to their perception of technology [See Figure 25].

<table>
<thead>
<tr>
<th>Pre Survey Statement 11 Student Responses to &quot;Finish the sentence: When I use technology, I feel ...&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>--- (no answer)</td>
</tr>
<tr>
<td>awesome</td>
</tr>
<tr>
<td>cool.</td>
</tr>
<tr>
<td>creative.</td>
</tr>
<tr>
<td>exied, Happ, weird</td>
</tr>
<tr>
<td>fine,*</td>
</tr>
<tr>
<td>good</td>
</tr>
<tr>
<td>good</td>
</tr>
<tr>
<td>good about myself.</td>
</tr>
<tr>
<td>Good about useing it by my self</td>
</tr>
<tr>
<td>good and Asome.</td>
</tr>
<tr>
<td>grat</td>
</tr>
<tr>
<td>Happy</td>
</tr>
<tr>
<td>Happy and cumfortable with technology.</td>
</tr>
<tr>
<td>happy because I love it</td>
</tr>
<tr>
<td>happy energetic and excited</td>
</tr>
<tr>
<td>happy with computers.</td>
</tr>
<tr>
<td>happy!</td>
</tr>
<tr>
<td>happy.</td>
</tr>
<tr>
<td>I can tech sumone how.</td>
</tr>
<tr>
<td>I feel good</td>
</tr>
<tr>
<td>Im happy but not to happy.</td>
</tr>
<tr>
<td>kida like i need technology</td>
</tr>
<tr>
<td>sooooooooooooooooooooooooo Haaaaaaaaaaaaaapppppppppyyyy!!!</td>
</tr>
<tr>
<td>supuper good</td>
</tr>
<tr>
<td>Veaar Veaar Veaar happy.</td>
</tr>
<tr>
<td>Whatever becase i'm cool at it.</td>
</tr>
</tbody>
</table>

*Note: on question 10 student crossed out "I like technology” and wrote "not that much"

Table 2: Pre-survey Statement 11 student responses
Students' responses were coded to allow an analysis like the other statements on the self-assessment survey. Statements of excitement and enthusiastic happiness were coded a 4. Statements of fine and good were given a 3, feelings of dislike or unease were given a 2, and statements of complete dislike were coded 1. As a result, on the pre-survey, 49% of students responded enthusiastically and 51% of students were either fine, happy, or good [See Figure 26]. The pre-survey revealed an overall positive feeling towards technology.
In the post-survey, the same individual as in previous statements continued the trend of discontent with technology and expressed anger at the technology, saying “mad because I HATE COMPUTERS!” [See Table 3]. While another student revealed an unease of using the new technology by stating, “kind of scard because I don’t know if im doing it rite.” Therefore, in using the same coding framework as the pre-survey, the post survey revealed 1% of students felt complete dislike and 2% felt uneasy towards technology [See Figure 27]. This was an increase in discomfort in using technology.

<table>
<thead>
<tr>
<th>Post Survey Statement 11 Student Responses to “Finish the sentence: When I use technology, I feel…”</th>
</tr>
</thead>
<tbody>
<tr>
<td>asome, happy, amasing, creative</td>
</tr>
<tr>
<td>awsome.</td>
</tr>
<tr>
<td>comfortable, happy, and relaxest.</td>
</tr>
<tr>
<td>free.</td>
</tr>
<tr>
<td>glad.</td>
</tr>
<tr>
<td>good, greatful, happy</td>
</tr>
<tr>
<td>good.</td>
</tr>
<tr>
<td>great!!</td>
</tr>
<tr>
<td>happy</td>
</tr>
<tr>
<td>happy</td>
</tr>
<tr>
<td>happy</td>
</tr>
<tr>
<td>happy</td>
</tr>
<tr>
<td>happy</td>
</tr>
<tr>
<td>Happy and very extra happy.</td>
</tr>
<tr>
<td>happy because it's my first time useing it.</td>
</tr>
<tr>
<td>Happy inside me.</td>
</tr>
<tr>
<td>Happy!</td>
</tr>
<tr>
<td>Happy.</td>
</tr>
<tr>
<td>happy, cool.</td>
</tr>
<tr>
<td>kind of scard because I don't know if im doing it rite.</td>
</tr>
<tr>
<td>like jumping out the window or happy</td>
</tr>
<tr>
<td>mad because I HATE COMPUTERS!</td>
</tr>
<tr>
<td>safe and come.</td>
</tr>
<tr>
<td>so smart</td>
</tr>
<tr>
<td>super happy!</td>
</tr>
</tbody>
</table>

Table 3: Post-survey Statement 11 student responses
Figure 27: Post-survey Statement 11

Students who felt positive towards technology before when considering the familiar devices became less comfortable when using new technology. Addressing this in the classroom environment could be done by allowing students to share concerns and frustrations so they can learn to work through them and process their ideas.

As for the other students who responded positively, 39% responded enthusiastically, 58% were fine, happy, or good. So, while there were admittedly some students who struggled, many of the students still felt “asome, happy, amasing, creative” and “comfortable, happy, and relaxest.” The goal for librarians and technology instructors to keep in mind for the future would be to make sure students do feel comfortable using the new technologies. Oftentimes instructors are concerned with assessment and covering the standards. However, it is also important to recognize how students are feeling about the technologies they are using and their real and perceived feelings of confidence and competence.

While being mindful of the students’ needs, librarians can align the curriculum based on the standards and providing scaffolding will enable librarians to integrate technology in ways
which are meaningful to students. By establishing a curriculum map, districts will ensure state and national standards are addressed. This outline of curriculum should be flexible to allow for students to learn new technologies which they can incorporate into their classroom assignments and projects. By enabling students to experiment with new technologies and providing a safe place to learn, libraries will impact students by building student self-confidence in computing.

**Reflections and Recommendations:**

The goal of this research project was to ascertain students’ perceptions regarding technology and the role of the library in engaging students with technology with the goal of aligning a technology infused library curriculum with information literacy standards. The research team sought to unearth whether technology integration in a rural, elementary school library curriculum impacted second grade students’ computing experiences. By developing technology instruction lessons guided by the national and state standards, the district librarian introduced students to a variety of technology tools and provided students with opportunities for authentic learning experiences. Students were surveyed prior to instruction and surveyed again after a semester of technology instruction. The findings resulted in a confirmation of students’ self-confidence and growth in being able to teach others how to use technology.

This growth, while expected, also led to one unanticipated effect as more statistically significant growth was found in students’ responses to statements where students had more opportunities to share what they had learned. Going beyond expectations, students were impacted by sharing their ideas beyond the library walls whether through classroom projects, sharing information online with their peers, or presenting on a district wide platform. In multiple cases, students’ confidence went from being able to use technology with help or by themselves to by the end of the course being ready to teach others how to use technology. In these instances,
students developed perceptions of competence in using technology. In the future, library technology instructional lessons with the students should incorporate more opportunities for students to teach what they are learning with others and provide opportunities for students to teach others about what they have learned.

Overall, from the responses received from students, the research team was able to gather the information they were interested in obtaining. While the research team originally thought they would gather information regarding specific tools, the adapted statements developed for this survey and the responses received provide a clear picture of students’ feelings, perceptions, and understanding of technology. By asking students to respond to statements regarding their understanding and perceptions of computing and through analysis of these results, the research team was able to sufficiently answer the initial research question of how rural, elementary library students perceive themselves as technology users. Indeed, the research team was able to recognize students’ initial high level of confidence and learn to further develop ways for students to teach others about their learning experiences once they have learned new technology skills.

In the next cycle of the research process and data collection there could be more open-ended questions. Future surveys could use open-ended statements to ask students to elaborate on their feelings. Additional surveys could ask what types of tools they felt confident in using. Open-ended questions would be helpful in deciphering what tools students perceive themselves to be confident in using and what they feel a lack of confidence in using. By understanding the type of tools students already know how to use, librarians and technology educators would be able to ensure they provide new experiences for students and see how the confidence is connected to the specific technology tools to which they have been introduced. Some examples of tools librarians could implement are Google’s Stop Motion Animator, Code.org, Ozobots,
Storybird, World Book Online, Seesaw, eReadIllinois Axis369, ThingLink or video creation tools such as Flipgrid, Animoto, mysimpleshow, or Adobe Spark Video. Short descriptions and links to these materials are located on the *Understanding Children’s Perspectives on Coding* resource page ([https://sites.google.com/uhigh.illinoisstate.edu/cas593brokaw/resources](https://sites.google.com/uhigh.illinoisstate.edu/cas593brokaw/resources)).

During instruction of these technology resources, librarians should demonstrate modeling of the tool to provide context for students. By providing visual examples and allowing students to see the steps first, students will have more confidence in performing the correct steps. In modeling, it could also be helpful to model troubleshooting and problem solving. By demonstrating the struggle, students will have examples of what to do if they encounter difficulties.

Another strategy to boost student confidence is the implementation of class discussions and peer sharing after using new technologies. By providing opportunities for students to turn and talk with one another about the tool, they can reflect about what they are learning, share with others, and ask questions. One example in Katie Mutharis and Kristen Ziemke’s book *Amplify*, educators instruct students to, “turn and talk about some technology problems you’ve had and how you solved them. Then we’ll put together some suggestions we can follow when we’re having technology issues” (Mutharis and Ziemke 70). By allowing students to reflect about their learning experiences with technology, they can turn and talk about solutions rather than becoming disgruntled, angry, or losing confidence. Furthermore, Mutharis and Ziemke remind educators to impart to students that “struggle is learning” (106). As students to grapple with struggle and learning, they encourage teachers to remember “failure is an opportunity to teach kids thoughtful persistence, a problem-solving mindset, and emotional fortitude” (106). In the
future, by providing students the opportunity to struggle and build fortitude educators could see growth in student confidence in when using technology.

Finally, librarians can establish opportunities for students to share their work authentically or teach others. This could be done by presenting their video creations to the class or sharing them with their teachers. Other meaningful experiences could be found by allowing older elementary students to teach younger students how to use the technology or arranging opportunities for students to teach their teacher or administrators how to use the tools. By providing students with opportunities to share their ideas and teach others what they know, they may feel even more confident in their understanding of computing.

As teachers implement these strategies, it will be helpful to revisit student perceptions of computing and see how the strategies embedded into the technology curriculum impact students. Additionally, in future research projects would also be beneficial for the research cycle to be completed starting in the beginning of the year and going through the conclusion of the year. By focusing on the spring semester, this research was unable to reveal students’ complete growth from the beginning of the school year until the end. By extending the period of study, the research team would be able to address additional areas of technology in more depth and be able to show more growth overtime. However, with the time given, the research design ended up being appropriate for what the research team wanted to address. The team was able to collect data with which to start a conversation about elementary library students’ perceptions of computing. By providing students with standards-based technology instruction in the library, the research team was able to see how students felt happy and awesome in teaching others how to use technology.
Summary and Conclusions

The initial findings from the first survey indicated students felt a great deal of confidence in using technology. It is likely many of them have used a cell phone, electronic device, or other form of technology before. However, the follow up survey was an opportunity for students to reveal how they felt after learning new technologies in the library classroom environment. In the follow up survey, students reported increased confidence in their capability to use technology themselves and believed they could now teach someone how to use technology. While they were confident initially, the results still indicated growth in their confidence in using new technologies.

Even so, there were some students who originally felt confident and then became less self-confident after learning the new skills. When using new technology, students who are self-assured initially are often expected to acquire new technology skills easily and are often left to try to figure new tools themselves out while educators assist struggling users. However, these results show even confident students need support to learn how to use technologies in new ways.

The survey also indicated students want to learn about technology and feel “happy”, “cool”, and “awesome”, but they can also feel frustrated if they are not sure they are “doing it right.” Librarians and teachers need to remember to remind students they do not always need to have one right way of doing things. They can try multiple ways and be creative. If it does not work, then it is okay to try again, and persistence should be encouraged.

Overall, students appeared to gain confidence in their ability to share their ideas. They felt they were able to use the technology themselves and teach others. This shows the importance of school libraries and librarians introducing new technologies to students. The introduction of new tools can enable students to build their confidence and help students achieve more in the library, classroom, and as lifelong learners. Even as students grow up in a world where they are surrounded by technology, they can continue and will continue to learn new skills.
participants in this study, learning new things made them feel “happy”, “awesome”, and “creative,” as well as “comfortable and relaxed.”

These second grade students were introduced to a wide variety of tools and were given opportunities to try many different types of technology throughout the semester between the pre and post-surveys. Overall, their responses were positive towards technology. The few negative responses of “I cannot” or an expression of disliking computers stemmed mostly from the same students. By recognizing how students feel about technology and revealing their perceptions of computing, this action research project enables librarians, technology instructors, and educators to better adapt technology instruction to encourage students to be successful lifelong learners. This project bridges the gap in the conversation by illuminating students’ beliefs regarding their comfort level in using new technologies and connects library media programs and librarians to their mission of knowledge creation and learning.

**Action Plan:**

Based on the conclusions addressed in the research project summary, the research team can develop an action plan for the future of technology instruction in the library. Since the team saw significant change with questions 3, 4, and 9, the researchers can infer providing meaningful experiences for students to engage with technology where they are encouraged to teach and share their ideas is essential. Additionally, it is important to embed lessons of digital citizenship, online safety, and problem-solving. By using these results, the research team can build a model for implementing second grade technology instruction. The creation of a curriculum map tied to the standards, lessons, and activities outlined in this research action project is an essential next step in developing a curriculum which extends beyond second grade and can be scaffolded for all grade levels across the district.
Therefore, in moving forward the research team developed a curriculum map which will enable librarians to provide meaningful technology instruction. As a plan of action going forward, the curriculum map will enable librarians and technology instructors to enable students to be lifelong learners and confident technology users.

The action plan presented through the attached curriculum map which can be viewed in the appendix and at

https://sites.google.com/uhigh.illinoisstate.edu/cas593brokaw/home?authuser=0 is a recommendation for teacher librarians in planning future technology instruction (see Appendix D). The curriculum map provides a timeline for implementation and suggestions for possible resources. Future collaboration with teachers, the technology director, the curriculum director, and principal will also be imperative in moving forward, and will be important for others implementing similar work. Additionally, funding through district allotted funds or grants and assigned technology instructional time paired with library skills will pave the wave for future library technology instruction.

Once this initial second grade curriculum map is adopted, further curriculum maps for K-6 will need to be developed adjacent to these recommendations so the skills align and build upon each other. It will also be important to provide instruction for teachers, so they know what students can create. Collaboration between the library and teachers is essential so students can first learn the skills in the library before being asked to create similar projects where they build upon their skills in the classroom, such as with the World Book Online projects detailed in this research analysis.

The curriculum map was developed based on the tools used during the action research project and have been organized to meet AASL, I-SAIL, and ISTE standards. The units are
scaffolded to promote the skills students found challenging and build up those where they encountered success. Each section of the curriculum map is divided into weekly units of study based on weekly library technology instruction of thirty-minute intervals. First, the unit of study is addressed and tied to the essential questions from the survey. For example, the unit of study for “Response and Reflection” is tied to the essential questions “How can I use technology to tell others my ideas?” and “How can I use technology to think about what I am learning?” These questions were developed based on survey statements 1 and 4 are aligned to the state and national standards which are listed on the map.

At the bottom of the unit, possible instructional tools, teaching points, and examples of student evidence are provided. Individual lesson plan titles are included on the right side of the table. Full lesson plans are not included, because the idea would be for the curriculum map to be a flexible guide which could meet the needs of any elementary school librarian as they embed the technology.

The units of study laid forth in the curriculum map are: introduction to the library computer lab, how to login to library online tools, how to use online resources, response and reflection using videos, implementing elements of coding, an inquiry unit, video creation, writing and creation, and collaborating with robots. Additional units and possible tools are listed at the end of the curriculum map. Once these units are laid out, the map elaborates on the standards to be addressed, the tools to be used, and the student objectives to be taught.

For example, for the stop motion video lessons, the unit of study is “video creation” and the essential question is “How can I use technology to create new things?” Based on the curriculum map, students will spend the four weeks learning about video creation, creating stop motion videos, and sharing them with their classmates. These activities are all based on the
standards: AASL III Collaborate standards, AASL VI Engage standards, I-SAIL Standard 3, and ISTE Standard 6. The possible video creation tool listed on the curriculum map is Google’s Stop Motion Animator, but librarians can locate other stop motion tools which work best for their district. Therefore, the map is adaptable as technology tools shift and change and will not need to be reframed once a technology tool emerges or retires.

One of the key teaching points for the video creation unit will be to instruct students on retelling or developing a plot to a story. The evidence of students successfully meeting the standards will be 1) Students are able to create a stop motion video retelling the plot of a story. 2) Students will be able to develop an original plot for a stop motion video with a partner. And 3) students will be able to create a stop motion video with at least 10 frames. Librarians can assess students on the completion of these objectives and develop rubrics to assess student work.

The concept of the curriculum map is to provide a structure for librarians to ensure they are addressing library standards and provide a framework for introducing students to a variety of technology tools. These units are also designed to tie into library informational literacy instruction, thus reinforcing the plot of a story read during story time or as a writing activity. Therefore, the technology is infused into the library instruction and pairs information literacy skills with technology skills.

By infusing literacy instruction, information literacy, and technology instruction in the library, the library becomes an all-encompassing gem in the treasure box of the school. Librarians are still polishing the diamond, but as these students’ perceptions reveal, the students are the real gems and the reason for all the libraries and librarians’ endeavors. The library provides a location for students to shine and it is the library’s reason for existence. Student
success and learning is the most valued treasure and by revealing how the library impacts students, we can realize the library truly is a treasure chest of polished jewels.
# Student Perception Survey

**Student indirect identifier: ___________________________**

**Instructions:** Read the sentence, and circle the statement and face which matches how you feel about the sentence.

1. I can use technology to tell others my ideas.
   - I can not. 😞
   - I can do it with help. 😐
   - I can do it by myself. 😊
   - I can teach someone how. 😎

2. I can use technology to create new things.
   - I can not. 😞
   - I can do it with help. 😐
   - I can do it by myself. 😊
   - I can teach someone how. 😎

3. I can use technology to learn new facts.
   - I can not. 😞
   - I can do it with help. 😐
   - I can do it by myself. 😊
   - I can teach someone how. 😎
4. I can use technology to think about what I am learning.

<table>
<thead>
<tr>
<th>I can not.</th>
<th>I can do it with help.</th>
<th>I can do it by myself.</th>
<th>I can teach someone how.</th>
</tr>
</thead>
</table>

5. I can use technology responsibly.

<table>
<thead>
<tr>
<th>I can not.</th>
<th>I can do it with help.</th>
<th>I can do it by myself.</th>
<th>I can teach someone how.</th>
</tr>
</thead>
</table>

6. I can be a good digital citizen.

<table>
<thead>
<tr>
<th>I can not.</th>
<th>I can do it with help.</th>
<th>I can do it by myself.</th>
<th>I can teach someone how.</th>
</tr>
</thead>
</table>

7. I can use technology safely.

<table>
<thead>
<tr>
<th>I can not.</th>
<th>I can do it with help.</th>
<th>I can do it by myself.</th>
<th>I can teach someone how.</th>
</tr>
</thead>
</table>
8. I feel comfortable using technology.

<table>
<thead>
<tr>
<th>I can not.</th>
<th>I can do it with help.</th>
<th>I can do it by myself.</th>
<th>I can teach someone how.</th>
</tr>
</thead>
<tbody>
<tr>
<td>😞</td>
<td>😲</td>
<td>😊</td>
<td>😎</td>
</tr>
</tbody>
</table>

9. I want to learn more about technology.

<table>
<thead>
<tr>
<th>I do not.</th>
<th>I have questions.</th>
<th>I want to learn.</th>
<th>I want to teach.</th>
</tr>
</thead>
<tbody>
<tr>
<td>😞</td>
<td>😲</td>
<td>😊</td>
<td>😎</td>
</tr>
</tbody>
</table>

10. I like using technology.

<table>
<thead>
<tr>
<th>I do not.</th>
<th>I have questions.</th>
<th>I like technology.</th>
<th>I love technology.</th>
</tr>
</thead>
<tbody>
<tr>
<td>😞</td>
<td>😲</td>
<td>😊</td>
<td>😎</td>
</tr>
</tbody>
</table>

Finish the sentence:

11. When I use technology, I feel

________________________________________

________________________________________
Appendix B “Parental Consent Form”

PARENTAL CONSENT
Parent/Guardian Form for Granting Permission for Child Participation

PROTOCOL TITLE: Understanding Children’s Perspectives on Computing
PRINCIPAL INVESTIGATOR: Rachel Magee, Ph.D., School of Information Sciences
CO-INVESTIGATOR/STUDENT INVESTIGATOR: Amy Brokaw

What is the Purpose of this Study?
Your child is being asked to take part in a research study. This form has important information about the reason for the study, what your child will do, and the way we would like to use information about your child if you choose to allow them to be in the study.

This research is about understanding what young children think about how they use computers, and how library instruction in computer use impacts those perceptions. This will help us to improve the way we teach students to use computers. Your child is being asked to participate in this study because they attend Ruth Schneider Elementary School and go to the library with Amy Brokaw, who teaches about computers.

What will my child do in this Study?
• Your child will take the same survey twice, at different parts of the school year. The survey is a five to ten minute, on-paper survey that asks about what your child can do with computers. The total time your child will be doing the study is about 20 minutes.
• The first survey will help us get an idea of how your child thinks about computers and what she/he/they can do with them now.
• Your child will attend the library with their class as normal throughout the school year.
• At the end of the year, your child will take the same survey, to help us get an idea of how they think about computers and what she/he/they can do with them after attending class in the library.

As a participant in this study, your child will be asked to come to the school library at Ruth Schneider Elementary School during regular library rotation. On two of these regular visits, your child will be asked to complete a short survey about using computers. Your child’s participation in this study will last for 20 minutes total over this academic school year.

At any time in the study, you and your child may decide to withdraw from the study. If your child withdraws, no more information will be collected from your child. When you or your child indicate he/she wishes to withdraw, the investigator will ask if the information/materials already collected from your child can be used.

What are the Possible Risks or Discomforts to my Child?
Your child’s participation does not involve any risks other than what your child would encounter in daily life. Your child may withdraw from the study at any time.
What are the Possible Benefits for My Child or Others?
Your child is not likely to have any direct benefit from being in this research study.

What Alternatives are Available?
You or your child may choose to not participate in this research study. If you do not wish for your child to participate in this study, the following alternatives are available:
- Free reading in the library during the time the survey is administered

Financial Information
Participation in this study will involve no cost to you or your child. Your child will not be paid for participating in this study.

What are my Child’s Rights as a Research Participant?
If you choose to allow your child to be in this study, your child has the right to be treated with respect, including respect for their decision whether or not they wish to continue or stop being in the study. Your child is free to stop being in the study at any time.

Choosing not to be in this study or to stop being in this study will not result in any penalty to your child or loss of benefits to which your child is otherwise entitled. If you and your child decide to not be in this study, this will not affect your child’s class standing.

If you or your child want to speak with someone who is not directly involved in this research, or if you or your child have questions about your child’s rights as a research subject, contact the University of Illinois Office for the Protection of Research Subjects (OPRS). You can call them at (217) 333-2670 or send e-mail to irb@illinois.edu.

Your child’s participation in this study is voluntary and they are free to withdraw at any time. Your child may also choose not to answer particular questions if they do not want to.

What about my Child’s Confidentiality and Privacy Rights?
We will use all reasonable efforts to keep your child’s personal information confidential, but we cannot guarantee absolute confidentiality. When this research is discussed or published, no one will know that your child was in the study. But, when required by law or university policy, identifying information (including yours or your child’s signed consent form) may be seen or copied by:
- The Institutional Review Board that approves research studies;
- The Office for Protection of Research Subjects and other university departments that oversee human subjects research;
- University and state auditors responsible for oversight of research.

If actual or suspected abuse, neglect, or exploitation of a child or a disabled or elderly adult is disclosed, the researcher or members of the study staff will report the information to Child Protective Services, Adult Protective Services, and/or a law enforcement agency.
Results of this study may be used for teaching, research, publications, and/or presentations at professional meetings. If your child's individual results are discussed, your child's identity will be protected by using a code number rather than your child's name or other identifying information.

**Whom should I Call if I have Questions or Concerns about this Research Study?**
If you or your child have any questions, call us promptly. Rachel Magee is the person in charge of this research study. You can call her at 217-265-6592 Monday-Friday, 9 am – 5 pm. You can also contact Amy Brokaw at 309-928-2622 or abrokaw@blueridge18.org with questions about this research.

**Consent**
I have read this form and the research study has been explained to me. I have been given the opportunity to ask questions and my questions have been answered. If I have additional questions, I have been told whom to contact.

I agree to let my child ____________________________ (print name) be in the research study described above. A copy of this consent form will be provided to me after I sign it.

Parent/Legal Guardian’s Name (printed) and Signature

Date

Name (printed) and Signature of Person Obtaining Consent

Date
Appendix C “Minor Written Assent Form”

MINOR WRITTEN ASSENT  
Assent to Participate in Research

Title of Research Study: Understanding Children’s Perspectives on Computing
Investigator: Rachel Magee, Ph.D. (PI), Amy Brokaw

Why am I being asked to take part in this research study?

We are doing research to find a better way to understand how things work. You are being asked to take part in this research because we want to know how students like you use and learn about computers.

What should I know about a research study?

You do not have to be in this study if you do not want to. It is up to you if you want to participate. You can even choose to say yes now and change your mind later if you want. Your decision will not be held against you and won’t impact your status as a student. You can ask all the questions you want before you decide, and during the research too.

Why is this research being done?

In this study, we want to find out more about how students use computers, what they can do with them, and how to teach them new things to try with computers.

How long will the research last?

Your participation in this research will last for this school year. During this year, there will be two times that we’ll ask you to do a survey while you’re at the library. Each time will take about 10 minutes.

What happens if I say “Yes, I want to be in this research”?

If it is okay with you and you agree to join this study, you will be asked to fill out a paper survey to tell us what you think about computers and what you can do with them. We will do this once soon, and then again at the end of the school year.
Is there any way being in this study could be bad for me?

There are not any risks for doing this study that are more than everyday life.

What happens to the information collected for the research?

We will limit the use of your personal information, including research study records, to people who need to review this information. We cannot promise complete secrecy but we won’t share your name in any of the presentations or papers we write about it.

Who can I talk to?

If you have questions, concerns, or complaints about the research, talk to the research team at rmmagee@illinois.edu or 217-265-6592. This research has been reviewed and approved by an Institutional Review Board (“IRB”). You may talk to them at (217) 333-2670 or irb@illinois.edu if your questions, concerns, or complaints are not being answered by the research team; you want to talk to someone besides the research team; or you have questions about your rights as a research participant.
Appendix D “Second Grade Library Technology Curriculum Map”

Second Grade Library Technology Curriculum Map


Second-grade students meet for library computer lab time once per week for 25-minute sessions.

<table>
<thead>
<tr>
<th>Year Round AASL Standards</th>
<th>AASL I. INQUIRE Build new knowledge by inquiring, thinking critically, identifying problems, and developing strategies for solving problems. B. Create. 3. Generating products that illustrate learning.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AASL III. COLLABORATE Work effectively with others to broaden perspectives and work toward common goals. B. Create. Learners participate in personal, social, and intellectual networks by: 1. Using a variety of communication tools and resources.</td>
</tr>
<tr>
<td></td>
<td>AASL VI. ENGAGE Demonstrate safe, legal, and ethical creating and sharing of knowledge products independently while engaging in a community of practice and an interconnected world. A. Think. Learners follow ethical and legal guidelines for gathering and using information by: 1. Responsibly applying information, technology, and media to learning.</td>
</tr>
</tbody>
</table>

Second Grade: Week 1-2

| Unit of Study | Introduction to the Library Computer Lab
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Essential Question(s): How can I use technology responsibly? How can I use technology safely? How can I be a good digital citizen?</td>
</tr>
<tr>
<td>AASL, ISAIL, &amp; ISTE Standards</td>
<td>AASL VI. ENGAGE Demonstrate safe, legal, and ethical creating and sharing of knowledge products independently while engaging in a community of practice and an interconnected world. A. Think. Learners follow ethical and legal guidelines for gathering and using information by: 2. Understanding the ethical use of information, technology, and media.</td>
</tr>
<tr>
<td></td>
<td>ISAIL Standard 3: Use information accurately, creatively, and ethically to share knowledge and to participate collaboratively and productively as a member of a democratic society.</td>
</tr>
</tbody>
</table>

Possible Tools: Chromebooks Google Gmail

Teaching Points: Welcome & Expectations Chromebook Use Google Login Information

Second Grade:
1. Welcome & Expectations
2. Google Login
### Second Grade: Week 3-5

| Student Evidence | Students will be able to:  
| --- | --- |
| 1) Use technology safely & responsibly by following procedures and expectations.  
2) Login to school Google Accounts |

#### Unit of Study: How to login and take an AR quiz

**Essential Question(s):** How do we access and use technology? How can I feel comfortable using technology?

**AASL, ISAIL, & ISTE Standards**

- **AASL VI. ENGAGE** Demonstrate safe, legal, and ethical creating and sharing of knowledge products independently while engaging in a community of practice and an interconnected world. A. Think. Learners follow ethical and legal guidelines for gathering and using information by: 2. Understanding the ethical use of information, technology, and media.

- **ISAIL Standard 3:** Use information accurately, creatively, and ethically to share knowledge and to participate collaboratively and productively as a member of a democratic society.

- **ISAIL Standard 5:** Understand and practice Internet safety when using any electronic media for educational, social, or recreational purposes.

**ISTE 1. Empowered Learner:**

- a. Access the Library Website
- d. Login and take a quiz using AR

#### Possible Tools

- School Library Homepage
- Renaissance Learning

#### Teaching Points

- AR Quiz Information or other library reading resource
- Read any AR book, login and take the quiz together
- Students practice independently with the same title

### Second Grade: Week 8-10

| Student Evidence | Students will be able to:  
| --- | --- |
| 1) Access the Library Website  
2) Login and take a quiz using AR |

#### Unit of Study: Resources: Online Resources to Find Books

**Essential Question(s):** What resources can I use to find books?

**AASL, ISAIL, & ISTE Standards**

- **AASL III. COLLABORATE** Work effectively with others to broaden perspectives and work toward common goals. B. Create. Learners participate in personal, social, and intellectual networks by: 2. Establishing connections with other learners to build on their own prior knowledge and create new knowledge.

- **AASL V. EXPLORE** Discover and innovate in a growth mindset developed through experience and reflection. A. Think. Learners develop and satisfy personal curiosity by: 1. Reading widely and deeply in multiple formats and write and create for a variety of purposes.

- **AASL VI. ENGAGE** Demonstrate safe, legal, and ethical creating and sharing of knowledge products independently while engaging in a community of practice and an interconnected world. D. Grow. Learners

#### Resources

- 6. Destiny Quest
- 7. No Bones About It
- 8. DigCit Lesson: Adding Friends Online / Posting / Cyberbullying
- 9. Destiny Add Friends
- 10. eReads Illinois (Axis 360)
**ISAIL Standard 3:** Use information accurately, creatively, and ethically to share knowledge and to participate collaboratively and productively as a member of a democratic society.

**ISAIL Standard 4:** Appreciate literature and other creative expressions of thoughts and ideas and pursue knowledge related to personal interests and aesthetic growth.

**ISAIL Standard 5:** Understand and practice Internet safety when using any electronic media for educational, social, or recreational purposes.

<table>
<thead>
<tr>
<th>Possible Tools</th>
<th>Destroy Quest</th>
<th>eBeads Illinois (Axis 360)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching Points</td>
<td>Information Seeking Strategies</td>
<td>Using Online Tools</td>
</tr>
<tr>
<td>Student Evidence</td>
<td>Students will be able to:</td>
<td>1) Access the library online database.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2) Locate books based on interests.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3) Use technology socially to positively share ideas and recommend books.</td>
</tr>
</tbody>
</table>

**Second Grade: Week 11-13**

<table>
<thead>
<tr>
<th>Unit of Study</th>
<th>Response &amp; Reflection: USE OF FLIPGRID Essential Questions: How can I use technology to tell others my ideas? How can I use technology to think about what I am learning?</th>
<th>11. FLIPGRID Introduction 12. FLIPGRID 2 Response 13. FLIPGRID Reflect</th>
</tr>
</thead>
</table>
| AASL, ISTE, & ISAL Standards | AASL III. COLLABORATE Work effectively with others to broaden perspectives and work toward common goals. D. Grow. Learners actively participate with others in learning situations by: 1. Actively contributing to group discussions.

AASL V. EXPLORE Discover and innovate in a growth mindset developed through experience and reflection. A. Think. Learners develop and satisfy personal curiosity by: 2. Reflecting and questioning assumptions and possible misconceptions.

AASL II. INCLUDE Demonstrate an understanding of and commitment to inclusiveness and respect for diversity in the learning community. C. Share. Learners exhibit empathy with and tolerance for diverse ideas by: 1. Engaging in informed conversation and active debate.

AASL II. INCLUDE Demonstrate an understanding of and commitment to inclusiveness and respect for diversity in the learning community. C. Share. Learners exhibit empathy with and tolerance for diverse ideas by: 2. Contributing to discussions in which multiple viewpoints on a topic are expressed.

AASL II. INCLUDE Demonstrate an understanding of and commitment to inclusiveness and respect for diversity in the learning community. D. Grow. Learners demonstrate empathy and equity in knowledge building within the global learning community by: 2. Demonstrating interest in other perspectives during learning activities.

AASL II. INCLUDE Demonstrate an understanding of and commitment to inclusiveness and respect for diversity in the learning community. D. Grow. Learners demonstrate empathy and equity in knowledge building within the global learning community by: 3. Reflecting on their own place within the global learning community.

AASL I. INQUIRE Build new knowledge by inquiring, thinking critically, identifying problems, and developing strategies for solving problems. C. Share. Learners adapt, communicate, and exchange learning products with others in a cycle that includes: 1. Interacting with content presented by others.

ISAL Standard 1: Access information efficiently and effectively to inquire, think critically, and gain knowledge.

ISAL Standard 5: Understand and practice Internet safety when using any electronic media for educational, social, or recreational purposes.

ISTE 2. Digital Citizen b.
ISTE 1. Empowered Learner b.
ISTE 6. Creative Communicator a.
ISTE 6. Creative Communicator b
ISTE 6. Creative Communicator c.
ISTE 6. Creative Communicator d.

Possible Tools
- Flipgrid
- Seesaw
<table>
<thead>
<tr>
<th>Teaching Points</th>
<th>Students reflect using Flipgrid to express their ideas</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Share with an authentic audience, and reflect.</td>
</tr>
<tr>
<td>Student Evidence</td>
<td>Students will be able to:</td>
</tr>
<tr>
<td></td>
<td>1) Use Flipgrid to express and share ideas and reflections.</td>
</tr>
</tbody>
</table>

### Second Grade: Weeks 14-17

<table>
<thead>
<tr>
<th>Unit of Study</th>
<th>Hour of Code / Digital Citizenship</th>
<th>Read Aloud</th>
</tr>
</thead>
<tbody>
<tr>
<td>AASL, ISAIL, &amp; ISTE Standards</td>
<td>Essential Question(s): How can I use technology to solve problems? How can I learn about technology?</td>
<td></td>
</tr>
<tr>
<td>AASL V. EXPLORE Discover and innovate in a growth mindset developed through experience and reflection. B. Create. Learners construct new knowledge by: 1. Problem solving through cycles of design, implementation, and reflection. AASL V. EXPLORE D. Grow. Learners develop through experience and reflection by: 1. Iteratively responding to challenges; 2. Recognizing capabilities and skills that can be developed, improved, and expanded; 3. Open-mindedly accepting feedback for positive and constructive growth. ISAIL Standard 2: Evaluate information critically and competently. ISAIL Standard 3: Use information accurately, creatively, and ethically to share knowledge and to participate collaboratively and productively as a member of a democratic society. ISTE 5.Computational Thinker a. ISTE 5.Computational Thinker c. ISTE 5.Computational Thinker d.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Possible Tools</td>
<td>Code.org : Digital Citizenship Tests</td>
<td></td>
</tr>
<tr>
<td>Teaching Points</td>
<td>Learn how to code Troubleshooting and Problem-Solving Skills Persistence</td>
<td></td>
</tr>
<tr>
<td>Student Evidence</td>
<td>Students will be able to: 1) Login to Code.org and access the lessons. 2) Complete a series of Code.org lessons.</td>
<td></td>
</tr>
</tbody>
</table>

### Second Grade: Week 18-21

<table>
<thead>
<tr>
<th>Unit of Study</th>
<th>Inquiry / Research / Biographies</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AASL, ISAIL, &amp; ISTE Standards</td>
<td>Essential Question(s): How can I use technology to learn new facts?</td>
<td></td>
</tr>
<tr>
<td>AASL I. INQUIRE Build new knowledge by inquiring, thinking critically, identifying problems, and developing strategies for solving problems. A. Think. Learners display curiosity and initiative by: 1. Formulating questions about a personal interest or a curricular topic; 2. Recalling prior and background knowledge as context for new meaning. B. Create. Learners engage with new knowledge by following a process that includes: 1. Using evidence to investigate questions; 2. Revising and implementing a plan to fill knowledge gaps;</td>
<td></td>
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</tr>
<tr>
<td>Possible Tools</td>
<td>WORLDBOOK ONLINE</td>
<td></td>
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</tr>
</tbody>
</table>

### Teaching Points
- Research Process (Big 6)
- Inquiry
- Information Literacy Strategies

### Student Evidence
- Students will be able to:
  1. Use Worldbook Online to research a famous person by answering questions.
  2. Create three GoogleSlides about a famous person.
  3. Share GoogleSlide presentations to the class.

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**Second Grade: Weeks 22-25**

<table>
<thead>
<tr>
<th>Unit of Study</th>
<th>Video Creation</th>
<th>Essential Question(s): How can I use technology to create new things?</th>
</tr>
</thead>
<tbody>
<tr>
<td>AASL, ISAIL, &amp; ISTE Standards</td>
<td>AASL III. COLLABORATE Work effectively with others to broaden perspectives and work toward common goals. A. Think.</td>
<td>Developing new understandings through engagement in a learning group.</td>
</tr>
<tr>
<td></td>
<td>AASL VI. ENGAGE Demonstrate safe, legal, and ethical creating and sharing of knowledge products independently while engaging in a community of practice and an interconnected world. C. Share.</td>
<td>Learners responsibly, ethically, and legally share new information with a global community by: 1. Sharing information resources in accordance with modification, reuse, and remix policies.</td>
</tr>
<tr>
<td></td>
<td>ISAIL Standard 3: Use information accurately, creatively, and ethically to share knowledge and to participate collaboratively and productively as a member of a democratic society.</td>
<td>22. Stop Motion Video Introduction 23. Stop Motion 2 24. Stop Motion 3 25. Stop Motion 4: Share</td>
</tr>
<tr>
<td>Possible Tools</td>
<td>Stop Motion Animator Google Extension</td>
<td></td>
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<tr>
<td>----------------</td>
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<td></td>
</tr>
<tr>
<td>Teaching Points</td>
<td>Story Plot</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Video Creation technology tools</td>
<td></td>
</tr>
<tr>
<td>Student Evidence</td>
<td>Students will be able to:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1) Create a Stop Motion video retelling the plot of a story.</td>
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<tr>
<td></td>
<td>2) Develop an original plot for a Stop Motion Video with a partner.</td>
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<td></td>
<td>3) Create a Stop Motion video with at least 10 frames.</td>
<td></td>
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</tbody>
</table>

### Second Grade: Week 26-30

<table>
<thead>
<tr>
<th>Unit of Study</th>
<th>Writing, Creation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Essential Question(s): How can I use technology to share ideas?</td>
<td></td>
</tr>
<tr>
<td>How can I use technology to create new things?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AASL, ISAIL, &amp; ISTE Standards</th>
<th>AASL VI. ENGAGE Demonstrate safe, legal, and ethical creating and sharing of knowledge products independently while engaging in a community of practice and an interconnected world. B. Create. Learners use valid information and reasoned conclusions to make ethical decisions in the creation of knowledge by: 1. Ethically using and reproducing other's work, 2. Acknowledging authorship and demonstrating respect for the intellectual property of others, 3. Including elements in personal knowledge products that allow others to credit content appropriately. AASL VI. ENGAGE C. Share. Learners responsibly, ethically, and legally share new information with a global community by: 1. Sharing information resources in accordance with modification, reuse, and remix policies.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISAIL Standard 3: Use information accurately, creatively, and ethically to share knowledge and to participate collaboratively and productively as a member of a democratic society.</td>
<td></td>
</tr>
<tr>
<td>ISTE 6. Creative Communicator a.</td>
<td></td>
</tr>
<tr>
<td>ISTE 6. Creative Communicator b</td>
<td></td>
</tr>
<tr>
<td>ISTE 6. Creative Communicator c</td>
<td></td>
</tr>
<tr>
<td>ISTE 6. Creative Communicator d</td>
<td></td>
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<tr>
<td>ISTE 2. Digital Citizen c.</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Possible Tools</th>
<th>Storybird.com</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching Points</td>
<td>Story Plot</td>
</tr>
<tr>
<td></td>
<td>Online Creation Tools</td>
</tr>
<tr>
<td></td>
<td>Illustrations</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Student Evidence</th>
<th>Students will be able to:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1) Write a story using storybird and include illustrations.</td>
</tr>
<tr>
<td></td>
<td>2) Share a story they created with others.</td>
</tr>
<tr>
<td>Unit of Study</td>
<td>Collaboration:</td>
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<tr>
<td>--------------</td>
<td>----------------</td>
</tr>
<tr>
<td><strong>Essential Question(s):</strong></td>
<td>How can I program technology? \n</td>
</tr>
<tr>
<td><strong>AASL, ISTE Standards</strong></td>
<td>AASL V. EXPLORE Discover and innovate in a growth mindset developed through experience and reflection. B. Create. Learners construct new knowledge by: 2. Innovating through self-directed pursuits by tinkering and making.</td>
</tr>
<tr>
<td></td>
<td>ISAIL Standard 4: Appreciate literature and other creative expressions of thoughts and ideas and pursue knowledge related to personal interests and aesthetic growth.</td>
</tr>
<tr>
<td><strong>Possible Tools</strong></td>
<td>Ozobots</td>
</tr>
<tr>
<td><strong>Teaching Points</strong></td>
<td>Collaboration \n</td>
</tr>
<tr>
<td><strong>Student Evidence</strong></td>
<td>Students will be able to: \n</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unit of Study</th>
<th>Other tools use with 2nd grade</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Essential Question(s):</strong></td>
<td>How can I use technology to create and share ideas?</td>
</tr>
<tr>
<td><strong>AASL, ISTE Standards</strong></td>
<td>AASL I. INQUIRE Build new knowledge by inquiring, thinking critically, identifying problems, and developing strategies for solving problems. B. Create. 3. Generating products that illustrate learning. \n</td>
</tr>
<tr>
<td><strong>ISAI Standards</strong></td>
<td><strong>Possible Tools</strong></td>
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</tbody>
</table>
| **ISAI Standard 8** | Use information accurately, creatively, and ethically to share knowledge and to participate collaboratively and productively as a member of a democratic society. | G Suite, Makey Makey, Seesaw, PlayDoh Touch, Dash Robot, Quiver Vision, Green Screen, Chatterpix, 3Doodler pen, Sphero | Inquiry, Collaboration, Technology Tools | Students will be able to:  
1) Design, create and use technology tools to create and share knowledge. |
Works Cited


Keengwe, Jared, et al. *Promoting Global Literacy Skills through Technology- Infused Teaching and Learning*. IGI Global, 2015. IGI Global. 701 East Chocolate Avenue Suite 200, Hershey, PA 17033. Tel: 866-342-6657; Tel: 717-533-8845; Fax: 717-533-8661; e-mail: cust@igi-global.com; Web site: http://www.igi-global.com/.
Kilickaya, Ferit, and Jaroslaw Krajka. “Can the Use of Web-Based Comic Strip Creation Tool Facilitate EFL Learners’ Grammar and Sentence Writing?” *British Journal of Educational Technology*, vol. 43, no. 6, Nov. 2012.


Neokleous, Georgios. “Interpreting Technologically Fluent Classrooms: Digital Natives’ Attitudes towards the Use of Technology in Primary Schools in Norway.” *Research-Publishing.Net*, Research-publishing.net, 15 Mar. 2019. Research-publishing.net. La Grange des Noyes, 25110 Voillans, France. e-mail: info@research-publishing.net; Web site: http://research-publishing.net.

Neuman, D. “Research in School Library Media for the next Decade: Polishing the Diamond.” *Library Trends*, vol. 51, no. 4, 01 2003, pp. 503–24,


