School Librarian Self-Efficacy Beliefs About integrating Technology During inquiry-Based Learning: A Mixed Methods Study

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ABSTRACT

SCHOOL LIBRARIAN SELF-EFFICACY BELIEFS ABOUT INTEGRATING TECHNOLOGY DURING INQUIRY-BASED LEARNING: A MIXED METHODS STUDY

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Northern Illinois University, 2023
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The purposes of this explanatory sequential mixed methods study were to examine the self-efficacy beliefs of school librarians about integrating technology during inquiry-based learning during the quantitative phase and then to explore how these practices about technology integration during inquiry-based learning were being implemented during the qualitative phase. This study was conducted to better understand the self-efficacy beliefs of school librarians and how they provided students with authentic and meaningful experiences when integrating technology during inquiry-based learning. For the quantitative strand of research, the Technology Integration Self-Efficacy Scale (Wang et al., 2004) was slightly modified to tailor it for school librarian participants in this study. For the qualitative strand of research, semi-structured interviews were conducted followed by reviewing lesson plan artifacts. Three research questions were addressed in this explanatory sequential mixed methods design.

During the quantitative phase, Research Question 1 (QUAN) asked “What are the self-efficacy beliefs of school librarians about integrating technology during inquiry-based learning?” There were 115 school librarians that participated in the quantitative phase by completing a survey. There were four noteworthy findings that emerged from the quantitative phase using descriptive statistics. First, school librarian participants that had less years of experience were more likely to have low self-efficacy beliefs while school librarians with more years of
experience were more likely to report high self-efficacy beliefs about integrating technology during inquiry-based learning. Second, younger school librarians were more likely to have low self-efficacy beliefs compared to older school librarians about integrating technology during inquiry-based learning. School librarians who were under 30 years old or younger reported the lowest self-efficacy beliefs compared to any other demographic. Third, middle school and high school librarians reported higher self-efficacy beliefs about integrating technology during inquiry-based learning compared to elementary school librarians. Fourth, school librarians that were not highly qualified reported the second lowest self-efficacy beliefs about integrating technology during inquiry-based learning compared to any other demographic. The quantitative findings from this study revealed that the years of experience, age, grade level taught, and qualifications influenced the self-efficacy beliefs of school librarians when integrating technology during inquiry-based learning.

During the qualitative phase, Research Question 2 (qual) asked “how do school librarians describe their practices when integrating technology during inquiry-based learning?” Ten school librarian participants were selected from the quantitative phase using maximum variation sampling to participate in the qualitative phase. The qualitative phase included collecting and analyzing data from semi-structured interviews and then reviewing lesson plan artifacts. Socialization was the most prevalent major theme that emerged from the semi-structured interviews where the participants described how their perceptions and experiences of observations and interactions with administration, colleagues, parents, and students influenced their self-efficacy beliefs and their practices about integrating technology during inquiry-based learning. Subthemes for Socialization included (1a) stakeholder relationships and (1b)
physiological factors. Performance was the second most prevalent major theme that emerged during the semi-structured interviews where the participants described how their perceptions, experiences, preparation, and performance influenced their self-efficacy beliefs about integrating technology during inquiry-based learning. Subthemes for Performance included (2a) experience, (2b) modeling and creating, and (2c) barriers. In addition to conducting semi-structured interviews, lesson plan artifacts were reviewed to further explore how school librarians integrated technology during inquiry-based learning. Student-Centered Integration was the most prevalent theme that emerged when reviewing lesson plan artifacts and included subthemes of (3a) student consumption, (3b) student creation, and (3c) student collaboration. Librarian-Centered Integration was the second major theme that emerged when reviewing lesson plan artifacts and included subthemes of (4a) modeling and creating and (4b) curating.

Research Question 3 was a mixed methods research question that asked “In what ways does the qualitative data of exploring the practices of school librarians about integrating technology during inquiry-based learning help to explain the quantitative strand of data of their self-efficacy beliefs?” Self-efficacy beliefs about integrating technology during inquiry-based learning do not always lead to practices, but they can provide a good indicator to determine if these practices will be incorporated well. Therefore, a joint display was developed to demonstrate how the quantitative and qualitative phases provided insights into how both phases were mixed and integrated. The joint display for this study included all three data sources for this study including lesson plan artifact subthemes, quotes from the semi-structured interviews, and scores from the quantitative survey instrument that indicated low or high self-efficacy beliefs.
SCHOOL LIBRARIAN SELF-EFFICACY BELIEFS ABOUT INTEGRATING TECHNOLOGY DURING INQUIRY-BASED LEARNING: A MIXED METHODS STUDY

BY

JOSEPH J. BABB
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A DISSERTATION SUBMITTED TO THE GRADUATE SCHOOL IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE DOCTOR OF PHILOSOPHY

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Dr. Pi-Sui Hsu
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DEDICATION

To my children, Benjamin and Kyla,

and my wife, Dina,

I love you.
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CHAPTER 1

INTRODUCTION

A school librarian can have an important and unique impact on the school community with the different ways they can support and promote student learning. This role within a school can vary dramatically depending on the program goals and culture of the school. School librarians have an opportunity to provide students with authentic and meaningful experiences through unique learning opportunities. There are many different responsibilities that school librarians have in their role, but one powerful way they can provide students with important learning opportunities is when integrating technology during inquiry-based learning. School districts across the United States are allocating large parts of their budgets to invest in integrating technology in the curriculum (Bowles, 2019) and at the same time are heavily emphasizing the importance for teachers and school librarians to implement inquiry-based learning in the classroom (Buchanan, Harlan, Bruce, & Edwards, 2016). Inquiry-based learning is an effective teaching method that is very scaffolded where the teacher is an active facilitator (Hmelo-Silver, Duncan, & Chinn, 2007) while students take ownership of their learning (Pedaste et al., 2015), construct knowledge as they engage in authentic and meaningful tasks (ALA & AASL, 2010; Hmelo-Silver et al., 2007), and have a voice and choice in the learning process (Byker, Putman, Handler, & Polly, 2017). Integrating technology during inquiry-based learning can be an opportunity for school librarians to focus their efforts on their library program to have a powerful impact on student learning. School librarians can be forerunners and leaders within their schools to integrate technology (Johnston, 2012; Johnston, 2015; Johnston, 2018; Wine, 2016) during
inquiry-based learning (Condliffe et al., 2017; Silm et al., 2017). However, there is a breakdown between what administrators and school districts expect for school librarians to integrate inquiry-based learning compared to how often teachers implement this type of teaching method (Capps & Crawford, 2013; Silm et al., 2017). This discrepancy might be present because of differing expectations that different stakeholders have within schools (Hew & Brush, 2007). For this mixed methods study, the self-efficacy beliefs of school librarians about technology integration during inquiry-based learning were examined during the quantitative phase. Then, school librarian practices were explored during the qualitative phase to see how likely they integrated technology during inquiry-based learning within their school library programs. This study used an explanatory sequential mixed methods design.

Background

Hmelo-Silver et al. (2007) defined inquiry-based learning as a teaching method where students construct meaning of content that is highly scaffolded and generate questions to engage in authentic and meaningful tasks, take ownership of the learning process, and then share their learning. Teachers facilitate this process by providing different levels of support based on the developmental levels of the students and can purposefully decide how much support students need throughout the process (Banchi and Bell, 2008; Hmelo-Silver et al., 2007). Banchi and Bell (2008) developed a continuum inquiry-based learning model including confirmation inquiry, structured inquiry, guided inquiry, and open inquiry. The teacher can choose which type of inquiry-based learning model would be most beneficial to their students and provide scaffolded supports to help students be successful throughout the research process. Teachers can collaborate
and partner with the school librarian to provide students with enhanced experiences and increased achievement since school librarians have specialized expertise on how to support students during inquiry-based learning (Buchanan et al., 2016). Integrating technology during inquiry-based learning allows students to experience and engage in high-level learning. The role of technology during inquiry-based learning has enabled students to do tasks that were not previously able to be explored.

Integrating technology during inquiry-based learning provides students with learning opportunities to construct meaning and engage in purposeful collaborative experiences (Edelson et al., 1999; Khalaf & Zin, 2018). Technology should not be used just for the sake of using technology for low-level tasks or a substitution for paper and pencil worksheets but should be implemented in ways that will have the greatest impact on instruction (Kirkland, 2014). Keser et al. (2015) stated that effective technology integration “is not how intense technological resources are used, but the use of proper pedagogical approach and technology” (p. 1193). For example, teachers should not merely substitute paper worksheets for digital worksheets with students, but should provide opportunities for students to explore, plan, design, collaborate, create, and publish their findings through inquiry-based learning opportunities. These experiences will motivate students to take ownership of their own learning.

Technology integration and inquiry-based learning have been two important objectives for school librarians throughout the history of their role. In 1969, the American Library Association (ALA) and National Education Association (NEA) developed the Standards for School Media Programs to respond to new technologies available and cultural changes in society. The ALA and NEA (1969) advocated that school library programs should be a focal
point within schools to provide students with meaningful technology experiences facilitated by
the school librarian. Inquiry-based learning should also be an important component included in
library programs. The ALA and NEA (1969) advocated that students must engage in inquiry to
engage in high-level tasks and stated that “the focus of the media program is on facilitating and
improving the learning process in its new directions—with emphasis on the learning, on ideas
and concepts rather than on isolated facts, and on inquiry rather than on rote memorization” (p. 2).
The school librarian should facilitate learning opportunities for students that have them
engage in high-level tasks. Additionally, the ALA and NEA (1969) stated that school library
programs should “stress individualization, inquiry, and independent learning for students” (p. 3),
help students “gain skill in the techniques in inquiry and critical evaluation” (p. 8), and “stress
learning through independent study and inquiry” (p. 36). These same objectives developed by the
ALA and NEA (1969) remain important for school librarians to implement in their current
library programs.

In 1988, *Information Power: Guidelines for School Library Media Programs* was
published by the American Association of School Librarians (AASL) and the Association for
Educational Communication and Technology (AECT). These professional organizations
partnered together to outline how school librarians could develop programs to have the greatest
impact on student achievement. One reason why the AASL and AECT (1988) published
*Information Power: Guidelines for School Library Media Programs* was to respond to the
demanding increase in technology and how school librarians could have a deep impact on
student learning by being technology leaders within their school communities (AASL & AECT,
1988). The AASL and AECT (1988) specified how school librarians could be technology
integration leaders to promote student learning and inquiry by stating that school librarians “must be responsible for assessing and promoting effective use of instructional technologies. They must play a leading role on the school’s technology planning team because they are educated to evaluate, select, and manage the technologies that make information and ideas available in a wide variety of formats” (p. 38). School librarians need to be equipped to shape the culture of their schools through their technological expertise and transform student learning through effective technology integration. The Information Power: Guidelines for School Library Media Programs published by the AASL and AECT (1988) was updated in 1998 and titled Information Power: Building Partnerships for Learning (AASL & AECT, 1998). The AASL and AECT (1998) emphasized that the school librarian should be an instructional leader and key collaborator with other stakeholders within the school community.

In 2009, The AASL published the Standards for the 21st-Century Learner in Action to equip school librarians to be effective technology integration leaders and facilitate inquiry-based learning opportunities for students. The AASL (2009) advocated that school librarians should integrate technology during inquiry-based learning activities. According to the AASL (2009), indicator 1.1.8 stated that school librarians should “demonstrate mastery of technology tools for accessing information and pursuing inquiry” (p. 47). School librarians should be equipped to determine what types of technology integration would be best to pair with inquiry-based learning to enhance student learning. One example of why school librarians must be able to facilitate this type of instruction is that seventh grade students need to engage in inquiry-based learning and “demonstrate creative thinking and construct knowledge using technology” (AASL, 2009, p. 191). During inquiry-based learning, students can be self-directed learners that are empowered
through the learning process by asking or answering questions, following or developing a process, and confirming or generating an outcome (AASL, 2009). In the years following AASL (2009), school librarians have needed to continue to evolve in their role due to the demands of integrating technology into their library programs since technology has advanced so rapidly (ALA & AASL, 2010; ALA, AASL, & CAEP, 2019; Seminelli, 2016; Wine, 2016).

School librarians are charged with effectively integrating technology during inquiry-based learning. Standard 2.2 in the *ALA, AASL, and CAEP School Librarian Preparation Standards (2019)* stated that school librarians need to “use a variety of instructional strategies and technologies to ensure that learners have multiple opportunities to inquire, include, collaborate, curate, explore, and engage in their learning” (2019, p. 9). The school librarian role is in a position to empower students and enhance their learning experiences due to this directive expected of them. For this to happen most effectively, school librarians need to use flexible scheduling to allow for time to plan, collaborate, and maximize the effectiveness of their schedule (Linton, 2012). Flexible and responsive library program schedules allow school librarians to have the most effective library program compared to library programs on a fixed schedule or hybrid schedule (AASL, 2019; Linton, 2012). Each classroom teacher should collaborate and partner with the school librarian to ensure “technology integration decisions are made collectively, and technology tools are closely aligned with content and instructional practices that support student learning” (Linton, 2012, p. 29). Technology integration during inquiry-based learning should be used with a purpose and be intentionally implemented with students. According to the AASL (2018a), school librarians should have library programs that “promote, and foster inquiry learning” and “empower learners to persist in inquiry” (p. 2).
Additionally, school librarians should integrate technology to provide students with authentic learning experiences, provide access to meaningful information, and facilitate opportunities for students to collaborate with others (AASL, 2018a). These experiences will benefit students by increasing their motivation, interest level, self-efficacy beliefs, and understanding of the content (Buchanan et al., 2016). School librarians can partner with teaching colleagues to be purposeful and provide students with this type of learning. This study examined the self-efficacy beliefs of school librarians about integrating technology during inquiry-based learning and their practices which provided valuable insights on how to ensure that these methods are incorporated in school library programs to have the greatest impact on student learning and achievement. The development of the school librarian role throughout its history has included the concepts of technology integration and inquiry-based learning as pillars within library programs. The American Association of School Librarians (AASL), American Library Association (ALA), Association for Educational Communications and Technology (AECT), and the National Education Association (NEA) have responded to the evolving role of the school librarian throughout its history by publishing standards, guidelines, and research to outline how the school librarian role can be most effective when integrating technology and promoting inquiry-based learning in their library programs.

**Problem Statement**

School librarians need to integrate technology during inquiry-based learning since the role of the school librarian has evolved in recent years, but these practices are not happening in all school library programs. This is very concerning because some school librarians are not
implementing these practices and many school librarian positions have been cut. Between 1999 and 2016, school librarian positions have been cut across the United States by 19% (Lance, 2018). Kletter (2021) stated that “the number of school librarians around the country has fallen about 20% in the last decade, and districts with large numbers of vulnerable students are the most impacted” (p.1). This has raised questions for the school librarian community with how to respond and adapt to this concerning trend. The role of the school librarian has evolved from the stereotypical view of a librarian (Kimmel, Howard, & Ruzzi, 2016; Levin, 2019; Seminelli, 2016; Wine, 2016). However, many people still think that the school librarian merely helps students check out books (Seminelli, 2016). It is too bad that school librarians cannot work together to overcome this misconception. School librarians have tried to break free and redefine themselves, but it has been difficult since library programs look different and vary dramatically from school to school (Kachel & Lance, 2018). This study examined school librarian self-efficacy beliefs during the quantitative phase and explored their practices during the qualitative phase which provided key insight as to how technology integration during inquiry-based learning has been included in library programs and implemented by school librarians.

**Purposes of the Study**

The purposes of this mixed methods study were to examine the self-efficacy beliefs of school librarians about integrating technology during inquiry-based learning during the quantitative phase and then to explore how these practices about technology integration during inquiry-based learning were being implemented during the qualitative phase. An explanatory sequential mixed methods design was used that involved collecting quantitative data first and
then in-depth qualitative data was used to help explain the quantitative results. In the first, quantitative phase of the study, survey data was collected from school librarians located in the Chicago suburbs to investigate the self-efficacy beliefs of school librarians about integrating technology during inquiry-based learning. The second, qualitative phase was conducted as a follow-up to the quantitative results and explored the practices of school librarians with how they integrate technology during inquiry-based learning. The qualitative data helped explain the quantitative survey results. In the explanatory follow-up, qualitative data including semi-structured interviews and reviewing lesson plan artifacts were explored to help explain how these practices about technology integration during inquiry-based learning were implemented.

Significance

This study is significant because it helped inform school librarians how to effectively integrate technology during inquiry-based learning in their library programs to provide students with authentic and meaningful experiences (ALA & AASL, 2010; ALA, AASL, & CAEP, 2019). The role of school librarians has evolved, and now they are tasked with integrating technology during inquiry-based learning (AASL, 2018b; ALA & AASL, 2010; ALA, AASL, & CAEP, 2019). The ALA and AASL have recognized this evolution and provided standards that reflect these changes. In the *ALA, AASL, and CAEP School Librarian Preparation Standards* (2019), Standard 2 described the school librarian as an effective teacher that incorporates inquiry-based learning in their instruction, while Standards 2 and 3 advocated that school librarians need to successfully integrate technology and provide students with meaningful learning experiences. There is an abundance of literature for how school librarians can integrate
technology in their library programs, but there is not sufficient academic research on this topic (Elbasri, 2018; Johnston, 2012; Johnston, 2015). This study will be helpful for administrators to utilize school librarians in ways that will have the greatest impact on student achievement (Johnston, 2012; Kachel & Lance, 2018; Levitov, 2016). Condliffe et al. (2017) advocated that teacher beliefs and practices should be examined and compare them to how they practically implement inquiry-based learning in practice. Therefore, the self-efficacy beliefs of school librarians were examined during the quantitative phase and their current practices were explored during the qualitative phase. This study provided insights into how school librarians can most effectively integrate technology during inquiry-based learning and have the most impact within their library programs.

Research Questions

The following questions were addressed through an explanatory sequential mixed methods design:

Research Question 1 (QUAN): What are the self-efficacy beliefs of school librarians about integrating technology during inquiry-based learning?

Research Question 2 (qual): How do school librarians describe their practices when integrating technology during inquiry-based learning?

Mixed Methods Research Question: In what ways does the qualitative data of exploring the practices of school librarians about integrating technology during inquiry-based learning help to explain the quantitative strand of data of their self-efficacy beliefs?
Worldview

Pragmatism was the guiding worldview for this mixed methods study. First, quantitative data was collected by examining the self-efficacy beliefs of school librarians about technology integration during inquiry-based learning. Next, qualitative data was collected by exploring the practices of school librarians and how they integrated technology during inquiry-based learning. According to Creswell and Plano Clark (2018), a pragmatic worldview allows the researcher to be “pluralistic and oriented toward ‘what works’ and real-world practice” (p. 37). This means that this study followed where the data led and was not constrained to a rigid view of how to explore the research questions. The aim of the pragmatic worldview is to be authentic and practical in how data is obtained. Creswell and Garrett (2008) reported “the focus of research is on the research question and different methods can be employed to answer this question” (p. 327). This worldview provided advantages in this study because the best aspects of each research philosophy were applied. Therefore, this study was not constrained by one perspective or was required to follow a dogmatic approach when attempting to answer the research questions. Overall, this study used a pragmatic approach which combined the most relevant belief systems and implemented strategies to effectively answer the research questions.

Theoretical Framework

Albert Bandura’s theory on self-efficacy beliefs and practices served as the theoretical framework for this explanatory sequential mixed methods study. According to Bandura (1977), “efficacy expectations determine how much effort people will expend and how long they will persist in the face of obstacles and aversive experiences. The stronger the perceived self-efficacy
beliefs, the more active the efforts” (p. 194). The stronger an individual’s self-efficacy beliefs are, the more likely they will be to successfully complete tasks and persevere through difficult practices or situations. Conversely, individuals with low self-efficacy beliefs will reach frustration more quickly when attempting certain tasks.

Several studies found similar findings where performance and practices are enhanced with a higher level of self-efficacy beliefs, while at the same time, stress and anxiety can be managed more easily (Akkuzu, 2014; Bandura & Adams, 1977; Lebeau et. al., 2018). Self-efficacy beliefs are a way to determine how likely an individual will engage in certain behaviors, practices, and overcome challenges. Self-efficacy beliefs are beliefs that a person holds are indicators for how an individual will successfully complete and perform a specific task or engage in specific practices (Bandura, 1977; Carey & Forsyth, 2019). This could include any behavior or practice an individual might engage in or abstain from due to their self-efficacy beliefs. Individuals with high self-efficacy beliefs will show more perseverance through difficult situations or practices and work hard to complete the given tasks (Bandura, 1977). If an individual believes they cannot succeed at a task, or they are not equipped with the proper resources to complete it sufficiently, they will avoid attempting to complete the task. The concept of self-efficacy beliefs does not automatically mean that an individual will successfully complete tasks and achieve desired outcomes, but that they will be more likely to engage in behaviors that help them complete tasks. Self-efficacy beliefs influence behavior and the amount of effort individuals will put forth during a specific task or practice, but self-efficacy beliefs do not guarantee that an individual will be successful with the task or practice (Bandura, 1977). Four sources from where individuals can build self-efficacy beliefs and practices include
“performance accomplishments, vicarious experience, verbal persuasion, and physiological
states” (Bandura, 1977, p. 195). These different sources of self-efficacy beliefs and practices can
impact the behavior and actions of an individual in different ways.

Performance accomplishments are “influential because it is based on personal mastery
experiences” (Bandura, 1977, p. 195). Individuals that engage in a repeated task and continue to
experience success will continue to engage in the behavior. For example, a professional skier that
has successfully skied down thousands of mountains throughout their career will have strong
self-efficacy beliefs when attempting to ski down the next mountain. If a person attempts a task
and finds repeated success, they will be more likely to try the task in the future which will help
them build strong self-efficacy beliefs. Bandura (1977) stated “after strong efficacy expectations
are developed through repeated success, the negative impact of occasional failures is likely to be
reduced” (p. 195). This means that an individual will build self-efficacy beliefs by continuing to
engage in a task even if there is an occasional failure or negative experience. Performance
accomplishments “not only promote behavioral accomplishments but also extinguish fear
arousal, thus authenticating self-efficacy through enactive and arousal sources of information”
(Bandura, 1977, p. 195). An individual that develops strong self-efficacy beliefs can generalize
their success and transfer their skills to related tasks and practices (Bandura, 1977). Performance
accomplishments have a stronger impact than vicarious experiences (Bandura, 1977).

Vicarious experiences are another factor that can impact the level of self-efficacy beliefs.
Bandura (1977) explained that “seeing others perform threatening activities without adverse
consequences can generate expectations in observers that they too will improve if they intensify
and persist in their efforts” (p. 197). This is when an individual that observes someone else
successfully complete a task can build their own self-efficacy beliefs since someone else modeled it for them. For instance, if during gym class, Student A can reach the top of the rope climb and successfully complete this task, then Student B may have higher self-efficacy beliefs of their own ability to accomplish the same task if they perceive themselves to be more athletic or have similar athletic abilities than Student A. However, if Student B perceives themselves as a lot weaker than Student A, then observing Student A successfully complete the rope climb will not impact their self-efficacy beliefs. The way an individual perceives themselves compared to the individual they are observing can impact their own self-efficacy beliefs. An individual that observes someone else behave in a certain way and be successful will be more likely to attempt the same pattern of behaviors (Bandura, 1977). This means that an individual observing modeled behavior and consequences will have their own self-efficacy beliefs reinforced and be more likely to engage in the same behaviors or avoid them. An individual that observes modeled behavior paired with consequences given to the person modeling the behavior will reinforce the individual’s self-efficacy beliefs (Bandura, 1977).

The most frequent ways to attempt to influence human behavior is through verbal persuasion (Bandura, 1977). This happens through conversation and is isolated away from an individual practicing authentic experiences. Verbal persuasion is when “people are led, through suggestion, into believing they can cope successfully with what has overwhelmed them in the past” (Bandura, 1977, p. 198). Individuals reflect on past experiences and then discuss how to overcome them in the future. This is a less effective tactic than performance mastery since it does not give an individual an opportunity to build meaningful experiences (Bandura, 1977). However, the effectiveness of verbal persuasion changes based on the individual’s perception of
the person communicating with them. Bandura (1977) stated that “the impact on verbal persuasion on self-efficacy may vary substantially depending on the perceived credibility of the persuaders, their prestige, trustworthiness, expertise, and assuredness” (p. 202). For example, if a high school student is studying for a final exam in their geometry class, their self-efficacy beliefs are more likely to change if a classmate who took the exam a week earlier tells them that it is a difficult test. However, if the high school student’s younger brother in middle school that has not taken the geometry class says it is a difficult test, the high school student’s self-efficacy beliefs are not likely to change. If an individual does not trust the persuader or does not find them to be a credible source, verbal persuasion will not be successful (Bandura, 1977).

The fourth source that impacts self-efficacy beliefs is physiological states which can also be referred to as emotional arousal. Bandura (1977) discussed that self-efficacy beliefs can be affected when individuals experience high levels of anxiety or strongly charged emotional reactions. If an individual experiences intense emotion, their self-efficacy beliefs will be affected which then leads to inhibited performance. Individuals are more likely to avoid certain stressful situations because they fear that they will experience stress or anxiety during the task. Bandura (1977) provided key distinctions for the sources of self-efficacy beliefs and how it can predict behavior. Researchers have built on the research on self-efficacy beliefs and have applied it to the medical field, law, and education (Pajares, 1992).

Pajares (1992) described that the self-efficacy beliefs of educators impact their instruction and what teaching methods they choose to implement with their students. However, it is very difficult for educators to change their self-efficacy beliefs and practices compared to other professions like the medical field or law (Pajares, 1992). Pajares (1992) explained that
many educators go into the field of teaching based on their own positive educational experiences that they encountered in the past. Preservice teachers in education have already had over one decade to form their self-efficacy beliefs and practices regarding education based on their personal schooling experiences so it is more difficult for their self-efficacy beliefs and practices to change compared to other professions. If a preservice teacher started attending school at age five in kindergarten and enrolled in a preservice education program at eighteen years old, they will have already had thirteen years to have their self-efficacy beliefs and practices about how to teach reinforced. Preservice teachers and practicing teachers need to be intentional to change their self-efficacy beliefs and practices. Pajares (1992) warned that “students become teachers unable, and subconsciously unwilling, to affect a system in need of reform” (p. 323). Other researchers have shared this same concern and have discussed that some preservice teachers regress in their self-efficacy beliefs and become rigid in their teaching methods (Bosch & Ellis, 2021; Tschannen-Moran et al., 1998). This is problematic for the field of education because educators have an extremely difficult time changing their beliefs and practices even if there is research that supports a better way of teaching. It is not that educators lack enough knowledge to obtain the most effective teaching methods and pedagogical framework, but it is that they succumb to the detrimental “resistant-to-change nature of educational beliefs” (Pajares, 1992, p. 324). Educators need to collectively shift their approach and be open to new information that will help them be more effective in the classroom. Bandura (1986) and Pajares (1992) advocated that the self-efficacy beliefs that individuals hold can be used to predict behaviors they will most likely engage in. Self-efficacy beliefs and practices need to be further studied because of the potential impact it can have on transforming education. Pajares (1992) advocated that research
focusing on the “attention to the beliefs of teachers and teacher candidates can inform
educational practice in ways that prevailing research agendas have not and cannot. The study of
beliefs is critical to education” (p. 329).

Birisci and Kul (2019) advocated that teacher self-efficacy beliefs about technology
integration positively correlated with their practices and how technology was implemented in the
classroom. The researchers recommended that “for the development of technology integration
self-efficacy beliefs, necessary and appropriate education should be provided by analyzing the
roles in interaction of self-efficacy beliefs” (Birisci & Kul, 2019, p. 85). This means that college
education programs need to prepare preservice school librarians and help build their self-efficacy
beliefs and practices about technology integration and equip them to use technology for high-
level tasks. Also, school districts need to provide professional development opportunities for
school librarians to continue to learn the most effective ways to integrate technology during
inquiry-based learning. If school librarians do not have strong self-efficacy beliefs about
technology integration, they will not implement technology at all or implement technology poorly. School librarians need to build their self-efficacy beliefs about technology integration
and engage in professional development in this area to integrate technology in meaningful ways
(Ash-Argyle & Shoham, 2014). If school librarians do not believe they can effectively integrate
technology for high-level tasks like inquiry-based learning in their library program, they will
avoid these types of activities.

Students can now access more information than at any point in human history because of
the overabundance of technology and information online. Students need to be equipped to use
these tools effectively during inquiry-based learning projects. School librarians can facilitate
inquiry-based learning opportunities and collaborate with teaching colleagues to plan projects for students. Bandura et al. (1996) reported that “unless people believe that they can produce desired effects by their actions, they have little incentive to act” (p. 1206). This means that school librarians must have high self-efficacy beliefs about integrating technology during inquiry-based learning to effectively support students. If school librarians feel uncomfortable integrating technology during inquiry-based learning, they will not be effective when teaching it, be hesitant to engage in this type of learning, avoid it, or not teach it at all.

Chapter Summary

In this chapter, an overview was provided to explain why school librarian self-efficacy beliefs and practices about technology integration during inquiry-based learning is important to a school community. School librarians must believe that they can impact student learning when integrating technology during inquiry-based learning. Their self-efficacy beliefs and practices should be examined to help them be successful with this task (Unal, Yamac, & Uzun, 2017). If school librarians do not have strong self-efficacy beliefs, they will not effectively integrate technology during inquiry-based learning, and it will do students a disservice to their growth and development as researchers. In chapter 2, literature was reviewed to examine the self-efficacy beliefs and explore the practices of school librarians about integrating technology during inquiry-based learning.
CHAPTER 2
LITERATURE REVIEW

School librarians can be influential leaders that effectively integrate technology during inquiry-based learning activities to provide students with meaningful and authentic learning experiences. However, there has been minimal research on this topic, especially when considering how their self-efficacy beliefs might enable or prevent school librarians from engaging in these activities. Also, it is alarming that many school librarian positions have been recently cut across the United States. Lance (2018) stated school librarian positions have been cut by 19% between 1999 and 2016. Kletter (2021) stated that “the number of school librarians around the country has fallen about 20 percent in the last decade” (p. 1). This is not just poor performing school librarians being removed from their position to be replaced by highly qualified and effective school librarians. Instead, it is that the school librarian position is being cut all together which has negatively impacted student achievement and created inequities across school communities (Valenza, 2021). The school librarian role is rapidly changing and evolving to meet the needs of this generation of students (Kimmel et al., 2016; Wine, 2016). Additionally, preservice and practicing school librarians might not be equipped to effectively integrate technology due to their educational training or professional development opportunities (Johnston, 2018; Munyoro & Mutula, 2018). Therefore, school librarians need to build their library program to include integrating technology during inquiry-based learning.

A gap in the literature for school librarian self-efficacy beliefs about technology integration during inquiry-based learning is that many of the current studies are focused on
classroom teachers in public schools (Banchi & Bell, 2008; ChanLin, 2008; Keser et al., 2015; Ravitz & Blazeyski, 2014; Silm et al., 2017; Williams et al., 2017), but there is limited research for school librarians (Thompson et al., 2021). There is an abundance on teacher technology integration (Kim et al., 2013; Wang et al., 2004), but it is limited with school librarians. This is problematic because the American Library Association (ALA) and the American Association of School Librarians (AASL) advocated that librarians should integrate technology during inquiry-based learning experiences (AASL, 2018b; ALA & AASL, 2010; ALA, AASL, & CAEP, 2019). School librarians need to be confident when promoting these types of experiences for students and effectively implement them in library programs. The ALA and AASL have repeatedly provided standards for more than a decade to support school librarians to help them implement successful technology integration during inquiry-based learning in their school library programs. The ALA and AASL Standards for Initial Preparation of School Librarians (ALA & AASL, 2010), AASL National School Library Standards Crosswalk with Future Ready Librarians (AASL, 2018b), and ALA, AASL, and CAEP School Librarian Preparation Standards (ALA, AASL, & CAEP, 2019) built upon each other and provided justification for why technology integration during inquiry-based learning should be a cornerstone in school librarian programs. These standards provided an overview of the responsibilities of the PreK-12 school librarian role and included how the school librarian can facilitate successful technology integration during inquiry-based learning.

Standard 1 in ALA and AASL (2010) described school librarians as effective teachers that design lessons that engage students in the inquiry-based learning process. This is also echoed and further discussed in AASL (2018b) and ALA, AASL, and CAEP (2019). Integrating
technology during inquiry-based learning is a powerful way that school librarians can enrich student learning. This should be something that school librarians are confident with and able to implement successfully with all grade levels they work with in their school. The AASL (2018b) reinforced this assignment for school librarians to integrate “technology to foster inquiry and scaffold master of skills necessary for learning to progress” (p. 7). This type of learning for students can be meaningful and empower them. The ALA, AASL, and CAEP (2019) provided school librarians with a target goal in Standard 2.2 that school librarians should “integrate a variety of technology into instructional strategies to provide learners with multiple opportunities to inquire, include, collaborate, curate, explore, and engage in their learning” (p. 52-53). School library directors are in a unique position to enhance and transform student learning experience through these teaching methods. Additionally, the school librarian role has several other important components in addition to integrating technology during inquiry-based learning that they must include in their library programs.

Integrating technology during inquiry-based learning is a very important component for school librarians to intertwine in their library programs, but they also have several other mandates to consider in their role. Standard 2 in ALA and AASL (2010) focused on literacy and reading where school librarians “promote reading for learning, personal growth, and enjoyment” (p. 4). Standard 3 in ALA, AASL, and CAEP (2019) built upon this and advocated that school librarians need to also equip students with print and digital literacies. Standard 3 in ALA and AASL (2010) required school librarians to “model and promote ethical, equitable access to and use of physical, digital, and virtual collections of resources” (p. 6). This standard is very similar to the direction that school librarians are provided in Standard 4 in ALA, AASL, and CAEP
Standard 4 in ALA and AASL (2010) required school librarians to “advocate for dynamic school library programs and positive learning environments that focus on student learning and achievement by collaborating and connecting with teachers, administrators, librarians, and the community” (p. 8). Standard 5 in ALA, AASL, and CAEP (2019) aligned closely with Standard 4 in ALA and AASL (2010) and described how the school librarian role should consist of many partnerships that positively impacts student achievement. Standard 5 in ALA and AASL (2010) called for school librarians to “plan, develop, implement, and evaluate school library programs, resources, and services in support of the mission of the library program within the school according to the ethics and principles of library science, education, management, and administration” (p. 10). However, Standard 5 in the ALA, AASL, and CAEP (2019) shifted away from focusing on administrative tasks and managing the library that the school librarian engages in, but instead focused on how professional development for school librarians and also how they can collaborate with others. Integrating technology during inquiry-based learning is one area where school librarians can grow professionally and should focus their efforts to provide students with authentic and meaningful experiences. School librarians can have many opportunities to integrate technology during inquiry-based learning, but need to be equipped to implement it well and must balance this task with all of the other important and necessary components of their role. It is worth examining school librarian self-efficacy beliefs about integrating technology during inquiry-based learning and explore their practices since this type of teaching can positively impact student learning. There are many standards from professional organizations that advocate for this type of instruction, but there is not sufficient academic literature on this topic (AASL, 2018b; ALA & AASL, 2010; ALA, AASL, & CAEP,
2019). Therefore, it is crucial for research to be conducted on the self-efficacy beliefs of school librarians about integrating technology during inquiry-based learning due to minimal research on this topic.

It was beneficial for school librarians to be studied to determine how they could most effectively facilitate and scaffold student learning experiences when integrating technology during inquiry-based learning. There was current research that examined areas of technology integration or inquiry-based learning, but these study focused on teachers, not on school librarians. However, school librarians and other teachers have the same goal of providing students with enriched learning experiences (AASL, 2020a; AASL, 2020c). School librarians could have used and relied on research that focused on other teachers since both roles have the same goal regarding student achievement and learning, but it was necessary to have research specifically focused on the role of the school librarian due to differences between school librarians and other types of educators. Also, this study provided insights for school administrators to more deeply understand how to support school librarians and their library programs (Johnston, 2012; Kachel & Lance, 2018; Levitov, 2016). Additionally, this study benefited teaching colleagues with how school librarians can collaborate and co-teach with them to facilitate student learning and what abilities school librarians are equipped with to support the curriculum. Lastly, this study ultimately benefited students because integrating technology during inquiry-based learning provides students with authentic and meaningful learning when they can engage in this type of learning.

This study was significant because school librarians can be technology integration leaders that provide students with engaging inquiry-based learning experiences. Johnston (2012)
described how academic research has ignored how school librarians can effectively integrate technology in their library programs. This has caused confusion for librarians with what their role about technology integration should be in their school. Johnston (2015) mentioned that the lack of academic research regarding how school librarians can effectively integrate technology in their library programs has been problematic for librarians to be technology leaders in their schools. There is a discrepancy with what school librarians are tasked with in their role regarding technology integration and what it looks like in practice (Johnston, 2015). A research gap existed about how school librarians can effectively integrate technology and what their role is within a school (Johnston, 2015). There were also discrepancies between what school librarians believed about technology integration during inquiry-based learning and what it looked like in practice. Condliffe et al. (2017) recommended that an important area of future research should be conducted to examine differences between teacher self-efficacy beliefs and how inquiry-based learning is implemented in practice. Self-efficacy beliefs about technology integration during inquiry-based learning is an important consideration for determining what practices school librarians were most likely to engage in. Therefore, this study aimed to understand the self-efficacy beliefs of school librarians about technology integration during inquiry-based learning to empower them to build effective library programs and help them support student learning.

There has been a large-scale and purposeful effort by school districts to encourage teachers to increase the use of inquiry-based learning due to the benefits these practices can have on student learning (Gutierrez, 2015). Silm et al. (2017) defined inquiry-based learning as a teaching method facilitated by the teacher where students collaborate to investigate questions, engage in a research process, and draw conclusions about the topic being studied. Buchanan et
al. (2016) stated that inquiry-based learning “is a cornerstone of curriculum reform throughout North America” (p. 26). At the same time, school districts across the United States have spent money and resources on technology initiatives without necessarily being prepared to integrate technology effectively with students (Bowles, 2019). Due to both initiatives of integrating technology and inquiry-based learning into the curriculum, school districts spent time, money, and resources to promote effective technology integration and inquiry-based learning, but these efforts were slow to be incorporated into school library programs and classroom practices. Despite the benefits for students who engage in inquiry-based learning, a gap existed regarding the expectations and implementation of inquiry-based learning in the curriculum between policymakers, school administration, and teachers (Capps & Crawford, 2013; Silm et al., 2017). School librarian self-efficacy beliefs, attitudes, and perceptions about technology integration during inquiry-based learning needed to be examined and explored to understand why some school librarians were not engaging in these types of activities even though research supports these practices.

The purpose of this literature review was to examine and explore the research that has been conducted on the self-efficacy beliefs for school librarians about integrating technology during inquiry-based learning and how they engaged in these practices. Technology should be used at a high-level of learning where students are actively engaged in the activity (Hsu, 2016; Voet and De Wever, 2017) but many educators might not know how to integrate technology effectively to enhance student learning. Integrating technology at high-levels enhances student learning and actively engages them in the learning process in activities like inquiry-based learning. Unfortunately, some teachers only have students complete repeated low-level tasks that
are not engaging (Keser et al., 2015). School librarians have an opportunity to be forerunners in their positions to be leaders in their schools and effectively demonstrate how to integrate technology during inquiry-based learning.

Definition of Inquiry-Based Learning

Silm et al. (2017) defined inquiry-based learning as a scaffolded and student-centered teaching method where students collaborate or work independently in authentic and meaningful activities. During inquiry-based learning, the teacher becomes more of a facilitator rather than a content deliverer since the students take on an active role in being self-directed learners. Pedaste et al. (2015) developed a framework for understanding inquiry-based learning as a cycle including phases of “orientation, conceptualization, investigation, conclusion, and discussion” (p. 47). These phases do not need to be a systematic and sequential process since student driven inquiry can go in different directions. Pedaste et al. (2015) mentioned that “inquiry-based learning is not a prescribed, uniform linear process” (p. 49). There are also different inquiry levels of support that teachers can implement in the classroom.

Banchi and Bell (2008) designed “a four-level continuum—confirmation, structured, guided, open—to be useful in classifying the levels of inquiry in an activity” (p. 26). The first level is confirmation inquiry which is when the teacher provides the question, procedure, and solution with the goal of having students confirm what they have previously been taught (Banchi and Bell, 2008). The second level is structured inquiry is when the question and procedure is provided by the teacher, but the students must discover the solution (Banchi and Bell, 2008). Guided inquiry is the third level when students are provided with a question to research and they
must generate the procedures and find the solution (Banchi and Bell, 2008). Open inquiry is the fourth level when students need to generate the question and procedure to find a solution (Banchi and Bell, 2008). Each level of inquiry changes with the amount of support provided by the teacher. Educators need to consider the learning needs and ability level of their students when deciding what level of inquiry to engage in. These different levels of inquiry are not rigid within a unit, but teachers can choose to fluctuate in the continuum of inquiry (Banchi & Bell, 2008; Bell et al., 2005; Borovay et al., 2019; Lonergan et al., 2019; Williams et al., 2017). School librarians should consider the appropriateness of using different inquiry approaches and realize different types of lessons might need different types of inquiry approaches. There are many different types of inquiry-based learning approaches that teachers can purposefully implement in the classroom depending on how scaffolded and structured the teacher wants it.

Hmelo-Silver et al. (2007) described inquiry-based learning as a guided and scaffolded approach that teachers can use to facilitate learning. This type of learning is meaningful and authentic for students and leads to higher levels of learning (Hmelo-Silver et al., 2007). There are many types of inquiry-based learning teaching methods educators can implement including Genius Hour (Rush, 2015), problem-based learning (Hmelo-Silver, 2004; Proudfoot et al., 2018; Ravitz & Blazevski, 2014), and project-based learning (Song, 2018). Hmelo-Silver et al. (2007) advocated that these different teaching method approaches can be interchangeable since “there are no clear-cut distinguishing features” (p. 100) between each type of inquiry teaching method. Additionally, Ravitz and Blazeski (2014) considered teaching methods for project-based learning and problem-based learning to be the same as inquiry-based learning since the differences between each teaching method is very nuanced. This means that these types of
inquiry instructional approaches can fit under the umbrella of inquiry-based learning. Therefore, for this study, the term inquiry-based learning was used as the term to describe this type of teaching method.

Inquiry-based learning is an excellent teaching method to use with technology to enhance student learning. Integrating technology during inquiry-based learning provides students with motivating and meaningful learning experiences (ChanLin, 2008; Heindl, 2018; Ravitz & Blazeyski, 2014). Authentic experiences for students are made possible by technology that was previously not available in classrooms. According to Lonergan et al. (2019), “the achievement of authentic inquiry is supported by the increasing availability of technology” (p. 17). Students can utilize technology to take ownership of their learning and access information beyond the classroom walls. These learning experiences will help students build intrinsic motivation for future learning opportunities (Byker et al., 2017). However, implementation is still not happening for many teachers (Lonergan et al., 2019). This means that school librarians have an opportunity to partner with other teaching colleagues and enhance student learning when integrating technology during inquiry-based learning.

School Librarian Changing Demographics

Many public and private schools in the United States have a library media center and a full-time school librarian. According to the National Center for Education Statistics (NCES, 2016), 91% of public and private schools in the United States have a library media center, but only 61% of schools have a full-time school librarian. Additionally, there are 48,200 out of 50,400 elementary schools that have a library media center, and 30,600 that have a full-time
school librarian (NCES, 2016). However, in recent years there have been reductions of school librarians due to positions being cut (Golden, 2019; Kachel & Lance, 2018; Lance, 2018).

Lance (2018) reported that there has been a 19% reduction of school librarians across the United States from the start of the 1999 school year through the end of 2016 school year. At first glance, it may appear that school district funding problems are the reason why librarian positions are being cut and reduced. However, it is interesting that Lance (2018) also reported that “between 2000 and 2016, the numbers of instructional coordinators skyrocketed. Since 2000, U.S. public schools have been hiring instructional coordinators at a dramatic rate” (p. 44). School funding is one factor that has caused a reduction in school librarians, but there are other several other reasons that should be considered. Kachel and Lance (2018) discussed several factors that caused such a severe reduction of school librarians from the 2009-2010 to 2015-2016 school years. Factors that impacted full-time school librarian employment included frequency of turnover rates for administrators, increases in technology available, school needs for instructional coordinators, the ability to find highly qualified school librarians, and whether a school community had advocates that believed in the benefits of the school librarian role (Kachel & Lance, 2018). If school librarians want to retain their positions in schools, they must evolve their library programming to meet the needs of the school community based on what will have the greatest impact on student learning. School librarians need to improve their image and advocate for their roles to school stakeholders and communicate with them regarding how they are supporting and promoting student learning.

There are still stereotypes and misconceptions regarding the school librarian role in schools. District administrators and the school community might not fully understand what
school librarians do in their role or value the school librarian position (Levin, 2019; Seminelli, 2016). A reason for this could be that there is not uniformity across school districts regarding library programming since many schools have site-based management where individual school principals make decisions for what the school librarian role will be (Kachel & Lance, 2018). Despite differences between school librarians at different schools, many school community stakeholders have positive views about librarians. However, various groups of stakeholders might not understand what school librarians actually do in their position. A misconception is that school librarians only read books to children, only manage the library catalog checking in or checking out books to students, or that libraries and librarians are the same that they were a long time ago (Seminelli, 2016). There is a perception that a school librarian is just someone that tells patrons to be quiet in order to maintain silence in the library. Seminelli (2016) described “the stereotype of the librarian being an older woman who wears glasses and has a very vaguely defined purpose other than to ‘shush’ library users obviously negatively impacts the professional image of a librarian” (p. 63). Current school librarians might laugh at the nonsense of this description, but it is an unfortunate view many people outside the profession hold. A complication to breaking free of this stereotypical view is that many school librarians have different goals or objectives based on what they believe are the most important components to include in a library program or are constrained by other barriers. There has also been a failure for librarians to collectively advocate and promote their library programs (Seminelli, 2016). If school librarians cannot demonstrate their importance, their fate will be in the hands of administrators or policymakers that will cut their positions to balance a budget or allocate resources to positions they deem more essential to support student learning (Golden, 2019).
However, there is an opportunity for school librarians to advocate for how they deeply impact student learning, especially with how they integrate technology during inquiry-based learning in their school library programs.

School Librarians and Technology Integration

School librarians are tasked with integrating technology to provide students with deep and meaningful learning experiences (AASL, 2016). They are leaders within their buildings and can be expected to support staff and students to integrate technology in effective ways. There is an abundance of research on technology integration in schools (Dinc, 2019; Lopez-Perez et al., 2019; Purgason et al., 2019). However, there is minimal current research that has been recently published regarding how school librarians can effectively integrate technology in their library programs. There have been blog posts, news articles written, and other types of literature published regarding the role of school librarians with technology integration, but there has not been adequate peer-reviewed research written on the topic (Elabasri, 2018; Johnston, 2012). Johnston (2012) highlighted how there have been many research studies written exploring technology integration, but they have not considered the role of the school librarian with this topic. This is problematic if school librarians are to have an integral role regarding technology integration. The lack of research examining the role for the school librarian in technology integration has caused inconsistencies for school librarians. This has led to different groups of stakeholders in the school to have different expectations of what the role of the school librarian should be and has even made it difficult for the school librarian to know exactly what to do (Johnston, 2012). There is still minimal research on this topic even since Johnston (2012)
explored this topic. Although there is research lacking in this area, several researchers have explored how school librarians integrate technology in their library programs and what beliefs and experiences they must have to be successful (Johnston, 2012; Johnston, 2015; Johnston, 2018; Munyoro & Mutula, 2018; Wine, 2016).

The role of the school librarian has rapidly changed over the last two decades. One major contributing factor to this is the fast evolution of technology in schools and society. Johnston (2012) conducted a quantitative study of 295 participants with a purpose to determine what enabled school librarians to successfully integrate technology to be a technology leader within their school and explored the barriers they might need to overcome. The study did not focus on specific types of technology that were being integrated but examined how likely school librarians were to integrate technology in their programs. This research can still be applied in library programs today since school librarians have been slow to evolve their programs and effectively integrate technology. Johnston (2012) advocated that school librarians have taken a leadership role in technology integration and hold an important role within their schools to transform student learning. However, research has found that school librarians have not been used to their fullest potential (Johnston, 2012). This could be due to administrator expectations of school librarians. Another finding from this study is that school librarians might be unsure or not be equipped to take on a leadership role for technology integration. One of the biggest enablers or barriers to school librarians taking on a technology integration leadership role within a building is the relationships between administrators, colleagues, technology specialists, and other school librarians (Johnston, 2012). Navigating professional relationships has been a challenge for many school librarians when integrating technology. One example is the “ambiguity surrounding the
technology-integration leadership role has resulted in school librarians who are uncertain how to perform this role in practice” (Johnston, 2012, p. 25). The school librarian and technology specialist have the same goal for students but the relationship between these two roles can be filled with tension.

Even since Johnston (2012) published the study, school librarians are still not being prepared or equipped to effectively integrate technology in their programs (Munyoro & Muluta, 2018). There has not been a unified approach throughout school districts that has specifically defined the role of the school librarian. For example, Johnston (2015) stated that the role of technology integration in library programs “is one that has been ignored in the research arena and left undefined for school administrators, teachers, and school librarians themselves, leading to uncertainty concerning how school librarians enact this role in practice” (p. 17). School librarians have been slow to evolve in their role regarding technology integration and need to transform their library programs to be technology leaders within their schools.

Johnston (2015) explored what successful school librarians do to overcome barriers and help them successfully integrate technology effectively. The study analyzed quantitative data from 295 school librarian participants who were mostly National Board Certified educators that provided survey responses during data collection. The study advocated that integrating technology in student learning is an important responsibility for school librarians to include in their programs. The researcher examined the perspectives of school librarians and found that instructional technology specialists empowered school librarians or inhibited them regarding technology integration. Instructional technology specialists either enabled the school librarian to engage in effective technology integration or the relationship was a barrier that the school
librarian had to overcome (Johnston, 2015). This has led some school librarians to be empowered and spurred on when integrating technology while others have been deterred from engaging in this practice. Johnston (2015) warned that school librarians and instructional technology specialists might inhibit student learning and “a competitive relationship may arise from territorial battles over technology as a resource and with access issues” (p. 24). School librarians, instructional technology specialists, and other teachers that integrate technology need to collaborate to enhance and transform student learning experiences. Johnston (2015) concluded “while school librarians have a role to play in leading technology integration efforts, they are just one piece of this process, and relationships must be forged with instructional technology specialists and teachers in order to provide engaging and meaningful learning experiences for students” (p. 25). School librarians need to market themselves as a resource within the school community and purposefully build relationships with other staff members to positively impact student learning. The role of a school librarian has evolved, especially with the rapidly changing technology environment (Johnston, 2015). School librarians need to recognize that their role has evolved and need to structure the library program in ways to best serve the school community. In addition to Johnston (2015), Wine (2016) described how the role of the school librarian has evolved and what factors enabled or prevented them from becoming a technology leader within their schools.

Wine (2016) discussed the ways the role of the school librarian has changed and evolved with rapidly changing technology integration in schools. Wine (2016) described how the role has changed from school librarians as the “keeper of the books” (p. 208) to someone that should “integrate instructional technology into curriculum, perhaps as part of a collaborative team with
instructional technology specialists and other staff members” (p. 218). School librarians need to constantly advocate for their own positions, but they also need others to advocate for them throughout the school community. They need to build relationships with other staff members in the building along with administration since they all have the same goal of providing students with the best learning experiences that will positively impact student achievement.

Wine (2016) explained that school librarians should partner with other teachers, administration, and the instructional technology specialist to provide students with powerful learning experiences through technology integration. These groups of stakeholders within the school system all have the same goals for the population of students. Wine (2016) discussed how school librarians could successfully integrate technology within their library programs but did not focus on how technology was specifically integrated in library programs. Powerful collaborative partnerships regarding technology integration could be formed to transform the learning environments when staff and administration are all headed in the same trajectory and focused on the same goals. The school librarian could be very instrumental in this role. Wine (2016) concluded that “the school librarian and instructional technology specialist have many common skills, interests, and priorities. They fill leadership roles in their schools as they work with students, teachers, administrators, and their communities, and are collaborative by nature” (p. 218). School librarians need to come alongside colleagues like the instructional technology specialist and promote deep and meaningful experiences when integrating technology in their instruction. However, Munyoro and Mutula (2018) and Johnston (2018) reported that school librarians might not be equipped to effectively be a technology integration leader due to lack of preparedness or professional development.
Munyoro and Mutula (2018) conducted a mixed methods study to examine the preservice library information science program to determine if school librarians received sufficient training to effectively integrate technology in their programs. The reason why the researchers wanted to investigate this topic is because some librarians might not be prepared to effectively integrate technology. In this study, the researchers used a mixed methods design by implementing a qualitative case study and a quantitative survey. The researchers conducted interviews using open-ended questions for the qualitative phase by gathering data from professors and administrators from five different universities. They collected quantitative survey data from professors and preservice school librarians that were in their final year of their educational program. Also, the researchers reviewed documents and artifacts to provide additional data for their study. The researchers implemented both purposive sampling and collected data from the total population when studying professors, university administrators, and employers, but used a simple random sample when surveying preservice students. Munyoro and Mutula (2018) did not provide information on how they developed their survey questionnaires and they did not discuss instrument validity. Also, rubrics for interview protocols and artifact evaluation were not mentioned or described in the research study. However, the researchers aligned their research questions closely to the Adedokin-Shittu ICT Impact Assessment Model (2013) which examined “positive effects, challenges, incentives and integration” of technology” (Adedokun-Shittu & Shittu, 2013). This study provided helpful information with their findings for how school librarians can best be equipped to be successful in their role.

Munyoro and Mutula (2018) found school librarians were not receiving adequate training in library and information science education programs but were then expected to be technology
integration leaders in their schools. They also found library information science programs had minimal technology integration and were not equipping preservice school librarians to be technology integration leaders in their schools (Munyoro & Multula, 2018). Munyoro and Mutula (2018) recommended that library information science education programs need a “paradigm shift from the teacher-centered instructivism to student-centered or heutagogical approaches” (p. 23). Preservice school librarians would have a more seamless transition into their roles as technology integration leaders if they were able to personally experiences learning in a student-centered constructivist approach when technology is integrated in meaningful ways. Unfortunately, preservice school librarians do not get to have many opportunities for these types of experiences. Munyoro and Mutula (2018) found that school librarians are entering the profession not equipped to be technology integration leaders. Johnston (2018) also found that some school librarians struggled when integrating technology in their library programs.

Johnston (2018) conducted qualitative needs assessment research regarding beliefs, ability, knowledge, and implementation of rural school librarians about technology integration. Data was collected for this study through conducting observations of lessons and interviews of 26 school librarians. Participants reported designing inquiry-based learning teaching methods to teach lessons to promote collaboration and problem solving among students. Johnston (2018) reported multiple school librarian participants in this study expressed frustrations regarding technology integration. Several participants reported that they received inadequate training and poor professional development in their school library preparation programs. School librarians reported frustration that they did not receive ongoing training or professional development training on best practices for integrating technology in their schools. School districts have
purchased many devices and have invested in technology, but then have not provided adequate professional development training on how to use these tools. Many of the participants in the study had Makerspace areas filled with technology activities but Johnston (2018) was surprised with the “lack of connection that was made for these Makerspaces to supporting the curriculum” (p. 73). Some participants reported that the only reason they had a Makerspace was that it was a trend and it was an expectation of them set by the principal, or they had a Makerspace just because many other school librarians had them in their library programs (Johnston, 2018).

Johnston (2018) concluded with several recommendations to better equip school librarians. According to Johnston (2018), an overwhelming majority of school librarians reported that their preservice experiences in librarian preparation programs did not prepare them to effectively integrate technology in their programs. Preservice and practicing school librarians need professional development for integrating technology effectively with students and building background knowledge for the concepts being taught (Johnston, 2018). Hands-on and authentic experiences in this area during professional development would better prepare school librarians to meet student learning needs and have a positive impact on student achievement.

Overall, it is very important for school librarians to effectively integrate technology. They need to be technology leaders that collaborate with other stakeholders in the school community to provide students with authentic and meaningful experiences (Johnston, 2012; Johnston, 2015). It is important for school librarians to evolve their library programs since the school librarian role is rapidly changing (Kimmel et al., 2016; Wine, 2016). Additionally, school librarians need adequate preservice training and then continued professional development on how to effectively integrate technology in their programs. There is an abundance of research conducted on how
teachers should integrate technology compared to school librarians (Keser et al., 2015; Kim et al., 2013; Ravitz & Blazeyski, 2014; Silm et al., 2017; Wang, Ertmer, & Newby, 2004). Research is very limited on school librarianship and technology integration, but school librarians have the same goals as other stakeholders within the school community (Wine, 2016). School librarians and other teaching colleagues need to work together to make sure all students in their building are achieving high-levels of learning. School librarians and teachers have the same overall goal which is to want students to be successful. One way to determine if technology integration will happen effectively is to examine school librarian self-efficacy beliefs.

Self-Efficacy Beliefs and Practices about Technology Integration

There are many studies that have been conducted on teacher self-efficacy beliefs about technology integration and teacher practices, but it is minimal for school librarians (Bosch & Ellis, 2021). Teacher self-efficacy beliefs about technology integration are important indicators for how successful implementation will be in the classroom (Hsu, 2016; Kao et al., 2020; Wang et al., 2004). Implementing technology in a classroom setting is an important aspect of modern-day education to deeply impact student learning experiences. Teachers with high self-efficacy beliefs about technology integration will be more likely to incorporate it efficiently and properly into the curriculum (Bosch & Ellis, 2021). Conversely, teachers with low self-efficacy beliefs about technology integration will rarely use it for innovative purposes, teachers will use it incorrectly, or they would not use it at all. Merely using technology for the sake of technology does not benefit students. Therefore, teachers must determine how to positively engage students when using technology in the classroom. Teacher self-efficacy beliefs about integrating
technology in the classroom must be high to reinforce effective practices when utilizing technology for the purpose of enhancing student learning in authentic and meaningful ways (Keser et al., 2015).

In a quantitative study conducted using purposive sampling of 713 preservice teachers, Keser et al. (2015) examined “the correlation between their TPACK [technological, pedagogical, and content knowledge] competencies and self-efficacy perceptions towards technology integration” (p. 1193). TPACK is a framework for educators to use when considering integrating technology in the classroom. There are three components of TPACK which includes technological knowledge, pedagogical knowledge, and content knowledge (Banas & York, 2014; Keser et al., 2015; Mishra & Koehler, 2006; Rodgers, 2018). Technological knowledge is the understanding of how to effectively integrate technology tools, applications, software, and devices during lessons with students (Mishra & Koehler, 2006; Rodgers, 2018). Teachers should consider how the technology integration will enhance student learning and give them opportunities to have meaningful experiences. Pedagogical knowledge is the understanding of what instructional strategies teachers should implement to effectively engage students (Mishra & Koehler, 2006; Rodgers, 2018). Content knowledge is the understanding a teacher has regarding the subject or topic they are teaching (Mishra & Koehler, 2006; Rodgers, 2018). Teachers need to be confident in technological knowledge, pedagogical knowledge, and content knowledge, pedagogical knowledge, and technological knowledge domains to effectively integrate technology in the classroom. If teachers have low self-efficacy beliefs about integrating technology in one of these domains, they are less likely to incorporate technology in their lessons, or they will incorporate it ineffectively. Keser et al. (2015) conducted a research study
that compared teacher practices about TPACK with teacher self-efficacy beliefs about technology integration.

Keser et al. (2015) used two instruments to collect quantitative data from participants including the Technopediaogical Education Competency Scale (Kabakci-Yurdakul et al., 2012) and the Technology Integration Self-Efficacy Scale (Wang et al., 2004). The Technopediaoagical Education Competency Scale (Kabakci-Yurdakul et al., 2012) measured “TPACK competencies of students” (p. 1195). This reliable and valid 33 item instrument allowed researchers to collect data from preservice teachers on a five-point Likert scale. The other instrument implemented in this study was the Technology Integration Self-Efficacy Scale (Wang et al., 2004). Wang et al. (2004) found that this “instrument exhibited construct validity and reliability.” This survey instrument developed by Wang et al. (2004) included 21 Likert-style items that participates had “to rate their levels of agreement (from 1-strongly disagree to 5-strongly agree) with statements related to their possession of confidence regarding technology use” (p. 235). Results from the study revealed three indicators for increasing their self-efficacy beliefs about technology integration and their confidence. Wang et al. (2004) found “that preservice teachers who were exposed to vicarious experiences that were related to successful technology integration (with and without goal setting) experienced significantly greater increases in judgements of self-efficacy for technology integration” (p. 239-240). Preservice teachers that were able to observe and collaborate with practicing teachers that effectively integrated technology reported higher levels of self-efficacy beliefs. Second, preservice teachers that set goals for integrating technology reported higher levels of self-efficacy beliefs even if they did not have vicarious experiences (Wang et al., 2004). Goal setting was an effective way for preservice teachers to develop higher
self-efficacy beliefs. However, vicarious experiences and goal setting paired together produced the most notable results. According to Wang et al. (2004), “preservice teachers who were exposed to vicarious learning experiences and who were assigned specific goals experienced significantly greater increases in judgements of computer self-efficacy than those who received only one of these two conditions” (p. 240). The researchers reported that preservice teachers were able to obtain higher levels of self-efficacy beliefs when receiving specific and purposeful professional development and preparation in their educational programs.

Keser et al. (2015) described that effective technology integration occurred when teachers purposefully select learning activities to pair with technology under the right circumstances and not merely have students indiscriminately use technology. Teachers need to be skillful with content knowledge and understanding the topic, pedagogical knowledge with what instructional strategies to implement, and technology knowledge to know what technology tools will enhance student learning. Successful technology integration will not happen if the teacher is not proficient in one of the domains. Keser et al. (2015) concluded that “self-efficacy perceptions of preservice teachers towards technology integration was an important predictor of TPACK” (p. 1203). This means that teachers that have high self-efficacy beliefs about technology integration will more likely incorporate technology more in their instruction and do it effectively. However, defining exactly what self-efficacy beliefs about technology integration means can be a difficult task because it relies on teachers self-reporting what their most inner beliefs are regarding technology instruction (Kim et al., 2013). However, some research has been conducted that focused on teacher self-efficacy beliefs when integrating technology at high-levels (Banas & York, 2014; Bosch & Ellis, 2021).
Banas and York (2014) conducted a quantitative study examining the self-efficacy beliefs of 104 preservice teachers, their intentions to integrate technology, and predict their future practices about technology integration. In this study, the researchers advocated that TPACK framework is helpful for preservice teachers to learn from because of the overlapping domains providing students with a framework to integrate technology (Banas & York, 2014). Their goal was to determine if self-efficacy beliefs about technology integration increased after engaging in authentic learning exercises (Banas & York, 2014). For the first part of their study, Banas and York (2014) modified the 28 Likert-type TPACK Assessment Tool (Schmidt et al., 2009) to measure TPACK for the preservice teachers. For the second part of their study, Banas and York (2014) measured intentions to implement technology by implementing a subscale of the Integrative Model of Predictive Behavior (Fishbein, 2000). The researchers used a 7-point Likert-type scale for both parts of the study. The researchers analyzed the data by conducting a paired samples t-test. The results from this test revealed “a significant increase in self-efficacy for all TPACK constructs, as well as intentions to integrate technology” (Banas & York, 2014, p. 728). They found that preservice teachers who participated in authentic learning exercises reported a positive impact on their self-efficacy beliefs about technology integration. The researchers also conducted a multiple regression analysis to determine the change in self-efficacy beliefs about technology integration and the likelihood of the preservice teachers to integrate technology in their instruction. These results showed that the preservice teachers had greater intentions to integrate technology after receiving authentic learning exercises due to an increase in their self-efficacy beliefs about technology integration (Banas & York, 2014). Additionally, Banas and York (2014) reported the participants had positive changes from the beginning to the
conclusion of the study “in all perceived TPACK constructs and intentions” (p. 739). This shows that the authentic learning exercises had an impact on the participants. Both self-efficacy beliefs and intentions about technology integration showed that the authentic learning exercises had a positive impact on these constructs. According to Banas and York (2014), the “perceived ability to integrate technology does not necessarily translate into one’s ability to effectively [emphasis appeared in the original text] integrate technology” (p. 740). It is not merely enough for educators to use technology, but it is crucial that educators are equipped to provide students with authentic and meaningful experiences when integrating technology. Banas and York (2014) concluded their study by recommending that “the goal, ultimately, is to have preservice teachers thinking about the best tools for instruction and means by which to enhance student learning” (Banas & York, 2014, p. 741). Preservice teachers need to be equipped to implement the best instructional strategies to engage students for enhanced learning opportunities and not just isolate specific technology tools or software programs. Preservice teachers that engage in authentic learning exercises when integrating technology in their teacher preparation programs will be able to increase their self-efficacy beliefs about technology integration and have greater intentions to employ it in their own classrooms (Banas & York, 2014). Teacher self-efficacy beliefs about technology integration can be a good predictor for how technology will be effectively integrated in the classroom, but it does not mean that it will happen. However, if a teacher has high self-efficacy beliefs about technology integration, they might be more likely to engage in those behaviors again in future lessons. Hsu (2016) also examined this concept about teacher self-efficacy beliefs and technology integration and explored what impact a constructivist teaching
method has on technology integration and what caused high-levels or low-levels for learning in the classroom.

Hsu (2016) explored teacher self-efficacy beliefs about technology integration using a mixed methods case study design that examined the difference between teachers using technology for low-level or high-level learning. The purpose of the study was to determine what self-efficacy beliefs about technology integration teachers held and what practices or barriers impacted technology use. The participants were elementary school teachers in kindergarten through sixth grade classrooms. There were 152 teachers from rural, suburban, and urban schools that participated during the quantitative phase followed by eight teachers that participated in the qualitative phase including interviews and observations. Hsu (2016) discussed that “higher-level technology use will enhance every aspect of students’ learning experiences across curricular areas, so students will grow intellectually rather than merely develop isolated technology skills” (p. 30). The problem is that teachers with low self-efficacy beliefs about technology integration will not engage in high-level technology use. Teachers will not likely integrate technology and give students higher-level authentic experiences if they have low self-efficacy beliefs about technology integration. If teachers have low self-efficacy beliefs about technology integration, they are more likely to have a more difficult time overcoming barriers that prevent them from integrating technology in their classroom. Hsu (2016) focused on three main areas during the study including teacher beliefs about technology integration, how teachers integrated technology during instruction and what tools they used, and potential barriers that would inhibit teachers from integrating technology to promote high-level learning.
Hsu (2016) utilized an online survey with 22 open-ended questions to collect quantitative data from 152 participants. The research design “of the survey followed McCrory’s (2006) framework for integrating technology for high-level learning and was validated by a number of researchers and teachers” (Hsu, 2016, p. 32). This framework specified the various ways teachers could implement authentic and meaningful opportunities for student learning when integrating technology into the classroom. Quantitative survey codes were implemented based on McCrory’s (2006) framework that included “representation, information, transformation, and collaboration” (Hsu, 2016, p. 33). Then, Hsu (2016) implemented maximum variation sampling to gather eight participants for the qualitative phase of the study. Qualitative codes were developed to explore the “pedagogical beliefs about technology integration, self-efficacy beliefs about technology integration, and beliefs about the perceived value of technology for student learning” (Hsu, 2016, p. 33). Potential barriers that might have impacted effective technology integration in the classroom were also coded and examined. Furthermore, Hsu (2016) established trustworthiness for the qualitative phase of research by implementing “triangulation, member checking, peer debriefing, and thick description” (p. 35). This purposeful research design ensured that the findings from the study provided accurate and reliable data about teacher self-efficacy beliefs about technology integration.

Hsu (2016) found that teachers who held high self-efficacy beliefs about technology integration in a student-centered and constructivist pedagogical framework were more likely to effectively integrate high-level technology activities in their classroom. Teachers that held constructivist pedagogical beliefs overwhelmingly reported high self-efficacy beliefs about technology integration in their classrooms and valued the role of technology in their classrooms.
(Hsu, 2016). However, teachers that held teacher-centered and traditional pedagogical beliefs about integrating technology in their classrooms reported low self-efficacy beliefs about integrating technology and did not value technology as much as teachers who help constructivist pedagogical beliefs (Hsu, 2016). Teacher self-efficacy beliefs about technology integration might not always lead to effective technology integration practices, but there is a greater potential for it to happen. The findings from this study revealed that “the teachers who held constructivist pedagogical beliefs about technology use tended to have high self-efficacy beliefs about technology use, to place a positive value on technology, and to have two or more practices of high-level learning in their lessons” (Hsu, 2016, p. 37). This means that teacher self-efficacy beliefs about technology integration can be an accurate predictor for how effectively teachers utilize technology for high-level tasks in the classroom. Hsu (2016) reported that “this study found consistency between beliefs and practices” (p. 37). This means that teachers that had high self-efficacy beliefs about technology integration effectively integrated technology to enhance student learning. However, it is very difficult for teachers to change their core beliefs about technology integration (Hsu, 2013; Hsu, 2016; Pajares, 1992; Posner, 1982). Hsu (2016) concluded that “professional development activities about technology integration should focus on more subjects and practices for high-level learning” (p. 39). Kao et al. (2020) conducted a study to examine how professional development impacted teacher self-efficacy beliefs about technology integration and how likely they would implement effective instructional practices in their classrooms.

In a quantitative study, Kao et al. (2020) examined primary school teachers’ self-efficacy beliefs and attitudes about technology integration, and if web-based professional development
impacted their instruction. There were 368 participants that used technology in their classrooms and had at least five years of teaching experience. Three instruments were adapted to collect data from participants including the Self-Efficacy for Web-Based Professional Development Questionnaire (Kao et al., 2014), Attitudes Towards Web-Based Professional Development (Kao & Tsai, 2009), and Technology Integration (Coscollola & Graells, 2011; Cifuentes et al., 2011). Kao et al. (2020) concurred that all three survey instruments implemented in this study were valid and reliable construct measures.

One of the instruments implemented by Kao et al. (2020) was the Self-Efficacy for Web-Based Professional Development Questionnaire that was developed by Kao et al. (2014). This instrument was developed to “measure elementary school teachers’ self-efficacy for web-based professional development” (Kao et al., 2014, p. 302). Kao et al. (2014) also measured how likely participants were to engage in web-based professional development and how they applied what they learned to their own teaching practices. The Self-Efficacy for Web-Based Professional Development Questionnaire developed by Kao et al. (2014) was determined to be reliable and accurately measured the self-efficacy beliefs and attitudes. Another instrument Kao et al. (2020) implemented was the Attitudes Towards Web-Based Professional Development (Kao and Tsai, 2009). This survey instrument rated items on a Likert-Type scale to determine the attitudes of participants that engage in web-based professional development (Kao et al., 2020). Kao et al. (2020) analyzed the survey results and found it to be a valid and very reliable measure. The third survey instrument that Kao et al. (2020) utilized was Technology Integration (Coscollola & Graells, 2011; Cifuentes et al., 2011). This instrument measured how teachers perceived how
their students learned by technology and the level of preparedness teachers had to integrate technology in their classrooms.

Kao et al. (2020) analyzed the data by conducting an ANOVA test to analyze the results by comparing the three questionnaire survey instruments implemented in the study. This was followed by a Scheffe test to determine the significance between the ANOVA comparisons. Next, the researchers utilized a Pearson correlation to measure the relationship between the variables. Furthermore, the researchers conducted stepwise regression analysis “to predict teachers’ perceptions of technology integration” (Kao et al., 2020, p. 409). The results from these series of tests revealed that there was strong construct validity.

Kao et al. (2020) found that teacher attitudes towards web-based professional development and their self-efficacy beliefs of their own proficiency about technology “may be critical for their positive technology integration” (p. 413). This means that teachers that were prepared and equipped to integrate technology through professional development will more likely have positive technology integration in the classroom. The researchers recommended that the focus of professional development should provide opportunities for teachers to navigate the internet because this would help teachers develop “higher self-efficacy, more positive attitudes toward web-based professional development, and higher intentions of integrating technology in teaching” (Kao et al., 2020, p. 413). Teachers that engaged in meaningful web-based professional development about technology integration were more likely to integrate technology in their classrooms (Kao et al., 2004). Effective technology integration professional development where teachers could observe effective practices modeled for them were more likely to transfer those practices to their own classrooms. Kao et al. (2020) concluded by recommending that
teachers must be equipped to integrate technology in their classrooms at high-levels and also receive professional development that models effective teaching practices for them. Studies that implemented a quantitative research design (Keser et al., 2015; Banas & York, 2014; Kao et al., 2020) or mixed methods research design (Hsu, 2016) about the self-efficacy beliefs and practices of educators provided helpful insights and trends for how teachers could increase their self-efficacy beliefs while implementing these effective practices in their classrooms. However, Niess et al. (2009) and Harris et al. (2010) provided a detailed framework for qualitative research that focused on teacher practices about technology integration and TPACK.

Niess et al. (2009) developed a rubric for how TPACK can benefit mathematics teachers when integrating technology at high-levels during lessons and created the Mathematics Teacher TPACK Developmental Model. The purpose of this framework was to provide stakeholders in school communities to evaluate and implement best practices for effective technology integration. One main reason for creating a TPACK model for effective technology integration was that “teachers’ beliefs about how to teach mathematics generally were aligned with how they learned mathematics” (Neiss et al., 2009, p. 6). This resulted in mathematics teachers mostly integrating technology for low-level tasks instead of ways that would benefit students. The reason for this is that technologies advanced at a faster rate than the implementation of effective technology integration strategies in mathematics classes.

Neiss et al. (2009) developed a hierarchy of how teachers could be evaluated when integrating technology into the curriculum. This hierarchy includes recognizing, accepting, adapting, exploring, and advancing. Recognizing means that teachers have knowledge of technology and understand of the technology functions but does not integrate it in their
instruction (Neiss et al., 2009). There could be many reasons why teachers might choose to not integrate technology in the classroom even if they have knowledge of a technology tool that might benefit student learning. Teachers that are in the recognizing level have a proficient understanding of how pedagogy and content mix together for effective instruction but struggle to connect pedagogy and content to technology (Neiss et al., 2009). Neiss et al. (2009) described the teacher at the recognizing level to have good pedagogical knowledge (PK) and content knowledge (CK), but not proficient TPACK where technological knowledge (TK) aligns with pedagogical knowledge (PK) and content knowledge (CK). The second stage of the hierarchy is accepting. Accepting means that teachers form beliefs and attitudes about integrating a technology tool into their instruction (Neiss et al., 2009). The third stage of the hierarchy is adapting where teachers must decide whether to utilize a technology tool in their instruction or forgo implementing it (Neiss et al., 2009). The fourth stage of the hierarchy is exploring where teachers choose to “actively integrate teaching and learning of mathematics with an appropriate technology” (Neiss et al., 2009, p. 9). The amount of time teachers spent integrating technology for their instruction might vary based on how comfortable they were when implementing it in their classroom. The fifth stage of the hierarchy is advancing “where teachers evaluate the results of the decision to integrate teaching and learning mathematics with an appropriate technology” (Neiss et al., 2009, p. 9). Teachers in the advancing stage reflect on how effective they integrated technology and make informed decisions for how they can continue to utilize technology during future instruction. Neiss et al. (2009) described the teacher at the advancing stage to have proficient “TPACK” where technological knowledge (TK) aligns with pedagogical knowledge (PK) and content knowledge (CK).
Neiss et al. (2009) found four major themes that educators should consider when developing their TPACK including curriculum and assessment, learning, teaching, and access. The first theme that the researchers identified was curriculum and assessment. Curriculum and assessment referred to instruction in the classroom and evaluating student achievement (Neiss et al., 2009). The second theme that the researchers identified was learning. Neiss et al. (2009) referred to learning as how students learn and how they conceptualize mathematical concepts. The third theme that the researchers identified was teaching. Neiss et al. (2009) referred to teaching as how teachers delivered instruction in the classroom and their classroom management. The researchers also identified professional development as a factor that influences teaching. The fourth major theme that the researchers identified was access. Neiss et al. (2009) described access as students having the ability to use technology in the classroom. Access included three components including “usage (whether or not students are allowed to use technology), barriers (how teachers address barriers to technology integration), and availability (how technology makes higher levels and more mathematics available for investigation for greater numbers of more and more diverse students)” (Neiss et al., 2009, p. 11). The four major themes identified by researchers can provide educators with a framework to evaluate their instruction and engage in purposeful professional development that targets deficiency areas to improve their TPACK and effectiveness as an educator. Neiss et al. (2009) developed a very helpful resource for educators to use to improve and assess their own TPACK. However, Harris et al. (2010) developed a qualitative “instrument that reflects key TPACK concepts and that has proven to be both reliable and valid” (p. 2). This instrument was developed due to a lack of academic research on qualitative instruments measuring TPACK. The instrument from Harris et al. (2010) was adapted
from the Technology Integration Assessment Instrument (TIAI) developed by Britten and Cassady (2005).

Harris et al. (2010) developed a qualitative instrument and rubric that they found to be a valid and reliable measure of technology integration and TPACK. There has been much recent literature published on TPACK but not how it can be assessed through valid and reliable instruments (Harris et al., 2010). The researchers discussed the different ways that TPACK could be assessed for teachers. Harris et al. (2010) stated that only “three types of data that can be used to assess teachers’ TPACK: self-report (via interviews, surveys, or other generated documents, such as reflexive journal entries), observed behavior, and teaching artifacts, such as lesson plans” (p. 2). TPACK has many different components so it could be difficult to understand the level of TPACK from a single snapshot of data. This is because “teachers’ knowledge is typically reflected through actions, statements, and artifacts, rather than being directly observable” (Harris et al., 2010, p. 2). There must be quality data generated to fully attempt to identify the level of teacher TPACK levels. Also, there is a gap that sometimes exists between beliefs and effective technology integration practices (Harris et al., 2010).

Harris et al. (2010) modified their qualitative instrument based on the Technology Integration Assessment Instrument (TIAI) developed by Britten and Cassady (2005). According to Harris et al. (2010), the “TIAI is a rubric that can be used to assess technology integration in a lesson plan across seven dimensions: planning for technology use, content standards, technology standards, differentiation, use of technology for learning, use of technology for teaching, and assessment” (p. 3). The researchers modified the TIAI using these descriptors to include items that would measure the level of TPACK for educators and tested their instrument for validity and
reliability. Harris et al. (2010) implemented expert reviews and sought feedback from experienced educators to account for construct validity and face validity. The researchers strongly weighed feedback that they received from expert reviewers and experienced educators. They also conducted a reliability analysis for their instrument by engaging in testing trials. Harris et al. (2010) found that the instrument had positive reliability and could be used in future studies. The researchers advocated that the qualitative rubric that they developed could be used in various ways in future studies (Harris et al., 2010). The TPACK-based Technology Integration Assessment Rubric (2010) could be used to assess preparation and planning artifacts (Harris et al., 2010). However, some teachers might not write enough detail in their lesson plans to allow researchers to evaluate their TPACK. Harris et al. (2010) stated that “since practicing teachers typically do not write detailed lesson or project plans for daily use, an interview protocol could be developed that would glean more complete information than teachers’ planbook entries usually encompass” (p. 6). Reviewing lesson plan artifacts and conducting interviews using this instrument could provide meaningful data to understand TPACK levels of educators. This could be very helpful when the TPACK levels of educators is assessed and determine if effective technology integration occurred during instruction.

Examining and exploring teacher self-efficacy beliefs about technology integration is important to build a strong understanding for how educators could use technology with students to have the greatest impact on their learning. Hsu (2016), Keser et al. (2015), and Kao et al. (2013) demonstrated that it is important to consider teacher self-efficacy beliefs about integrating technology into the curriculum. Keser et al. (2015) explained the TPACK model and discussed how teachers need to be experts in technological knowledge, pedagogical knowledge, and
content knowledge. Teachers would be less likely to integrate technology effectively if one of these domains was lacking or if the teacher was not confident and equipped in all three areas. Neiss et al. (2009) and Harris et al. (2010) explored TPACK and how it could be measured for teachers in the classroom. Keser et al. (2015) advocated that teacher self-efficacy beliefs must be considered when discussing technology integration. Hsu (2016) examined and explored teacher self-efficacy beliefs about technology integration regarding how teachers implemented higher-level and lower-level technology in the classroom. Hsu (2016), Kao et al. (2020), Keser et al. (2015), and Bosch and Ellis (2021) demonstrated that there was a relationship between teacher self-efficacy beliefs about technology integration in the classroom and that teachers with higher self-efficacy beliefs about technology integration will integrate technology effectively in their instruction and enhance student learning. Implementing technology effectively and integrating it into the curriculum is crucial for students to be successful. Technology integrated poorly without appropriate supports could cause frustration or inhibit student learning (ChanLin, 2008). Teachers must be purposeful when integrating technology, use instructional strategies that promote student learning, engage in effective teaching methods like inquiry-based learning with their students, and give students enriched experiences in the classroom.

Technology Integration during Inquiry-Based Learning

Teachers should not just use technology for the sake of using technology or for laborious low-level tasks (Hsu, 2016). Technology should be an empowering tool for students to use to increase their learning and should be used intentionally with a purpose. Technology integration during inquiry-based learning could provide meaningful and authentic learning experiences for
students (ChanLin, 2008; Heindl, 2018; Johnson et al., 2009; Ravitz & Blazeyski, 2014). Inquiry-based learning is a teaching method where teachers scaffold instruction to have students answer ill-structured or open-ended meaningful questions to motivate students and have them take ownership of their own learning (Ravitz & Blazeyski, 2014). Integrating technology during inquiry-based learning is a powerful instructional approach that teachers could implement that would empower students to be self-directed learners to enhance their learning in meaningful and authentic ways. ChanLin (2008), Johnson et al. (2009), and Ravitz and Blazeyski (2014) advocated that technology integration could enhance student learning when engaging in inquiry-based learning. Also, Voet and De Wever (2017) examined the practices of teachers about integrating technology during inquiry-based learning and how teacher beliefs influenced their decision to engage in this type of learning.

Ravitz and Blazeyski (2014) reported enhanced student learning experiences were possible by integrating technology during inquiry-based learning activities and projects. The researchers described inquiry-based learning as a teaching method that “often requires students to investigate open-ended or ill-defined topics in depth so that they can create solutions, products, or performances” (Ravitz & Blazeyski, 2014, p. 66). Also, they discussed how schools ranging from kindergarten through high school have been transformed by the access to technology and the internet over the last few decades (Ravitz & Blazeyski, 2014). Due to the rapid increase regarding technology integration, many teachers can quickly find resources and implement inquiry activities in their classroom (Goodyear et al., 2019, Juliani, 2017; Ravitz & Blazeyski, 2014; Spencer, 2021).
Ravitz and Blazeyski (2014) implemented a quantitative study using a survey to determine the relationship between how teachers integrated technology and how they implemented inquiry-based learning in their classrooms. The researchers used stratified sampling to gather 330 high school teachers that qualified to be participants since they engaged in inquiry-based learning in their classrooms. Results from this study showed that there was greater technology integration when teachers were confident and prepared when implementing inquiry-based learning teaching methods (Ravitz & Blazeyski, 2014). If teachers were not confident or prepared to engage in this type of instruction, it inhibited their ability to facilitate it in their classrooms (Ravitz & Blazeyski, 2014). Also, teachers that used technology effectively when implementing inquiry-based learning were more likely to use student-centered teaching methods. Ravitz and Blazeyski (2014) concluded that future research should focus on how teachers integrated technology during inquiry-based learning activities and compare it to when teachers engaged in inquiry-based learning activities without using technology. The role of the teacher was very important during these activities to support student learning. Heindl (2018) conducted a qualitative study and explored how teachers used technology during inquiry-based learning and studied how it influenced student learning and achievement.

Heindl (2018) explored how the role of the teacher and the teaching methods they used when integrating technology during inquiry-based learning impacted student learning. In a qualitative study, Heindl (2018) reported experiences of 21 students between 9-10 years old and investigated the difference between traditional teaching methods and inquiry-based learning teaching methods when integrating technology into the curriculum. The study focused on schools that were lacking in technology resources. Heindl (2018) discussed that traditional teaching
methods when using technology in the classroom “are teacher-centered, teacher-led, silent and task-based. They seldom involve active engagement, discussions or student-centered activities” (p. 2). This means that the teacher is in control of disseminating the information that the teacher believes is important. In traditional teaching methods, the teacher is the gatekeeper of knowledge and learning is primarily driven by the teacher (Heindl, 2018). This may hinder student learning by limiting intrinsic motivation and creating an environment where learning becomes a chore chart of tasks for students to complete. Martin-Hansen (2002) described that these low-level tasks and low-levels of inquiry “results in a cookbook lesson in which students follow teacher directions to come up with a specific end point or product” (p. 37). Sometimes, these types of lessons are helpful for students to engage in, but there also need to be high-level learning opportunities as well. Only conducting low-levels of inquiry may hinder growth for students to become self-directed learners since they are not fully engaged in the inquiry process (Martin-Hansen, 2002).

Alternatively, Heindl (2018) discussed that technology integrated inquiry-based learning during lessons encouraged students to “be active, working independently and discussing the topic with peers” (p. 2). Some teachers need to loosen their grip of control in the classroom and allow students to take the lead in their own learning process as self-directed learners (Heindl, 2018). The problem that some educators need to reconcile is that there is clear evidence that student-centered approaches and inquiry-based learning instruction promotes student learning, but many educators still have a pedagogical framework grounded in teacher-centered and traditional teaching methods when integrating technology into their classrooms (Heindl, 2018; Khalaf & Zin, 2018; Palak & Walls, 2009).
Voet and De Wever (2017) published a study about the practices of high school teachers with how they integrated technology for inquiry-based learning activities in history classes and how teacher beliefs could influence this type of instruction in the classroom. The researchers conducted a qualitative study using semi-structured interviews and explored the practices of teachers about technology integration during inquiry-based learning. They also wanted to explore how teacher beliefs could influence teachers when deciding to engage in this type of instruction. Semi-structured interviews were implemented for this study where the researchers coded and analyzed the transcripts. The researchers decided on three main codes including “beliefs, types of use and barriers” (Voet & De Wever, 2017, p. 1406) and distinguished between how teachers and students utilized technology in the classroom. Voet and De Wever (2017) reported a discrepancy between teacher beliefs about technology integration and actual integration of technology to promote high-level learning. All participants had technology available to them in the classroom but did not utilize it in ways that enhanced student learning. Teachers mainly used technology in the classroom three different ways including for them to find answers to student questions, showing media from the past, and structuring the lesson, while students used technology mostly for looking up basic facts and then share what they learned to the class (Voet & De Wever, 2017). However, teachers advocated for themselves reporting that they used technology to provide students with enhanced learning opportunities.

Teachers reported positive beliefs about integrating technology during inquiry-based learning but researchers found that technology was mostly used for low-level tasks. A few of participants described how they “adopted technology because they felt compelled by social or institutional pressures” (Voet and De Wever, 2017). External institutional values could also
influence how and why teachers integrated technology in their classrooms. Voet and De Wever (2017) conveyed that most of the technology integration in classrooms focused on low-level learning activities rather than promoting student learning with high-level inquiry-based learning experiences. The researchers advocated that future recommendations for research should focus on integrating technology at high-levels to provide students with meaningful and authentic learning opportunities (Voet & De Wever, 2017).

There are many ways teachers can integrate technology during inquiry-based learning to enhance student learning. Teachers that have high self-efficacy beliefs about integrating technology during inquiry-based learning are more likely to engage in those practices and implement them in their classrooms. Teacher self-efficacy beliefs about integrating technology during inquiry-based learning can impact how they will implement practices in the classroom. Kurup et al. (2019) and Nadelson et al. (2013) stated that if teachers are not confident or have low self-efficacy beliefs, there are ways they are able to improve their self-efficacy beliefs when engaging in inquiry-based learning activities. Teacher self-efficacy beliefs do not always lead to practices implemented in the classroom, but it can provide a good indicator to determine if it will be incorporated well. Authentic, meaningful, real-world, and hands-on experiences for teachers will help them build confidence and beliefs (Adams et al., 2014). These hands-on and authentic experiences will lead to higher self-efficacy beliefs and lower anxiety even for teachers who teach young students in elementary school (Novak & Wisdom, 2018).

Teachers should not abolish traditional teaching methods when incorporating technology, but instead integrate technology in a way that promotes inquiry-based learning into the curriculum (Heindl, 2018; Khalaf & Zin, 2018; Palak & Walls, 2009; Veletsianos et al., 2016).
This will help students to take ownership of their learning and enhance their understanding of content. Integrating technology during inquiry-based learning can benefit students from early childhood (Levin & Tsybulsky, 2017; Wang et al., 2009) through high school (Voet & De Wever, 2017). Teachers should be intentional when integrating technology during inquiry-based learning and determine when it would be best to use with students. Some lessons or projects might be better than others when deciding to integrate technology during inquiry-based learning. Students might become overwhelmed if there is not appropriate scaffolding or support provided to them during projects. If teachers do not provide appropriate scaffolding for inquiry learning, this could cause students to lose focus and experience burnout (Andrini, 2016). Teachers need to respond to the needs of their students and know what instructional strategies will work best with their students. Students could experience project fatigue or boredom if there is too much of an emphasis on inquiry learning (Spencer, 2019a). However, teachers can implement a good instructional design and integrate technology during inquiry learning when under the correct circumstances. Technology integration during inquiry-based learning is an effective teaching method for teachers to use in their classrooms. There are still teachers that are struggling or reluctant to integrate technology during inquiry-based learning despite research that shows benefits for students that engage in this type of learning (Li et al., 2015; Nadelson et al., 2013; Park & Ertmer, 2008). Examining the self-efficacy beliefs of school librarians about technology integration during inquiry-based learning would provide valuable insights for how to incorporate these practices in school library programs, partner with teaching colleagues to facilitate these opportunities together, and have a positive impact on student achievement.
Implications of the Literature and Future Recommendations

Continued research needed to be conducted on the self-efficacy beliefs of school librarians about technology integration during inquiry-based learning and how likely it is for them to engage in these practices. Effective technology integration and inquiry-based learning are both priorities for new curriculum that is being implemented in public school across the United States in kindergarten through high school (Buchanan et al., 2016). However, it is not being implemented as much as school administration and policymakers would like it to be in their schools (Capps & Crawford, 2013; Golden, 2019; Sim & et al., 2017). There is current literature examining self-efficacy beliefs of teachers about technology integration during inquiry-based learning activities. However, the research for this topic needs to be explored when focusing on school librarians. Condliffe et al. (2017) recommended that future research on integrating technology during inquiry-based learning approaches should consider teacher self-efficacy beliefs about integrating technology during inquiry-based learning and determine how it might be implemented in the classroom. Therefore, a mixed methods design was implemented in this study to capture trends and gain a deep understanding on the self-efficacy beliefs of school librarians about integrating technology during inquiry-based learning. In Chapter 3, the methodology for this mixed methods study was explained about the self-efficacy beliefs and practices of school librarians about integrating technology during inquiry-based learning.
CHAPTER 3

METHODOLOGY

This explanatory sequential mixed methods study examined and explored the self-efficacy beliefs and practices of school librarians about integrating technology during inquiry-based learning. The quantitative data provided trends while the qualitative data revealed a deep understanding of the meaning of the quantitative data. Creswell and Plano Clark (2018) advocated for a mixed methods approach because “the strength of one method may offset the weaknesses of the other” (p. 18). Combining quantitative and qualitative methods strengthened findings and provided a deep understanding of the results. During the quantitative phase, school librarian self-efficacy beliefs about integrating technology during inquiry-based learning were examined. During the qualitative phase, school librarians described their practices about integrating technology during inquiry-based learning. School librarian self-efficacy beliefs about technology integration during inquiry-based learning were a good predictor of school librarian practices and how they implemented this type of instruction in their library programs. Creswell and Plano Clark (2018) stated that “mixed methods research offers new insights that go beyond separate quantitative and qualitative results. By combining the approaches, researchers gain new knowledge that is more than just the sum of the two parts” (p. 13). A sequential explanatory mixed methods approach for this study was the best way to understand school librarian self-efficacy beliefs about integrating technology during inquiry-based learning and how this type of instruction was implemented in their practices and school library programs. School librarian participants described that some of the factors that influenced their practices included the student...
population at their school, principal or building expectations, or other responsibilities the school librarian had within the school. This sequential explanatory mixed methods study was needed because the quantitative data provided trends for school librarian self-efficacy beliefs about integrating technology during inquiry-based learning while qualitative data interviews and lesson plans gave meaning to the quantitative findings.

Research Questions

The following questions were addressed through an explanatory sequential mixed methods design:

Research Question 1 (QUAN): What are the self-efficacy beliefs of school librarians about integrating technology during inquiry-based learning?

Research Question 2 (qual): How do school librarians describe their practices when integrating technology during inquiry-based learning?

Mixed Methods Research Question: In what ways does the qualitative data of exploring the practices of school librarians about integrating technology during inquiry-based learning help to explain the quantitative strand of data of their self-efficacy beliefs?

Research Design

This explanatory sequential mixed methods study examined and explored the self-efficacy beliefs and practices of school librarians about integrating technology during inquiry-based learning. There were many possible reasons that impacted the self-efficacy beliefs and practices of school librarians about integrating technology during inquiry-based learning and
whether they engaged in this type of instruction so implementing an explanatory sequential mixed methods design was useful for this study. The research design was very important to guide decision making throughout the entire research process. Creswell and Plano Clark (2018) stated “research designs are procedures for collecting, analyzing, interpreting, and reporting data in research studies” (p. 51). Important decisions were made throughout the research process by recognizing the strengths, weaknesses, and limitations of the different components in this study. The purposes, goals, and objectives for this research study were considered when deciding on which research design to implement.

This was an emergent study that collected and analyzed quantitative data followed by the qualitative phase. In keeping with a mixed methods design, quantitative and qualitative data were both collected during the study. However, it was emergent because the quantitative data informed how the qualitative method was implemented, which enabled the ability to consider what data was significant and what was worth exploring during the qualitative phase. Creswell and Plano Clark (2018) stated “the details of the design on the subsequent qualitative phase, however, may emerge based on the researcher’s interpretation of the results from the initial quantitative phase” (p. 52). The qualitative phase was able to be purposefully and accurately designed based on being informed by the quantitative data analysis.

The study was sequential because the quantitative data was collected and analyzed before the gathering of qualitative data. Creswell and Plano Clark (2018) stated that an explanatory sequential design “occurs in two distinct interactive phases” (p. 65). Quantitative data collection and analysis helped make important decisions for the qualitative phase. The quantitative strand was collected first which was followed by the qualitative strand. Sequential timing allowed for
quantitative data analysis to take place and helped inform the qualitative strand with how to implement it. This study can be indicated as QUAN $\rightarrow$ qual because the explanatory sequential design where the quantitative data and qualitative data mixed together which provided meaningful results. The qualitative data explained the quantitative results in this study. Creswell and Plano Clark (2018) explained that the researcher in a study can indicate QUAN $\rightarrow$ qual using an explanatory sequential design for mixed methods study to indicate that “the researcher implemented the two strands in a sequence, the quantitative methods occurred first and had a greater emphasis in addressing the study’s purpose, and the qualitative methods followed to help explain the quantitative results” (p. 63). The qualitative strand described the meaning of the quantitative results. The explanatory sequential design helped determine what was significant, what was worth exploring, and reflect on any unexpected results before beginning the qualitative method procedures (Bradley et al., 2009; Creswell & Plano Clark, 2018; Morgan, 2014; Morse, 1991). This process determined what the focus for the qualitative methods was for the study. According to Creswell and Plano Cark (2018), the theory of an explanatory sequential design “can help to identify the questions that need to be asked, the variables and measures to be collected, and the potential relationships that should emerge when the first phase is completed” (p. 78). The quantitative phase revealed what to focus on during the qualitative phase. Also, the quantitative data identified trends that were used to prepare the qualitative phase.

There are different strengths and challenges associated with each type of research design. In this study, an explanatory sequential mixed methods study required a longer timeline to collect data because the quantitative and qualitative data were not collected at the same time. Also, “it might be difficult to secure institutional review board (IRB) approval” (Creswell &
Plano Clark, 2018, p. 81). This was because the final version of the qualitative questions could not be presented prior to quantitative data being collected and analyzed. However, the qualitative data collection methods were approved by the Northern Illinois University IRB after the quantitative data was analyzed since the quantitative data had to be collected and analyzed before moving to the qualitative phase. Table 1 shows the steps for how the quantitative and qualitative components were developed throughout the study.

Table 1
Steps for Explanatory Sequential Mixed Methods Design

<table>
<thead>
<tr>
<th>Step 1: Design and implement the quantitative strand</th>
<th>Step 2: Use strategies to connect from the quantitative results</th>
<th>Step 3: Design and implement the qualitative strand</th>
<th>Step 4: Interpret the connected results</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Obtain Permissions</td>
<td>- Analyze data and determine significance of results</td>
<td>- Obtain permissions</td>
<td>- Explanation of quantitative and qualitative results</td>
</tr>
<tr>
<td>- Modify survey to collect quantitative data</td>
<td>- Select participants for qualitative strand</td>
<td>- Collect qualitative data by conducting interviews and reviewing lesson plans</td>
<td>- Mix quantitative and qualitative results to explain how qualitative results give meaning to quantitative results</td>
</tr>
<tr>
<td>- Collect data from participants</td>
<td>- Design qualitative data collection protocols for interviews and reviewing lesson plans</td>
<td>- Analyze qualitative results and identify themes</td>
<td></td>
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</table>

Creswell and Plano Clark (2018) recommended that the researcher should have “data collection procedures organized into five key steps: use sampling procedures, obtain permissions and recruit participants, identify data sources, record the data, and administer the procedures” (p.
A summary of these five data collection procedures that were implemented in this study can be viewed in Table 2.

Table 2  
Data Collection Procedures for Mixed Methods Study

<table>
<thead>
<tr>
<th>Quantitative data collection procedures</th>
<th>Steps in data collection</th>
<th>Qualitative data collection procedures</th>
</tr>
</thead>
</table>
| • School librarians from the Chicago suburbs  
• 115 Participants  
• Nonprobabilistic convenience sampling | Sampling | • School librarians that participated in the quantitative phase  
• 10 participants selected based on self-efficacy beliefs from survey  
• Maximum variation sampling based on quantitative results |
| • IRB approval through Northern Illinois University  
• Participant informed consent  
• No other permissions needed | Permissions | • IRB approval through Northern Illinois University  
• Participant informed consent  
• No other permissions needed |
| • Modified survey instrument - Technology Integration Self-Efficacy Scale (Wang et al., 2004) | Data Collection and Sources | • Semi-structured interviews recorded for coding  
• TPACK-based Technology Integration Assessment Rubric (Harris et al., 2010) to review lesson plans |
| • Qualtrics  
• Personally identifiable information kept secure | Data Recording | • Interviews conducted virtually  
• Interviews recorded  
• Interview protocol used  
• Notetaking during interviews  
• Review lesson plans using TPACK-based Technology Integration Assessment Rubric (Harris et al., 2010) |
| • Survey instrument shared online through Qualtrics  
• Participants complete online within duration of survey availability window  
• All personally identifiable information kept secure and confidential | Administrative Procedures | • Personally identifiable information kept confidential and changed if needed to be shared |
Sampling

For the quantitative strand in this explanatory sequential mixed methods study, nonprobabilistic convenience sampling was used. Nonprobabilistic sampling “involves selecting individuals who are available and can be studied” (Creswell & Plano Clark, 2018, p. 177). This process of obtaining participants for the quantitative phase of the study included specifically reaching out directly to school librarians teaching at schools in the Chicago suburbs. This happened by directly reaching out to school librarians by sending emails and making phone calls. Quantitative data was collected using a modified Technology Integration Self-Efficacy Scale (Wang et al., 2004) and analyzed in SPSS. The sample size for this quantitative phase included 115 respondents.

For the qualitative strand in this explanatory sequential mixed methods study, maximum variation sampling was used to identify ten participants that completed the quantitative survey. The participants were specifically chosen based on their demographic information (educational background, years of experience, etc.) and level of their self-efficacy beliefs based on their score from the survey instrument. The scores on the quantitative survey were separated into quartile ranges which included 26 participants in the lower quartile with possible scores of 21-79 on the survey, 62 participants in the middle quartiles with possible scores of 80-95 on the survey, and 27 participants in the upper quartile with possible scores of 96-105. There were 42 school librarian participants that indicated at the conclusion of the quantitative survey that they would be willing to participate in the qualitative phase. Maximum variation sampling was used for this study to attempt to have school librarian participants be considered for the qualitative phase that were in the lower quartile and upper quartile. However, there were no high school librarians in
this study that reported an overall score of low self-efficacy beliefs or were in the lower quartile base on the quantitative results for this study. The two high school librarian participants were not selected using maximum variation sampling due to no high school librarians reporting low self-efficacy beliefs for their overall score, but the other eight participants in the qualitative phase were selected using maximum variation sampling. Three elementary school librarians and one middle school librarian that reported low self-efficacy beliefs and were in the lower quartile. One high school librarian reported self-efficacy beliefs that were in the middle quartiles since no high school librarian reported low self-efficacy beliefs in the lower quartile. Two elementary school librarians, two middle school librarians, and one high school librarian reported high self-efficacy beliefs that were in the upper quartile.

Overall, for the quantitative strand, 2.6% of participants taught in a preschool and elementary school (N = 3), 52.2% of participants taught in an elementary school (N = 60), 25.2% of participants taught in a middle school (N = 29), and 20% of participants taught in a high school (N = 23). For the qualitative phase, there were no participants that taught in preschool and elementary school, 50% of participants taught in an elementary school (N = 5), 30% of participants taught in a middle school (N = 3), and 20% of participants taught in a high school (N = 2). The quantitative and qualitative phases had very similar distributions of the grade levels taught by participants. Therefore, all participants that were involved in the follow-up qualitative phase were already participants in the quantitative phase. The written communication to solicit potential participants for this study can be found in Appendix A.
Participants

School librarians volunteered to provide data in the quantitative and qualitative phases. The goal was to have at least 100 school librarians participate in the quantitative phase and then have ten school librarians participate in the qualitative phase. There was a total of 115 school library participants for the quantitative phase and ten school librarians were selected for the qualitative phase. Gathering data from as many school librarians as possible located in the Chicago suburbs was necessary to engage in rigorous data collection. School librarians for this study were employed at public schools in preschool combined with elementary schools, elementary schools, middle schools, and high schools. Participants were from a variety of different backgrounds that included age, years of experience, level of education, school demographics, and level of schooling.

Permissions

All policies and procedures were adhered to for seeking approval from the Northern Illinois University’s Institutional Review Board (IRB). All participants were informed about the study and were provided informed consent before contributing to the study. No other permissions were needed from other institutions for approval since all participants were adults and volunteered their own time. Personally identifiable information was kept secure and private using password protected files. This information was used for this research study and will always be kept confidential. Also, personally identifiable information was used to reach out to possible participants who indicated they were interested in participating in the qualitative strand. The informed consent form is located in Appendix B.
Data Collection

For the quantitative strand of research, the Technology Integration Self-Efficacy Scale (Wang et al., 2004) was slightly modified to tailor it for school librarian participants since the original survey instrument included preservice teachers for participants. The Technology Integration Self-Efficacy Scale (Wang et al., 2004) included 21 items that were measured using a Likert-style scale. To determine instrument validity and reliability, Wang et al. (2004) addressed this by implementing several phases in their study. First, an expert review panel was formed of six professionals with an expertise in self-efficacy beliefs to provide suggestions and feedback to the researchers about the items included in the survey. A factor analysis was conducted on all 21 items and the researchers separated the items into two groups. The first group was “Computer Technology Capabilities and Strategies” which included 16 items. The second group was “External Influences of Computer Technology Uses” (Wang et al., 2004, p. 248). The researchers conducted another factor analysis on the 16 remaining items and found that they formed a valid instrument. Next, the researchers calculated the Cronbach “alpha coefficients of .94 (for pre-survey) and .96 (for post-survey) indicated that the instrument was valid and highly reliable (Wang et al., 2004). The researchers did not specify what they considered high or low self-efficacy beliefs and did not categorize participants into different groups. However, Unal et al. (2017) described participants that scored higher on the survey had higher self-efficacy beliefs. Modifications to the original scale were made to fit the needs of this study. For example, one survey item stated that “I feel confident that I can motivate my students to participate in technology-based projects” (Wang et al., 2004, p. 245). This item was modified for this study and stated “I feel confident that I can motivate my students to participate in projects when
integrating technology during inquiry-based learning.” Another survey item stated that “I feel confident that I can carry out technology-based projects even when I am opposed by skeptical colleagues” (Wang et al., 2004, p. 246). This item was modified for this study and stated “I feel confident that I can carry out integrating technology during inquiry-based learning even when I am opposed by skeptical colleagues.” All items asked respondents to rate how confident they were regarding each of the items on the survey. The online survey asked participants if they were interested in participating in the qualitative phase for an interview and be willing to submit samples of lesson plan artifacts to gather qualitative data. The modified survey instrument used for this study can be found in Appendix C. Additionally, demographic information asked of participants can be found in Appendix F.

During the qualitative strand of research, data was collected by conducting semi-structured interviews with open-ended questions and then reviewing lesson plan artifacts. Semi-structured interviews were conducted prior to reviewing lesson plan artifacts. The reason why semi-structured interviews were conducted prior to reviewing lesson plan artifacts was because the last question asked to participants during the semi-structured interview was to ask them if they would be willing to share lesson plan artifacts. This was done intentionally to build rapport with the participants before asking them to share lesson plan artifacts which the school librarians might have been hesitant to do. Before collecting interview data, an “interview protocol is needed that includes the major open-ended questions to be asked during an interview and that provides space for recording both information gathered during the interview and essential data about the time, day, and place of the interview” (Creswell & Plano Clark, 2018, p. 180). The interview protocol for this study included open-ended and demographic questions. Interviews
were audio recorded so that they could be transcribed, and precautions were taken to ensure that all data collected was kept confidential and not compromised. Personal identifiable information was substituted and pseudonyms were used for this study. Interview questions were finalized after analyzing the quantitative data since this was an emergent study. Ideally, semi-structured interviews would have been conducted in the library where the school librarian was employed to obtain an understanding of their environment. However, it was not possible to conduct in-person interviews due to school guidelines in response to the COVID-19 pandemic. Therefore, virtual interviews were conducted through the Google Meet videoconferencing application. Interviews were recorded using a digital recorder and later transcribed. All personally identifiable information was kept confidential and used only for this research. The identities of all participants were altered, so that any sensitive information collected from participants was kept confidential. This provided anonymity for the respondents and demonstrated respect for those individuals who chose to participate in the qualitative phase for this study. Pseudonyms were used for all participants in this study. This study was an explanatory sequential mixed methods design so the interview questions were finalized once quantitative data was analyzed. Reviewing lesson plan artifacts took place after conducting interviews with participants. The semi-structured interview questions can be found in Appendix E.

Following the semi-structured interviews, this study utilized the TPACK-Based Technology Integration Assessment Rubric (Harris et al., 2010) to analyze lesson plan artifacts. Harris et al. (2010) developed the rubric to “help teacher educators to more accurately assess the quality of technology integration in lesson plans” (p. 1). The reason why Harris et al. (2010) focused on creating a rubric for evaluating lesson plans is that lesson plan artifacts can provide
meaningful insights into the choices and reasoning teachers made. Harris et al. (2010) stated that evaluating lesson plans is a way to analyze teaching artifacts that both demonstrate the results of teachers’ decision-making, while also providing a pragmatic window into their pedagogical reasoning” (p. 2). The researchers took purposeful steps to ensure that the rubric to evaluate lesson plans had strong validity and reliability. One step that the researchers took to strengthen rubric validity was to have several TPACK expert researchers provide feedback. Another step that researchers implemented was to test the reliability of the rubric. Harris et al. (2010) had 15 experienced educators ranging from proficient to excellent with technology integration “test the reliability of the instrument by using it to each assess 15 preservice teachers’ technology-infused lesson plans” (p. 3). The educators that evaluated the reliability of the instrument had a wide range of content specialties and taught a variety of grade levels. Harris et al. (2010) revised the rubric again after calculating the interrater reliability, internal consistency, and test-retest reliability. The final version of the rubric supported strong reliability for this instrument. Total rubric interrater reliability results were calculated at .857 which “supported rubric reliability,” internal consistency resulted “in a Cronbach’s Alpha reliability calculated at .911,” and test-retest reliability results showed 87% consistency (Harris et al., 2010, p. 6). The researchers also employed two strategies to analyze the validity of the rubric including construct validity and face validity. Harris et al. (2010) explained that construct validity “was examined in this study using expert reviews” while face validity “was examined using feedback from experienced teachers” (p. 4). Overall, the rubric showed strong reliability and validity. The rubric was modified to meet the needs of this study since the rubric does not mention inquiry-based learning, which is a key construct in this study. One example of how an item was modified from the rubric is one item
stated “technology use optimally supports instructional strategies” (Harris et al., 2010, p. 8) and the phrase "during inquiry-based learning” was added to the end of the sentence to meet the needs of this study. The original rubric and the modified rubric for this study can be found in Appendix D.

Data Administrative Procedures

For the quantitative phase, the survey was distributed and recorded using Qualtrics which is an online survey tool. Qualtrics was available through Northern Illinois University where participants could access the survey through a link that was emailed to them. Participants could complete the survey at their convenience throughout the duration when the survey was active. Personally identifiable information was kept secure. Participants had the option to provide personally identifiable information if they wanted to be considered for the qualitative phase of the mixed methods study.

For the qualitative phase, data was recorded by conducting semi-structured interviews and then reviewing lesson plans. The finalized interview protocol was developed after quantitative data was collected and analyzed. Also, interviews had audio recordings so that they could be transcribed and coded later. Then, lesson plan artifacts were reviewed. All data collected from the qualitative phase was kept confidential in password protected files. Any personally identifiable information that was published in this study was changed using pseudonyms to keep participant information confidential.
Data Analysis

Data from the quantitative phase was analyzed using descriptive statistics so Statistical Program for the Social Sciences (SPSS) was used for this in-depth analysis. Descriptive statistics identified trends within the data and helped identify potential participants for the qualitative phase of this study. Preliminary exploration of the quantitative data included assigning values to survey responses and checking for any errors generated from the data entry process. Descriptive statistics and demographic data gathered through SPSS was used to identify participants that reported high or low self-efficacy beliefs about technology integration during inquiry-based learning so that they could potentially be included in the qualitative phase of the study. The quantitative results helped determine the types of questions that were asked during the interviews and what was focused on when lesson plan artifacts were reviewed. Participants in the quantitative phase were asked if they were interested in participating in the qualitative phase which included participating in an interview and sharing lesson plan artifacts. All participants for the qualitative phase were selected from school librarian participants who complete the quantitative phase. Data from the quantitative phase identified ten participants that participated during the qualitative phase. Ten school librarians were interviewed and then asked to share lesson plan artifacts during the qualitative phase of this study. Maximum variation sampling was used to identify potential qualitative participants based on the quantitative results. These participants were sorted in SPSS based on their survey score which grouped participants into the lower quartile, middle quartiles, or upper quartile. For this study, participants from the lower quartile were classified as having low self-efficacy beliefs, participants from the middle quartiles were classified as having average self-efficacy beliefs, and participants from the upper quartile
were classified as having high self-efficacy beliefs. School librarian participants from the qualitative phase represented grade levels taught at elementary school, middle school, and high school. This study used maximum variation sampling so nine of the ten school librarian participants were selected from the lower quartile and upper quartile ranges. One high school librarian was selected from the middle quartiles since no high school librarians were in the lower quartile range with low self-efficacy beliefs. The lower quartile had a range for the survey score of 21-79, the middle quartiles had a range of 80-95, and the upper quartile had a range of 96-105.

Ten school librarian participants were selected for the qualitative phase from elementary schools, middle schools, and high schools. The distribution of school librarians for their grade level taught was similar for both quantitative and qualitative phases. Elementary school librarians represented 52.2% of the quantitative data and 50% of the qualitative data. Middle school librarians represented 25.2% of the quantitative data and 30% of the qualitative data. High school librarians represented 20% of the quantitative data and 20% of the qualitative data. However, preschool and elementary school librarians represented 2.6% of the quantitative data but were not represented in the qualitative data.

Five of the ten school librarian participants were selected from elementary schools. Chelsea (age 33, less than 7 years of experience, elementary school) had a survey score of 70, Michelle (age 51, less than 7 years of experience, elementary school) had a survey score of 79, and David (age 40, 7-13 years of experience, elementary school) had a score of 79. Chelsea, Michelle, and David were in the lower quartile range with low self-efficacy beliefs. Lauren (age 62, 14-20 years of experience, elementary school) had a survey score of 96 and John (age 47, less than 7 years of experience, elementary school) had a score of 100 which meant they were in
the upper quartile range with high self-efficacy beliefs. John had experience as an instructional technology specialist prior to him becoming a school librarian. Three of the ten school librarian participants were selected from middle schools. Mary (age 29, 7-13 years of experience, middle school) had a score of 77 which was in the lower quartile range with low self-efficacy beliefs. Christine (age 45, 7-13 years of experience, middle school) had a survey score of 98 and Jackie (age 57, 14-20 years of experience, high school) had a survey score of 97 which meant they were in the upper quartile range with high self-efficacy beliefs. Two of the ten school librarian participants were selected from high schools. Molly (age 43, 14-20 years of experience, high school) had a survey score of 100 which meant she was in the upper quartile range with high self-efficacy beliefs. This study employed maximum variation sampling, but there was one high school librarian, Kristin (age 42, 7-13 years of experience, high school, average self-efficacy beliefs), who had a survey score of 86 which meant she was in the middle quartiles with average self-efficacy beliefs. This was due to no high school librarians reporting low self-efficacy beliefs in the lower quartile for this study. Overall, the information gained from the quantitative phase helped to develop the qualitative phase in this explanatory sequential mixed methods study. The qualitative phase for this study included two types of data collection. The first data collection method for the qualitative phase consisted of conducting semi-structured interviews. The second data collection method for the qualitative phase consisted of reviewing lesson plan artifacts that were provided by school librarian participants. A summary of the school librarian participants that were selected for the qualitative phase based on the quantitative data analysis can be observed in Table 3.
Table 3

Participants Selected for Qualitative Phase Based on Quantitative Analysis

<table>
<thead>
<tr>
<th>Name</th>
<th>Grade Level Taught</th>
<th>Survey Score</th>
<th>Quartile Range</th>
<th>Self-Efficacy Belief Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chelsea</td>
<td>Elementary</td>
<td>70</td>
<td>Lower</td>
<td>Low</td>
</tr>
<tr>
<td>David</td>
<td>Elementary</td>
<td>79</td>
<td>Lower</td>
<td>Low</td>
</tr>
<tr>
<td>Michelle</td>
<td>Elementary</td>
<td>79</td>
<td>Lower</td>
<td>Low</td>
</tr>
<tr>
<td>Lauren</td>
<td>Elementary</td>
<td>96</td>
<td>Upper</td>
<td>High</td>
</tr>
<tr>
<td>John</td>
<td>Elementary</td>
<td>100</td>
<td>Upper</td>
<td>High</td>
</tr>
<tr>
<td>Mary</td>
<td>Middle</td>
<td>77</td>
<td>Lower</td>
<td>Low</td>
</tr>
<tr>
<td>Jackie</td>
<td>Middle</td>
<td>97</td>
<td>Upper</td>
<td>High</td>
</tr>
<tr>
<td>Christine</td>
<td>Middle</td>
<td>98</td>
<td>Upper</td>
<td>High</td>
</tr>
<tr>
<td>Kristin</td>
<td>High</td>
<td>86</td>
<td>Middle</td>
<td>Average</td>
</tr>
<tr>
<td>Molly</td>
<td>High</td>
<td>100</td>
<td>Upper</td>
<td>High</td>
</tr>
</tbody>
</table>

The steps for coding the interview data included several distinct phases in this study. Semi-structured interviews were conducted virtually using Google Meet and were audio recorded. The audio recordings from the virtual Google Meet interviews were transcribed into a Microsoft Word document and then line-by-line coding was used to develop a thematic analysis. Interview transcript data was stored and coded in a secure Google Document. First, line-by-line coding was used throughout the transcripts which provided a detailed representation of the entire set of data. The process of line-by-line coding produced 1,345 initial codes. Second, codes were reviewed and organized into separate categories by copying and pasting them into a Google Sheet based on the code similarities and topics. Initial codes that were not relevant to this study were removed so there were 1,006 unique codes that remained. The names of the initial codes were cleaned and revised to have consistency for how the codes were named throughout the document. The cleaned codes were able to be grouped into 30 updated names for the codes. The 30 updated names for the codes were put into five different groups which included socialization
(N = 444), performance (N = 284), professional development (N = 154), time and money (N = 89), and responding to COVID-19 (N = 25). Then, the codes were organized by participants which included the number of occurrences that the codes appeared throughout the transcripts. Third, codes were copied and grouped together to identify the frequency of how often the codes appeared. Fourth, themes were generated based on the codes that were identified that helped answer the research questions for this study. Fifth, the codes were grouped together within the appropriate theme and significance was attributed to the data and themes. Sixth, it was determined that two major themes of Socialization and Performance were the themes reported on in this study to provide an in-depth summary of these themes. Socialization subthemes that emerged included (1a) stakeholder relationships and (1b) physiological factors. Performance subthemes that emerged included (2a) experience, (2b) modeling and creating, and (2c) barriers. Socialization and Performance themes had the most frequent occurrences during the semi-structured interviews. Also, these two major themes provided evidence that addressed and helped answer the research questions in this study. The major themes of Socialization and Performance helped give in-depth meaning to the quantitative phase and provided opportunities for school librarian participants to explain how they have integrated technology during inquiry-based learning in their school library programs. An overview including all of the codes and overall frequency can be viewed in Table 4.
Table 4
An Overview of Initial Grouping and Frequencies for Codes

<table>
<thead>
<tr>
<th>Group</th>
<th>Code</th>
<th>Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socialization</td>
<td>Empowered by stakeholder relationships or empowering stakeholders</td>
<td>68</td>
</tr>
<tr>
<td>(N = 444)</td>
<td>Negative physiological factors</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>Responsive and flexible to stakeholder needs</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>Positive physiological factors</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>Respected and valued within school community</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>Disrespected or not valued within the school community</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>Opposed by skeptical colleagues or negative advocates</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>Perception of relevance and importance is positive</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>Culture in school community is positive towards school librarian</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Perception of relevance and importance is negative</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Culture in school community is negative towards school librarian</td>
<td>11</td>
</tr>
<tr>
<td>Performance</td>
<td>Equipping students and/or teachers with high-level skills</td>
<td>64</td>
</tr>
<tr>
<td>(N = 284)</td>
<td>Facilitating and/or scaffolding instruction</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td>Curating and integrating print and/or online resources</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>Modeling/creating for other stakeholders</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>Collaboration and/or co-teaching integrated in library program</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>Promoting student collaboration, feedback, and reflection</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Barriers to collaboration and co-teaching</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Barriers to integrating technology during inquiry-based learning</td>
<td>11</td>
</tr>
<tr>
<td>Professional development</td>
<td>Reflecting on experiences</td>
<td>49</td>
</tr>
<tr>
<td>(N = 154)</td>
<td>Professional development ongoing or mastery experiences</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>Curriculum designer and curriculum connections</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>Mentor and/or mentee relationship</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Professional development barriers</td>
<td>7</td>
</tr>
<tr>
<td>Time and money</td>
<td>Time and/or library scheduling barriers</td>
<td>38</td>
</tr>
<tr>
<td>(N = 89)</td>
<td>Budget cuts negatively impacting library program</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Time and/or scheduling enablers</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Budget positively impacting library program</td>
<td>14</td>
</tr>
<tr>
<td>COVID-19</td>
<td>COVID-19 barriers/interruptions to library program</td>
<td>25</td>
</tr>
<tr>
<td>(N = 25)</td>
<td>Student focus issues or gaps in learning</td>
<td>10</td>
</tr>
</tbody>
</table>

Including the themes of Professional Development, Time and Money, and COVID-19 into this study would have been beyond the scope and purpose of this study. However, themes of Professional Development, Time and Money, and COVID-19 are recommended for future studies and areas of research for how the self-efficacy beliefs of school librarians about
integrating technology during inquiry-based learning were impacted and how it influenced the practices of school librarians. A review of the coded transcripts and themes were reviewed for accuracy and strategies of triangulation, member checking, and thick description were implemented to confirm trustworthiness and validity of the data (Creswell & Plano Clark, 2018). This was a time-consuming process to make sure transcripts were accurate and all information was recorded properly.

The last question during the semi-structured interviews asked participants if they would be willing to share lesson plan artifacts that focused on integrating technology during inquiry-based learning. A modified version of the TPACK-based Technology Integration Assessment Rubric (Harris et al., 2010) was used to thoroughly review lesson plans. All lesson plans that were collected were analyzed. First, line-by-line coding was used throughout the lesson plan artifacts which generated 262 codes. Second, codes were cleaned and updated to have consistency among similar codes. Third, code frequencies were identified and then grouped together as themes and subthemes began to emerge. Fourth, the themes of Student-Centered Integration \((N = 158)\) and Librarian-Centered Integration \((N = 104)\) emerged for the different ways technology was integrated during inquiry-based learning activities in lesson plans. Fifth, subthemes were developed and included (3a) student consumption, (3b) student creation, and (3c) student collaboration for Student-Centered Integration. Subthemes for Librarian-Centered Integration included (4a) modeling and creating and (4b) curating.

The next step for analyzing data after interpreting the methods one at a time was to further explore how the quantitative and qualitative results were connected. Quantitative and qualitative results needed to be triangulated, integrated, and combined. Triangulation was a
strategy that was implemented in this study. Creswell and Plano Clark (2018) stated that triangulation is when a mixed methods researcher seeks “convergence and corroboration by comparing findings from qualitative data with the quantitative results” (p. 290). Integrating quantitative and qualitative data is where “qualitative research interfaces with quantitative research” (Creswell & Plano Clark, 2018, p. 220). This process of integrating quantitative and qualitative data was not merely making simple connections. It was not analyzing each strand independently and quickly determining what overlaps. Integrating both methods strengthened each strand and covered for any weaknesses in the other method. Creswell and Plano Clark (2018) stated that using an explanatory sequential design allowed for a “deeper understanding that occurs when personal experiences help to explain statistical results” (p. 220). In this explanatory sequential mixed methods design, the quantitative data was deeply explained by the qualitative data. The qualitative review of conducting interviews and reviewing lesson plan artifacts gave meaning to the quantitative results. For example, one of the quantitative survey items stated “I feel confident that I have the skills necessary to integrate technology during inquiry-based learning.” The qualitative phase that followed the quantitative phase enabled a deeper understanding by asking open-ended questions as to why a participant strongly agreed or strongly disagreed with an item. Furthermore, the qualitative data helped to clarify the quantitative data results. A template script was provided by Creswell and Plano Clark (2018) to provide an overview description of the process for an explanatory sequential mixed methods design. According to Creswell and Plano Clark (2018), integration in an explanatory sequential mixed methods design should “consist of explaining the survey results with qualitative interviews [and lesson plans], connecting the quantitative results with the qualitative data
collection, displaying the results that link the survey results with the qualitative research questions, and interpreting the results to help explain the survey results with information from participants who can best reflect on the survey results” (p. 298). This research study followed this explanatory sequential mixed methods design template script by Creswell and Plano Clark (2018) for this explanatory sequential mixed methods study.

This study used an explanatory sequential mixed methods design that was indicated by QUAN → qual since quantitative data was collected and analyzed first before the qualitative phase was implemented. The quantitative phase took priority since it is the first phase in this study and then qualitative data helped provide meaning for the quantitative results. Creswell and Creswell (2018) described that the “researcher first conducts quantitative research, analyzes the results and then builds on the results to explain them in more detail with qualitative research” (p. 15). During the quantitative phase of this study, quantitative data was collected and analyzed. Then, significant and meaningful quantitative results were identified to use for the qualitative phase. The qualitative phase provided supplemental data and provided meaning and an explanation to the quantitative results. During the qualitative phase of this study, qualitative data was collected and analyzed through conducting interviews and reviewing lesson plan artifacts. Then, results from both phases were interpreted to determine how the qualitative phase explained and gave meaning to the quantitative results. Creswell and Creswell (2018) recommended that “if a stronger emphasis is sought for the quantitative approach, then an explanatory sequential strategy is used because it began with the quantitative component of the study” (p. 238). In this study, the initial quantitative phase informed how the qualitative phase was structured, but then the qualitative phase provided in-depth meaning of the quantitative results.
Validity

Validation of data collection techniques was very important in this mixed methods study. According to Creswell and Plano Clark (2018), “validity in mixed methods research involves employing strategies that address potential issues in data collection, data analysis, and data interpretations that might compromise the merging or connecting of the quantitative and qualitative strands of the study” (p. 452). The potential compromising of data was deeply considered to ensure that data was validated for both quantitative and qualitative strands. Potential threats to the validity in this study were considered and actions were taken to minimize them. Due to potential threats to the validity of this study, several strategies were implemented to minimize them in this study. One threat to validity in a mixed methods study could be having no connection between the quantitative and qualitative strands (Creswell & Plano Clark, 2018). In this mixed methods study, qualitative participants were purposefully selected from the sample of participants in the quantitative study. Another threat could have been to identify the wrong significant or nonsignificant results (Creswell & Plano Clark, 2018). Consequently, a thorough analysis was conducted to consider what results were significant. Furthermore, another threat to validity could be not considering the significant quantitative results during the qualitative phase (Creswell & Plano Clark, 2018). In order to minimize this threat, qualitative data collection was deeply examined so that it could help explain the results from the quantitative phase. Triangulation, member checking, and thick descriptions were three specific strategies that were implemented in this study to build trustworthiness and validation of the findings.

Triangulation of data was one of the strategies that was employed in this study that corroborated the quantitative and qualitative data results which supported the trustworthiness and
validation of the data (Creswell & Plano Clark, 2018; Greene et al., 1989). Creswell and Plano Clark (2018) stated a "valid strategy is the triangulation of data drawn from several sources" (p. 217). School librarian participants that participated in the qualitative phase of research were purposefully selected using maximum variation sampling based on the quantitative survey results. Then, two different types of qualitative data were collected including semi-structured interviews and then lesson plan artifacts. Data collection from the three sources used in this study validated the trustworthiness of the findings in this study.

Member checking was another strategy implemented to preserve the validation of the data during the semi-structured interviews which enabled asking for clarification and restating information shared by the participants (Harper & Cole, 2012). The average duration of the semi-structured interviews was about 52 minutes. This enabled the participants to clarify their responses and answer questions during the semi-structured interviews. The school librarian participants were asked to make clarifications and expound on their responses when needed and were also given opportunities to hear their responses stated back to them.

Thick description was also used as a strategy in this study to validate findings. Hong and Cross Francis (2020) stated that "the practice of thick description involves providing context and meaning to observable actions, words, and artifacts, so they can be better understood by an outsider (p. 213). There are misconceptions held by school community stakeholders and policymakers (Kachel and Lance; 2018; Levin, 2019; Seminelli, 2016) about the school librarian role so providing thick descriptions helped clarify data provided by the school librarian participants. Hong and Cross Francis (2020) continued that "thick descriptions include enough context so that someone who did not observe or experience the phenomenon can make meaning
of the behavior, statement, or object” (p. 213). Due to the vast differences in library programs and demographics among the different school librarian participants, thick descriptions were necessary to provide trustworthiness and validate the findings.

Creswell and Plano Clark (2018) stated “validity differs in quantitative and qualitative research, but in both approaches it serves the purpose of checking on the quality of the data, the results, and the author’s interpretation of the data results” (p. 216). It was important to ensure that there was proper validation of quantitative and qualitative methods in this study. Quantitative results from the survey tool were checked to determine if the results accurately answered the questions posed to the participants. Data was reviewed to confirm that results were valid and reliable. Several steps were taken throughout data collection and analysis to reduce potential threats that could have caused issues with the validity or reliability in this explanatory sequential mixed methods study. First, Creswell and Plano Clark (2018) advocated that threats could be minimized by having the researcher “consider all possibilities for explanation of results (e.g., significant and nonsignificant predictors)” (p. 252). This study considered all possibilities when analyzing the quantitative data and the qualitative phase was finalized after the quantitative data was collected and analyzed. Second, Creswell and Plano Clark (2018) advocated that the researcher should “design qualitative data collection questions to probe into the surprising, contradictory quantitative results” (p. 252). The qualitative phase in this study was informed by the results from the quantitative phase. Third, Creswell and Plano Clark (2018) advocated that the researcher should “purposefully select the qualitative sample using the quantitative results to identify participants from the sample of quantitative participants who can provide the best explanations” (p. 252). There were 42 school librarian participants that indicated during the
quantitative phase that they would be willing to participate in the qualitative phase. This study used maximum variation sampling to identify participants from the quantitative phase that would be good to include in the qualitative phase. Measures were taken to ensure that there was strong qualitative validity, meaning that it can be trusted to accurately represent what participants truly believe. Strategies including triangulation, member checking, and thick description were used to reduce possible threats during the qualitative phase. This study reported on the most important findings, represented and acknowledged all important findings, and chose participants for the qualitative strand based on the survey scores during quantitative phase (Creswell & Plano Clark, 2018). Overall, purposeful steps were taken in this explanatory sequential mixed methods study to promote the trustworthiness of results during the quantitative and qualitative phases.

Mixing and Integration of Quantitative and Qualitative Data

Creswell and Plano Clark (2018) stated mixing and integration of quantitative and qualitative data is the “centerpiece of mixed methods research. The presence of meaningful integration distinguishes mixed methods from other methodologies that do not highlight the mixing of the databases. Integration is the point in the research procedures where qualitative research interfaces with quantitative research” (p. 220). The mixing and integration of quantitative and qualitative data was very important in this study to enhance and strengthen the findings in this study. Quantitative data was collected and analyzed before moving onto the qualitative phase so that the quantitative phase could inform the qualitative phase. The quantitative phase informed the qualitative phase and there were no predetermined codes used during the qualitative phase. Maximum variation sampling was used in this study to identify
participants for the qualitative phase. Creswell and Plano Clark (2018) advocated that “a strong connection between the phases, such as the selection of participants for the qualitative phase from information arising from the quantitative data analysis, helps the researcher achieve more meaningful explanations” (p. 234). This explanatory sequential mixed methods study had strong connections and meaningful explanations because the participants selected for the qualitative phase participated in the quantitative phase. Table 3 showed how participants were selected for the qualitative phase based on the quantitative results. Creswell and Plano Clark (2018) stated that the researcher needed to “determine how the qualitative themes and codes provide additional insight into and nuances about the quantitative database—an approach consistent with an explanatory sequential design intent” (p. 238.) In chapter 4, a joint display was included that highlighted the integration between the quantitative and qualitative phases. The mixing and integration of the quantitative and qualitative phases in this study strengthened this explanatory sequential mixed methods study. In chapter 3, a methodology for this study was provided that described this explanatory sequential mixed methods research study. Chapter 4 provided information on the results from this study.
CHAPTER 4

RESULTS

Chapter 4 provided a detailed description of the results from the quantitative and qualitative phases for this explanatory sequential mixed methods study. Demographic data and quantitative survey results were collected and analyzed first followed by the qualitative phase. Qualitative data included conducting semi-structured interviews and then reviewing lesson plan artifacts. This chapter focused on examining the self-efficacy beliefs of school librarians about technology integration during inquiry-based learning and explored their practices implemented in their library programs.

Purposes of the Study

The purposes of this mixed methods study were to examine the self-efficacy beliefs of school librarians about integrating technology during inquiry-based learning during the quantitative phase and to explore how these practices about technology integration during inquiry-based learning are being implemented during the qualitative phase. An explanatory sequential mixed methods design was used which involved collecting quantitative data first and then explaining the quantitative results with in-depth qualitative data. In the first, quantitative phase of the study, survey data was collected from school librarians located in the Chicago suburbs to investigate the self-efficacy beliefs of school librarians. The second, qualitative phase was conducted as a follow-up to the quantitative results to explore self-efficacy practices of school librarians. The qualitative data helped explain the quantitative survey results. In this
explanatory follow-up, practices about technology integration during inquiry-based learning were explored by conducting in-depth interviews with school librarian participants and reviewing lesson plan artifacts.

Research Questions

The following questions were addressed through an explanatory sequential mixed methods design:

Research Question 1 (QUAN): What are the self-efficacy beliefs of school librarians about integrating technology during inquiry-based learning?

Research Question 2 (qual): How do school librarians describe their practices when integrating technology during inquiry-based learning?

Mixed Methods Research Question: In what ways does the qualitative data of exploring the practices of school librarians about integrating technology during inquiry-based learning help to explain the quantitative strand of data of their self-efficacy beliefs?

Quantitative Findings

For the quantitative phase of this study, 115 school librarians participated and provided responses to the survey. Demographic data that was collected included gender, years of experience, age, grade level taught, highly qualified status, and type of scheduling. School librarians from preschool through high school were asked to share their self-efficacy beliefs by answering 21 items that were based on a modified version of the Technology Integration Self-Efficacy Scale (Wang et al., 2004). Respondents could score between 21-105 on this survey.
instrument. Means for the instrument were calculated based on participant demographics.

Additionally, participants were asked at the end of the survey if they would be willing to participate in the qualitative phase. All participants were contacted by email and asked to complete a survey that was estimated to take about 15 minutes. The survey focused on the self-efficacy beliefs of school librarians about integrating technology during inquiry-based learning.

Table 5 provided an overview of the demographic data that was collected during this study.

Table 5
Demographic Characteristics of Respondents for Quantitative Results

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Frequency</th>
<th>Percent</th>
<th>Mean</th>
<th>Standard Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>15</td>
<td>13%</td>
<td>84.53</td>
<td>14.74</td>
</tr>
<tr>
<td>Female</td>
<td>100</td>
<td>87%</td>
<td>85.62</td>
<td>11.86</td>
</tr>
<tr>
<td>Years of library experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 7 years</td>
<td>38</td>
<td>33.0%</td>
<td>78.74</td>
<td>14.99</td>
</tr>
<tr>
<td>7-13 years</td>
<td>39</td>
<td>33.9%</td>
<td>86.85</td>
<td>8.75</td>
</tr>
<tr>
<td>14-20 years</td>
<td>21</td>
<td>18.3%</td>
<td>91.57</td>
<td>5.70</td>
</tr>
<tr>
<td>21-27 years</td>
<td>14</td>
<td>12.2%</td>
<td>88.64</td>
<td>12.57</td>
</tr>
<tr>
<td>28 or more years</td>
<td>3</td>
<td>2.6%</td>
<td>95.67</td>
<td>4.51</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 years old or younger</td>
<td>6</td>
<td>5.2%</td>
<td>67.50</td>
<td>24.11</td>
</tr>
<tr>
<td>31-40 years old</td>
<td>30</td>
<td>26.1%</td>
<td>83.17</td>
<td>11.34</td>
</tr>
<tr>
<td>41-50 years old</td>
<td>42</td>
<td>36.5%</td>
<td>86.33</td>
<td>10.63</td>
</tr>
<tr>
<td>51-60 years old</td>
<td>28</td>
<td>24.3%</td>
<td>87.50</td>
<td>9.70</td>
</tr>
<tr>
<td>61 years old or older</td>
<td>9</td>
<td>7.8%</td>
<td>94.89</td>
<td>4.20</td>
</tr>
<tr>
<td>Grade level taught</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preschool and elementary</td>
<td>3</td>
<td>2.6%</td>
<td>85.33</td>
<td>4.73</td>
</tr>
<tr>
<td>Elementary school</td>
<td>60</td>
<td>52.2%</td>
<td>81.52</td>
<td>13.76</td>
</tr>
<tr>
<td>Middle school</td>
<td>29</td>
<td>25.2%</td>
<td>89.24</td>
<td>7.67</td>
</tr>
<tr>
<td>High school</td>
<td>23</td>
<td>20%</td>
<td>91.08</td>
<td>9.66</td>
</tr>
<tr>
<td>Highly qualified</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>102</td>
<td>88.7%</td>
<td>87.65</td>
<td>9.95</td>
</tr>
<tr>
<td>No</td>
<td>13</td>
<td>11.3%</td>
<td>68.46</td>
<td>15.17</td>
</tr>
<tr>
<td>Type of schedule</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed</td>
<td>22</td>
<td>19.1%</td>
<td>74.68</td>
<td>18.56</td>
</tr>
<tr>
<td>Flexible</td>
<td>61</td>
<td>53%</td>
<td>88.95</td>
<td>8.18</td>
</tr>
<tr>
<td>Hybrid</td>
<td>32</td>
<td>27.8%</td>
<td>86.28</td>
<td>8.85</td>
</tr>
</tbody>
</table>
Descriptive results for demographic data in Table 5 showed that there were 115 school librarian participants that completed the survey. A total of 115 participants from the Chicago suburbs completed this survey and 42 participants provided their personal information and indicated that they would be willing to participate in the qualitative phase of the study. All 115 respondents indicated that all students in their schools had a device assigned to them by the school district. One high school librarian indicated that they are employed part-time while all others indicated that they are employed full-time. Survey results showed that 87% of respondents for this study were female ($N = 100, M = 85.62, SD = 11.86$) and 13% of respondents were male ($N = 15, M = 84.53, SD = 14.74$). Results shown in Table 5 indicated that 33% of respondents had less than 7 years of experience as a school librarian ($N = 38, M = 78.74, SD = 14.99$) which were the lowest scores, 33.9% of respondents had between 7-13 years of experience ($N = 39, M = 86.85, SD = 8.75$), 18.3% of respondents had between 14-20 years of experience ($N = 21, M = 91.57, SD = 5.70$), 12.2% of respondents had between 21-27 years of experience ($N = 14, M = 88.64, SD = 12.57$), and 2.6% of respondents had 28 or more years of experience ($N = 3, M = 95.67, SD = 4.51$) which were the highest scores on the survey for years of experience. School librarians that had less than seven years of experience were more likely to have lower self-efficacy beliefs while school librarians with more years of experience were more likely to report higher self-efficacy beliefs. The demographic results shown in Table 5 revealed that 5.2% of school librarians were 30 years old or younger ($N = 6, M = 67.50, SD = 24.11$), 26.1% were between 31-40 years old ($N = 30, M = 83.17, SD = 11.34$), 36.5% were between 41-50 years old ($N = 42, M = 86.33, SD = 10.63$), 24.3% were between 51-60 years old ($N = 28, M = 87.50, SD = 9.70$), and 7.8% were 61 years old or older ($N = 9, M = 94.89, SD = 4.20$). Table 5 revealed that
the younger school librarians were more likely to have lower self-efficacy beliefs while older librarians were more likely to report higher self-efficacy beliefs.

It can be observed in Table 5 that each grade level was represented in the study including preschool, elementary school, middle school, and high school. The results showed 2.6% of school librarian respondents taught preschool and elementary school students \(N = 3, M = 85.33, SD = 4.73\) which was a very small representation of the data. All three respondents that taught preschool and elementary school indicated that they followed a hybrid schedule that included both fixed and flexible scheduling. Additionally, 52.2% stated they taught at an elementary school \(N = 60, M = 81.52, SD = 13.76\), 25.2% stated they taught at a middle school \(N = 29, M = 89.24, SD = 7.67\), and 20% stated they taught at a high school \(N = 23, M = 91.08, SD = 9.66\).

Middle school and high school librarians reported higher self-efficacy than elementary school librarians with high school librarians reporting the highest self-efficacy beliefs.

One survey question asked participants if they were highly qualified and 88.7% of school librarian respondents indicated they were highly qualified in their role \(N = 102, M = 87.65, SD = 9.95\). However, 11.3% of school librarians indicated that they were not highly qualified for their role \(N = 13, M = 68.46, SD = 15.17\). School librarians that were not highly qualified reported the second lowest self-efficacy beliefs compared to any other demographic group. The only demographic group that scored lower than school librarians that were not highly qualified were school librarians who were 30 years old or younger. One school librarian employed at a preschool and elementary school with a student population of 250 and one middle school librarian with a student population of 400 indicated that they were not highly qualified for their role. The other eleven school librarians that were not highly qualified all taught at elementary
schools. All high school librarians indicated that they were highly qualified. There was a large discrepancy on survey item 21 between highly qualified and not highly qualified school librarians at all grade levels regarding carrying out integrating technology during inquiry-based learning even when they are opposed by skeptical colleagues. For survey item 21, highly qualified school librarians reported higher self-efficacy beliefs to engage in technology during inquiry-based learning when opposed by a skeptical colleague compared to school librarians that are not highly qualified.

Eleven out of the thirteen school librarians that were not highly qualified all had less than seven years of experience while two school librarians that were not highly qualified had between 7-13 years of experience and between 21-27 years of experience. All school librarians that were not highly qualified were employed at schools with enrollment between 250-620 students. Out of the thirteen school librarians that were not highly qualified, 7 respondents indicated that they were on a fixed schedule, 1 respondent indicated that they were on a flexible schedule, and 5 indicated that they were on a hybrid schedule that included fixed lessons and flexible lessons within it.

The AASL (2019) advocated that school library programs must have responsive, equitable, and flexible scheduling to allow for “an open schedule that encourages school librarians to collaborate as full partners with classroom educators to design, implement, assess, and evaluate inquiry lessons” (p. 1). Conversely, the AASL (2019) advocated that a fixed library program schedule impedes and inhibits the possibility of a successful library program. Table 5 showed that 19.1% of school librarians were on a fixed library schedule ($N = 22, M = 74.68, SD = 18.56$), 53% were on a flexible library schedule ($N = 61, M = 88.95, SD = 8.18$), and 27.8%
were on a hybrid schedule which includes fixed lessons but also allows for some flexibility within the schedule ($N = 32, M = 86.28, SD = 8.85$). Table 6 showed what type of scheduling school librarian participants had in their program and included demographics for gender and whether participants were highly qualified in their roles.

Table 6

<table>
<thead>
<tr>
<th></th>
<th>School librarians on a fixed schedule</th>
<th>School librarians on a flexible schedule</th>
<th>School librarians on a hybrid schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>3</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Female</td>
<td>19</td>
<td>51</td>
<td>30</td>
</tr>
<tr>
<td>Highly qualified</td>
<td>15</td>
<td>60</td>
<td>27</td>
</tr>
<tr>
<td>Not highly qualified</td>
<td>7</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 6 demonstrated that there were 20% of males ($N = 3$) and 19% of females ($N = 19$) indicated that they were on a fixed schedule, 66.67% of males ($N = 10$) and 51% of females ($N = 51$) were on a flexible schedule, and 13.33% of males ($N = 2$) and 30% of females ($N = 30$) were on a hybrid schedule.

The results displayed in Table 6 revealed that 10% ($N = 15$) of school librarians were highly qualified and on a fixed schedule while 6.09% ($N = 7$) of respondents were not highly qualified and on a fixed schedule. School librarians on a hybrid schedule that were highly qualified accounted for 23.48% ($N = 27$) while 4.35% ($N = 5$) of school librarians on a hybrid schedule were not highly qualified. However, school librarians on a flexible schedule collectively reported higher self-efficacy beliefs than school librarians on a fixed or hybrid library schedule. There were 52.17% of school librarians on a flexible schedule ($N = 60$) that
were highly qualified and only 0.87% of school librarians \((N = 1)\) on a flexible schedule that were not highly qualified. Table 7 revealed the library scheduling demographics related to the various grade levels taught including preschool and elementary school, elementary school, middle school, and high school.

<table>
<thead>
<tr>
<th>Grade level taught</th>
<th>School librarians on a fixed schedule</th>
<th>School librarians on a flexible schedule</th>
<th>School librarians on a hybrid schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preschool &amp; elementary</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Elementary school</td>
<td>21</td>
<td>14</td>
<td>25</td>
</tr>
<tr>
<td>Middle school</td>
<td>0</td>
<td>26</td>
<td>3</td>
</tr>
<tr>
<td>High school</td>
<td>1</td>
<td>21</td>
<td>1</td>
</tr>
</tbody>
</table>

It can be observed in Table 7 that 18.26% of elementary school librarians \((N = 21)\) and 0.87% of high school librarians \((N = 1)\) indicated that they followed a fixed library schedule. School library programs on a hybrid schedule included 2.61% of preschool and elementary school librarians \((N = 3)\), 21.74% of elementary school librarians \((N = 25)\), 2.61% of middle school librarians \((N = 3)\), and 0.87% of high school librarians \((N = 1)\). However, most school librarians reported that they were on a flexible library schedule. Table 7 demonstrated that 12.17% of elementary school librarians \((N = 14)\), 22.61% of middle school librarians \((N = 26)\), and 18.26% of high school librarians \((N = 21)\) were all on a flexible library schedule. All school librarians that provided data for this study were employed in the Chicago suburbs.

There were 115 school librarians that participated in the quantitative phase and shared their self-efficacy beliefs about integrating technology into inquiry-based learning. The survey
instrument that was used to collect quantitative data was modified based on the Technology Integration Self-Efficacy Scale (Wang et al., 2004). This survey instrument was modified to address the needs of this study to capture the self-efficacy beliefs about integrating technology during inquiry-based learning. There were 21 Likert-style items included in the survey that had point values between 1 to 5, where 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree. The range of possible scores was between 21-105, but the actual range reported by participants for this study was 40-100. Table 8 showed the survey response means for participants and identified the survey item addressed internal influences or external influences modeled after Wang et al. (2004).

Table 8
Survey Response Means for School Librarians’ Self-Efficacy Beliefs

<table>
<thead>
<tr>
<th>Survey Question</th>
<th>Influence Type</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item 19: Improved ability as time goes by</td>
<td>External</td>
<td>4.56</td>
<td>0.716</td>
</tr>
<tr>
<td>Item 1: Understand device capabilities</td>
<td>Internal</td>
<td>4.50</td>
<td>0.718</td>
</tr>
<tr>
<td>Item 6: Help students when they have difficulty</td>
<td>Internal</td>
<td>4.45</td>
<td>0.704</td>
</tr>
<tr>
<td>Item 2: Have the skills necessary</td>
<td>Internal</td>
<td>4.44</td>
<td>0.752</td>
</tr>
<tr>
<td>Item 3: Successfully teach relevant subject content appropriately</td>
<td>Internal</td>
<td>4.43</td>
<td>0.849</td>
</tr>
<tr>
<td>Item 17: Comfortable integrating technology</td>
<td>External</td>
<td>4.43</td>
<td>0.806</td>
</tr>
<tr>
<td>Item 18: Be responsive to students’ needs</td>
<td>Internal</td>
<td>4.43</td>
<td>0.703</td>
</tr>
<tr>
<td>Item 9: Mentor students appropriately</td>
<td>Internal</td>
<td>4.38</td>
<td>0.756</td>
</tr>
<tr>
<td>Item 8: Motivate my students to participate in projects</td>
<td>Internal</td>
<td>4.36</td>
<td>0.580</td>
</tr>
<tr>
<td>Item 12: Regularly integrate technology when appropriate</td>
<td>Internal</td>
<td>4.34</td>
<td>0.826</td>
</tr>
<tr>
<td>Item 5: Use correct technological terminology with students</td>
<td>Internal</td>
<td>4.34</td>
<td>0.699</td>
</tr>
<tr>
<td>Item 4: Evaluate software and digital tools</td>
<td>Internal</td>
<td>4.31</td>
<td>0.705</td>
</tr>
<tr>
<td>Item 13: Connect to curriculum standards</td>
<td>Internal</td>
<td>4.21</td>
<td>0.874</td>
</tr>
<tr>
<td>Item 10: Consistently use effective methods</td>
<td>Internal</td>
<td>4.19</td>
<td>0.897</td>
</tr>
<tr>
<td>Item 16: Using data to improve instruction</td>
<td>Internal</td>
<td>4.18</td>
<td>0.779</td>
</tr>
<tr>
<td>Item 15: Curricular goals and technology uses in mind</td>
<td>External</td>
<td>4.15</td>
<td>0.851</td>
</tr>
<tr>
<td>Item 20: Develop creative ways to cope with system constraints</td>
<td>External</td>
<td>4.13</td>
<td>0.843</td>
</tr>
<tr>
<td>Item 11: Provide individual feedback to students</td>
<td>Internal</td>
<td>4.12</td>
<td>0.880</td>
</tr>
<tr>
<td>Item 7: Effectively monitor student devices and internet use</td>
<td>Internal</td>
<td>4.03</td>
<td>0.898</td>
</tr>
<tr>
<td>Item 14: Assigning and grading</td>
<td>Internal</td>
<td>3.97</td>
<td>0.945</td>
</tr>
<tr>
<td>Item 21: Opposed by a skeptical colleague</td>
<td>External</td>
<td>3.90</td>
<td>1.026</td>
</tr>
</tbody>
</table>
All survey items asked school librarian participants to rate their self-efficacy beliefs about technology integration during inquiry-based learning. There were sixteen items for internal influences that were included in the survey for this study. The other five survey items were external factors. Internal and external influences for each survey item were listed in Table 8. The top internal influences for survey items included understanding device capabilities \( (M = 4.50, SD = 0.718) \) for item 1, helping students when they have difficulty \( (M = 4.45, SD = 0.704) \) for item 6, and having the skills necessary \( (M = 4.45, SD = 0.704) \) for item 2. It can be observed in Table 8 that the self-efficacy beliefs about technology integration during inquiry-based learning for the participants had the lowest rated items for assigning and grading \( (M = 3.97, SD = 0.945) \) for item 14, effectively monitoring student devices and internet use \( (M = 4.03, SD = 0.898) \) for item 7, and providing individual feedback to students \( (M = 4.12, SD = 0.880) \) for item 11.

The five external influences on self-efficacy beliefs about technology integration during inquiry-based learning included having an improved ability as time goes by \( (M = 4.56, SD = 0.716) \) on item 19, being comfortable integrating technology \( (M = 4.43, SD = 0.806) \) on item 17, keeping curricular goals and technology uses in mind \( (M = 4.15, SD = 0.851) \) on item 15, developing creative ways to cope with system constraints \( (M = 4.13, SD = 0.843) \) on item 20, and being opposed by skeptical colleagues \( (M = 3.90, SD = 1.026) \) on item 21. Participants rated their ability to improve as time goes by when integrating technology during inquiry-based learning for item 19 as their highest rated self-efficacy belief while participants reported being opposed by skeptical colleagues for item 21 as their lowest self-efficacy belief.

Overall, it can be observed in Table 8 where internal influences and external influences are ordered together that school librarians were most self-efficacious about integrating
technology during inquiry-based learning for having an improved ability as time goes by ($M = 4.56, SD = 0.716$) on item 19, understanding device capabilities ($M = 4.50, SD = 0.718$) on item 1, and helping students when they have difficulty ($M = 4.45, SD = 0.704$) on item 6. Table 8 revealed that school librarians were least self-efficacious when effectively monitoring student devices and internet use ($M = 4.03, SD = 0.898$), assigning and grading ($M = 3.97, SD = 0.945$), and being opposed by skeptical colleagues ($M = 3.90, SD = 1.026$). Table 9 provided a more detailed overview of these three highest rated and three lowest rated survey items.

Table 9

Means for Highest and Lowest Rated Self-Efficacy Beliefs for Survey Items

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Item 19</th>
<th>Item 1</th>
<th>Item 6</th>
<th>Item 7</th>
<th>Item 14</th>
<th>Item 21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Overall</td>
<td>4.56</td>
<td>4.50</td>
<td>4.45</td>
<td>4.27</td>
<td>3.97</td>
<td>3.90</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>4.60</td>
<td>4.40</td>
<td>4.53</td>
<td>4.27</td>
<td>3.80</td>
<td>3.80</td>
</tr>
<tr>
<td>Female</td>
<td>4.55</td>
<td>4.52</td>
<td>4.44</td>
<td>4.00</td>
<td>3.99</td>
<td>3.92</td>
</tr>
<tr>
<td>Years of library experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 7 years</td>
<td>4.34</td>
<td>4.11</td>
<td>4.13</td>
<td>3.82</td>
<td>3.61</td>
<td>3.47</td>
</tr>
<tr>
<td>7-13 years</td>
<td>4.67</td>
<td>4.62</td>
<td>4.54</td>
<td>3.97</td>
<td>4.03</td>
<td>4.00</td>
</tr>
<tr>
<td>14-20 years</td>
<td>4.71</td>
<td>4.86</td>
<td>4.76</td>
<td>4.48</td>
<td>4.24</td>
<td>4.33</td>
</tr>
<tr>
<td>21-27 years</td>
<td>4.57</td>
<td>4.64</td>
<td>4.50</td>
<td>4.07</td>
<td>4.14</td>
<td>4.00</td>
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<tr>
<td>28 or more years</td>
<td>4.67</td>
<td>5.00</td>
<td>5.00</td>
<td>4.33</td>
<td>5.00</td>
<td>4.67</td>
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<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 years old or younger</td>
<td>4.00</td>
<td>3.67</td>
<td>3.83</td>
<td>4.00</td>
<td>3.17</td>
<td>2.67</td>
</tr>
<tr>
<td>31-40 years old</td>
<td>4.53</td>
<td>4.27</td>
<td>4.47</td>
<td>3.93</td>
<td>3.87</td>
<td>3.77</td>
</tr>
<tr>
<td>41-50 years old</td>
<td>4.60</td>
<td>4.62</td>
<td>4.40</td>
<td>4.05</td>
<td>4.02</td>
<td>3.90</td>
</tr>
<tr>
<td>51-60 years old</td>
<td>4.57</td>
<td>4.61</td>
<td>4.50</td>
<td>4.00</td>
<td>3.96</td>
<td>4.07</td>
</tr>
<tr>
<td>61 years old or older</td>
<td>4.78</td>
<td>5.00</td>
<td>4.89</td>
<td>4.44</td>
<td>4.56</td>
<td>4.67</td>
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<td>Grade level taught</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Preschool &amp; elementary</td>
<td>4.67</td>
<td>4.67</td>
<td>4.67</td>
<td>4.00</td>
<td>4.33</td>
<td>4.00</td>
</tr>
<tr>
<td>Elementary school</td>
<td>4.48</td>
<td>4.32</td>
<td>4.25</td>
<td>3.98</td>
<td>3.65</td>
<td>3.62</td>
</tr>
<tr>
<td>Middle school</td>
<td>4.62</td>
<td>4.69</td>
<td>4.66</td>
<td>4.10</td>
<td>4.34</td>
<td>4.14</td>
</tr>
<tr>
<td>High school</td>
<td>4.70</td>
<td>4.78</td>
<td>4.74</td>
<td>4.09</td>
<td>4.35</td>
<td>4.39</td>
</tr>
<tr>
<td>Highly qualified</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>4.66</td>
<td>4.61</td>
<td>4.55</td>
<td>4.09</td>
<td>4.08</td>
<td>4.05</td>
</tr>
<tr>
<td>No</td>
<td>3.77</td>
<td>3.69</td>
<td>3.69</td>
<td>3.62</td>
<td>3.08</td>
<td>2.77</td>
</tr>
<tr>
<td>Type of schedule</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Fixed</td>
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<td>3.91</td>
<td>3.64</td>
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<td>3.36</td>
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<tr>
<td>Flexible</td>
<td>4.69</td>
<td>4.69</td>
<td>4.66</td>
<td>4.11</td>
<td>4.26</td>
<td>4.05</td>
</tr>
<tr>
<td>Hybrid</td>
<td>4.69</td>
<td>4.50</td>
<td>4.45</td>
<td>4.16</td>
<td>3.81</td>
<td>4.00</td>
</tr>
</tbody>
</table>
The descriptive results for the three highest rated items and three lowest rated items on the survey were provided on Table 9. Items 19, 1, and 6 were the highest rated items while items 7, 14, and 21 were the lowest rated items. These six survey items were important to examine because these items had very similar responses across demographics, or they were very different based on participant demographics compared to other survey items.

Item 19 ($M = 4.56$) asked participants about their improved ability as time goes by for integrating technology during inquiry-based learning which received the highest rating for the survey. This item received the highest rating for the two genders represented in the study. Males ($M = 4.60$) and females ($M = 4.55$) provided the highest rating based on gender for item 19 compared to any other survey item. School librarians with less than seven years of experience ($M = 4.34$) provided the lowest rating compared to participants with more experience. Participants with 28 or more years of experience and were 61 years old or older provided higher ratings for item 19. High school librarians provided the highest rating for item 19 while elementary school librarians provided the lowest rating. Highly qualified ($M = 4.66$) school librarians reported higher self-efficacy beliefs for item 19 compared to school librarians that were not highly qualified ($M = 3.77$). School librarians on a fixed schedule ($M = 4.00$) reported lower self-efficacy beliefs for item 19 compared to school librarians on a flexible schedule ($M = 4.69$) or hybrid schedule ($M = 4.69$).

Item 1 ($M = 4.50$) was the second highest rated survey item that asked school librarian participants to rate how well they understand device capabilities to maximize them when integrating technology during inquiry-based learning. Males ($M = 4.4$) rated item 1 slightly lower than females ($M = 4.52$). School librarians with less than seven years of experience ($M = 4.11$)
provided the lowest rating for item 1 while school librarians with 28 or more years of experience ($M = 5.00$) provided the highest rating. Participants that were 30 years old or younger ($M = 3.67$) provided the lowest rating for item 1 based on age while librarians 61 years old or older ($M = 5.00$) provided the highest rating. High school librarians ($M = 4.74$) and middle school librarians ($M = 4.69$) rated item 1 higher than elementary school librarians ($M = 4.32$) and preschool and elementary school librarians ($M = 4.67$). Highly qualified ($M = 4.61$) school librarians rated their ability to understand device capabilities to maximize them higher than school librarians that were not highly qualified ($M = 3.69$). School librarians on a flexible schedule ($M = 4.69$) reported the highest self-efficacy beliefs compared to participants on a hybrid schedule ($M = 4.50$) or fixed schedule ($M = 4.00$).

Item 6 ($M = 4.45$) was the third highest rated survey item that asked school librarian participants to rate how well they can help students when they have difficulty with technology during inquiry-based learning. Males ($M = 4.53$) reported higher self-efficacy beliefs compared to females ($M = 4.44$) for item 6. School librarians with less than seven years of experience ($M = 4.11$) and between 21-27 years of experience ($M = 4.50$) reported the lowest self-efficacy beliefs for this item. Participants 30 years old or younger ($M = 3.83$) reported the lowest self-efficacy beliefs based on age while participants 51-60 years old ($M = 4.50$) and 61 years old or older ($M = 4.89$) reported the highest self-efficacy beliefs for item 6. Elementary school librarians ($M = 4.25$) reported the lowest rating for item 6 while middle school librarians ($M = 4.66$) and high school librarians ($M = 4.74$) reported the highest ratings for this item. Highly qualified ($M = 4.55$) school librarians reported higher ratings compared to school librarians that were not highly qualified ($M = 3.69$). Library programs on a flexible schedule ($M = 4.66$) reported the highest
ratings while library programs on a hybrid schedule ($M = 4.55$) or fixed schedule ($M = 3.91$) reported the lowest ratings.

Items 7, 14, and 21 were the lowest rated survey items regarding the self-efficacy beliefs of school librarians about integrating technology during inquiry-based learning. Item 7 ($M = 4.03$) was the third lowest rated survey item that asked participants to rate how effectively they could monitor student devices and internet use during inquiry-based learning projects. Males ($M = 4.27$) rated this item higher than female ($M = 4.00$) school librarian participants. School librarians with less than 7 years of experience ($M = 3.82$) or between 7-13 years of experience ($M = 3.97$) provided lower ratings compared to school librarians with 14-20 years of experience ($M = 4.48$), 21-27 years of experience ($M = 4.07$), and 28 or more years of experience ($M = 4.33$). Participants between 31-40 years old ($M = 3.93$) reported the lowest ratings for item 7 while participants 61 years old or older ($M = 4.44$) reported the highest ratings. Middle school librarians ($M = 4.10$) reported the highest self-efficacy beliefs for item 7 while elementary school librarians ($M = 3.98$) reported the lowest self-efficacy beliefs. Highly qualified ($M = 4.09$) school librarians reported higher self-efficacy beliefs compared to school librarians that were not highly qualified ($M = 3.62$). Library programs on a fixed schedule ($M = 3.64$) reported the lowest self-efficacy beliefs compared to library programs on a flexible schedule ($M = 4.11$) or hybrid schedule ($M = 4.16$).

Item 14 ($M = 3.97$) was the second lowest rated survey item that asked participants how confident they were at assigning and grading inquiry-based learning projects when technology was integrated. Males ($M = 3.8$) reported lower self-efficacy beliefs compared to female ($M = 3.99$) school librarian participants. School librarians with less than seven years of experience ($M$
= 3.61) reported the lowest scores compared to school librarians with more than 28 years or more experience (M = 5.00). Participants that were 61 years old or older (M = 4.56) reported the highest rating followed by participants between 41-50 years old (M = 4.02). Participants that were 30 years old or younger (M = 3.17) reported the lowest rating based on age. High school librarians (M = 4.35) and middle school librarians (M = 4.34) reported higher ratings compared to elementary school librarians (M = 3.65). Highly qualified (M = 4.08) school librarians reported higher self-efficacy beliefs compared to school librarians that were not highly qualified (M = 3.08). Library programs on a fixed schedule (M = 3.36) had the lowest self-efficacy beliefs compared to library programs on a flexible schedule (M = 4.26) or hybrid schedule (M = 3.81).

Item 21 (M = 3.90) was the lowest rated survey item overall. It asked participants about their self-efficacy beliefs about integrating technology during inquiry-based learning projects when opposed by skeptical colleagues. Males (M = 3.80) reported lower self-efficacy beliefs compared to female (M = 3.92) participants. School librarians that had 28 or more years of experience (M = 4.67) reported the highest self-efficacy beliefs compared to school librarians with 21-27 years of experience (M = 4.00), 14-20 years of experience (M = 4.33), and 7-13 years of experience (M = 4.00). However, school librarians that had less than seven years of experience (M = 3.47) rated their self-efficacy beliefs the lowest compared to school librarians with more experience. Participants that were 30 years old or younger (M = 2.67) reported the lowest overall self-efficacy beliefs for item 21. This was the lowest self-efficacy belief reported for the entire survey. However, school librarians between 31-40 years old (M = 3.77), 41-50 years old (M = 3.90), 51-60 years old (M = 4.07), and participants 61 years old or older (M = 4.67) reported higher self-efficacy beliefs. Elementary school librarians (M = 3.62) held the lowest self-efficacy
beliefs compared to preschool and elementary school librarians ($M = 4.00$), middle school librarians ($M = 4.14$), and high school librarians ($M = 4.39$). Highly qualified ($M = 4.05$) had higher self-efficacy beliefs for item 21 compared to school librarians that were not highly qualified ($M = 2.77$). This was the second lowest self-efficacy belief reported for the entire survey. School librarians on a fixed schedule ($M = 3.36$) reported lower ratings for item 21 compared to participants on a flexible schedule ($M = 4.05$) or hybrid schedule ($M = 4.00$). Examining the highest rated and lowest rated survey items provided important data and highlighted discrepancies between the different demographics.

Grouping Participants by Quartile Levels

School librarian respondents were grouped into quartile levels based on their overall score for the quantitative survey results to prepare for the qualitative phase. SPSS was used to calculate the quartile percentile for each range. Possible scores for the survey instrument had a range from 21-105, but the survey results for this study produced a range of 40-100. Table 10 showed the self-efficacy belief quartile percentiles based on the survey responses provided by the school librarians.

Table 10

Levels of Survey Responses for School Librarians’ Self-Efficacy Beliefs

<table>
<thead>
<tr>
<th>Self-efficacy level</th>
<th>Range</th>
<th>Number of respondents</th>
<th>Percent of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower quartile</td>
<td>21-79</td>
<td>26</td>
<td>22.61%</td>
</tr>
<tr>
<td>Middle quartiles</td>
<td>80-95</td>
<td>62</td>
<td>53.91%</td>
</tr>
<tr>
<td>Upper quartile</td>
<td>96-105</td>
<td>27</td>
<td>23.48%</td>
</tr>
</tbody>
</table>
There were 26 respondents that scored between 21-79 that were placed in the lower quartile and accounted for 22.61% of respondents. The lower quartile had five outlier scores identified in it including 56, 53, 50, 42, and 40. The middle quartiles included 62 respondents that scores ranged between 80-95 which accounted for 53.91% of respondents. The upper quartile included 27 respondents that scored between 96-105 which accounted for 23.48% of school librarian respondents. For this study, school librarian participants in the lower quartile were classified as having low self-efficacy beliefs, school librarians in the middle quartiles were classified as having average self-efficacy beliefs, and school librarians in the upper quartile were classified as having high self-efficacy beliefs. Table 11 provided an overview of how participants were selected along with their demographics.

Table 11  
Participants Selected for Qualitative Phase Based on Quantitative Analysis

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Grade level taught</th>
<th>Years of experience</th>
<th>Survey score</th>
<th>Quartile range</th>
<th>Self-efficacy belief level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molly</td>
<td>43</td>
<td>High</td>
<td>14-20</td>
<td>100</td>
<td>Upper</td>
<td>High</td>
</tr>
<tr>
<td>John</td>
<td>47</td>
<td>Elementary</td>
<td>Less than 7</td>
<td>100</td>
<td>Upper</td>
<td>High</td>
</tr>
<tr>
<td>Christine</td>
<td>45</td>
<td>Middle</td>
<td>7-13</td>
<td>98</td>
<td>Upper</td>
<td>High</td>
</tr>
<tr>
<td>Jackie</td>
<td>57</td>
<td>Middle</td>
<td>14-20</td>
<td>97</td>
<td>Upper</td>
<td>High</td>
</tr>
<tr>
<td>Lauren</td>
<td>62</td>
<td>Elementary</td>
<td>14-20</td>
<td>96</td>
<td>Upper</td>
<td>High</td>
</tr>
<tr>
<td>Kristin</td>
<td>42</td>
<td>High</td>
<td>7-13</td>
<td>86</td>
<td>Middle</td>
<td>Average</td>
</tr>
<tr>
<td>Michelle</td>
<td>51</td>
<td>Elementary</td>
<td>Less than 7</td>
<td>79</td>
<td>Lower</td>
<td>Low</td>
</tr>
<tr>
<td>David</td>
<td>40</td>
<td>Elementary</td>
<td>7-13</td>
<td>79</td>
<td>Lower</td>
<td>Low</td>
</tr>
<tr>
<td>Mary</td>
<td>49</td>
<td>Middle</td>
<td>7-13</td>
<td>77</td>
<td>Lower</td>
<td>Low</td>
</tr>
<tr>
<td>Chelsea</td>
<td>33</td>
<td>Elementary</td>
<td>Less than 7</td>
<td>70</td>
<td>Lower</td>
<td>Low</td>
</tr>
</tbody>
</table>

The quartile ranges were also used to select participants for the qualitative phase since maximum variation sampling was used in this study. All participants were selected using
maximum variation sampling except for Kristin (age 42, 7-13 years of experience, high school, average self-efficacy beliefs) since there were no high school librarians in this study that were classified to be in the lower quartile.

Qualitative Phase

This study collected qualitative data from ten school librarian participants by gathering data from semi-structured interviews and then reviewing lesson plan artifacts. The Northern Illinois University IRB provided approval for the qualitative phase. All school librarian participants that were included during the qualitative phase provided informed consent during the quantitative phase and indicated that they would be willing to participate in the qualitative phase. Maximum variation sampling was used to identify the ten participants based on the quantitative results. The purpose of the qualitative phase was to explore the practices of school librarians about integrating technology during inquiry-based learning and give meaning to the quantitative phase which examined the self-efficacy beliefs of school librarians. The second research question for this study focused on the qualitative phase and asked, "How do school librarians describe their practices when integrating technology during inquiry-based learning?" Data collection for the qualitative phase included conducting semi-structured interviews and then reviewing lesson plan artifacts. Data from the semi-structured interviews and lesson plan artifacts provided meaningful insights into answering the second research question for this explanatory sequential mixed methods study.

Semi-structured interviews were conducted virtually through Google Meet and were audio recorded. The audio recordings were transcribed into a secure Google Document and then
line by line coding was used to develop a thematic analysis. Interview transcript data was stored and coded in a secure Google Document. First, line by line coding was used throughout the transcripts to provide a detailed representation of the entire set of data. The initial line-by-line coding produced 1,345 codes during this process. Second, codes were organized into separate categories by copying and pasting them into a Google Sheet and then were organized by participant which included the number of occurrences that the codes appeared throughout the transcripts. Codes that were not relevant to this study were removed so the original 1,345 codes were reduced to 1,006 codes. The codes were cleaned and revised so that the names of similar codes would have consistency throughout the document. For example, the codenames of “positive emotional and physiological factors example,” “positive emotional memory,” and “positive physiological factors mentioned” were grouped together so the cleaned and revised code became “positive physiological factors.” The revised and cleaned codes were grouped into 30 updated codenames. The 30 updated codenames were organized into five different groups which included socialization ($N = 444$), performance ($N = 284$), professional development ($N = 154$), time and money ($N = 89$), and responding to COVID-19 ($N = 25$). The codes were organized by participant which included the frequencies for how many times each code appeared throughout the transcript. Third, all codes from each interview were copied and grouped together to identify the frequency of how often the codes appeared. Fourth, themes were generated based on the codes that were identified that helped answer the research questions for this study. Fifth, the codes were grouped together within the appropriate theme and significance was attributed to the data and themes. Sixth, it was determined that two major themes including Socialization and Performance were the themes reported on in this study to provide an in-depth summary of these
themes since they had more frequent occurrences compared to other themes. It was beyond the scope of this study to include themes of Professional Development, Time and Money, and COVID-19, but these themes would be recommended for future research studies. Strategies of triangulation, member checking, and thick description were utilized in this study to strengthen the trustworthiness and validity of this data (Creswell & Plano Clark, 2018).

Lesson plan artifacts were reviewed after conducting the semi-structured interviews. The concluding question on the interview protocol asked participants if they would be willing to share an exemplary lesson plan that they were proud of when they have integrated technology during inquiry-based learning. Most of the school librarian participants shared lesson plan artifacts, but some did not share any due to not writing formal lesson plans with enough detail to evaluate them. Reviewing lesson plan artifacts after conducting semi-structured interviews provided additional helpful insights with how school librarians integrated technology during inquiry-based learning in their practices.

Semi-Structured Interview Analysis

Ten school librarians were selected to participate in the semi-structured interviews which revealed two major themes that emerged. These two themes included Socialization and Performance. Socialization was the most prevalent theme that emerged during the semi-structured interviews which revealed that school librarian practices when integrating technology during inquiry-based learning were influenced by observations, perceptions, and experiences with administration, colleagues, parents, and students, as well as physiological factors. Two subthemes that emerged within Socialization included (1a) stakeholder relationships and (1b) physiological factors. Performance was the second theme that emerged during the semi-
structured interviews which revealed that interviewee practices about technology integration during inquiry-based learning were closely tied to their preparation and performance. Three subthemes that emerged within Performance included (2a) experience, (2b) modeling and creating, and (2c) barriers. The overview of theme frequencies that emerged during the semi-structured interviews can be viewed in Table 12.

<table>
<thead>
<tr>
<th>Table 12</th>
<th>Overview of Themes Found in Semi-Structured Interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Occurrences $(N = 728)$</td>
</tr>
<tr>
<td>Theme 1: Socialization</td>
<td>444</td>
</tr>
<tr>
<td>Theme 2: Performance</td>
<td>284</td>
</tr>
</tbody>
</table>

The qualitative research question in this study asked school librarian participants to describe their current practices when integrating technology during inquiry-based learning. During the quantitative phase of the study, school librarian self-efficacy beliefs about integrating technology during inquiry-based learning were examined. Then, semi-structured interviews during the qualitative phase of this study provided an in-depth exploration of the actual practices of school librarians and provided meaning for the quantitative data.

Semi-Structured Interviews Primary Theme 1: Socialization

In the Socialization theme, school librarian participants described how their perceptions and experiences of observations and interactions with administration, colleagues, parents, and students influenced their self-efficacy beliefs and their practices about technology integration
during inquiry-based learning. There were several dominant factors within this theme that school librarians cited for how relationships with school community stakeholders influenced their practices for integrating technology during inquiry-based learning. The factors that influenced school librarians to integrate technology during inquiry-based learning included experiences and perceptions for interactions with stakeholders, level of respect and value, culture perceptions of their role, level of relevance and importance, and physiological factors. The overview of theme frequencies that emerged within the Socialization theme during the semi-structured interviews can be viewed in Table 13.

### Table 13
Overview of Socialization Theme from Semi-Structured Interviews

<table>
<thead>
<tr>
<th>Subtheme</th>
<th>Codes for Socialization</th>
<th>Number of Occurrences (N = 444)</th>
<th>Percent of Occurrences (N = 444)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stakeholder relationships</td>
<td>Empowered by stakeholder relationships or empowering stakeholders</td>
<td>68</td>
<td>15.32%</td>
</tr>
<tr>
<td></td>
<td>Responsive and flexible to stakeholder needs</td>
<td>60</td>
<td>13.51%</td>
</tr>
<tr>
<td></td>
<td>Respected and valued within school community</td>
<td>46</td>
<td>10.36%</td>
</tr>
<tr>
<td></td>
<td>Disrespected or not valued within the school community</td>
<td>43</td>
<td>9.68%</td>
</tr>
<tr>
<td></td>
<td>Opposed by skeptical colleagues or negative advocates</td>
<td>33</td>
<td>7.43%</td>
</tr>
<tr>
<td></td>
<td>Perception of relevance and importance is positive</td>
<td>29</td>
<td>6.53%</td>
</tr>
<tr>
<td></td>
<td>Culture in school community is positive towards school librarian</td>
<td>28</td>
<td>6.31%</td>
</tr>
<tr>
<td></td>
<td>Perception of relevance and importance is negative</td>
<td>13</td>
<td>2.93%</td>
</tr>
<tr>
<td></td>
<td>Culture in school community is negative towards school librarian</td>
<td>11</td>
<td>2.48%</td>
</tr>
<tr>
<td>Physiological Factors</td>
<td>Negative physiological factors</td>
<td>61</td>
<td>13.74%</td>
</tr>
<tr>
<td></td>
<td>Positive physiological factors</td>
<td>52</td>
<td>11.71%</td>
</tr>
</tbody>
</table>
Socialization Subtheme: Stakeholder Relationships

In the (1a) stakeholder relationships subtheme, school librarian participants shared their perceptions and experiences of how they have interacted with stakeholders by being responsive and flexible to their needs when integrating technology during inquiry-based learning. Christine (age 45, 7-13 years of experience, middle school, high self-efficacy beliefs) shared how she has purposefully built relationships and supported teachers to help them effectively integrate technology during inquiry-based learning:

Being able to meet people where they are with technology and how comfortable they are gives them the confidence to try different things. It's okay not to know how it works, but I think that the teachers at my school really embrace that. They’re willing to try and put themselves out of their comfort zone. They always know that I will try and fix it if they run into trouble and they will tell me when it doesn't work. It goes back to the relationship building. People must be comfortable and willing, and they must know that somebody is not going to lambaste them for doing it wrong. I am working on a lot of solutions with teachers by showing them how something works so that they can utilize it in their classrooms. I am always touching base with teachers and there is always so much tweaking. It is never the same twice even from quarter-to-quarter. It is always tweaked a little bit.

Michelle (age 51, less than 7 years of experience, elementary school, low self-efficacy beliefs) discussed how she is responsive and adaptive based on the different stakeholder needs within the school community. She shared an example of what it is like to plan a unit with a grade level team to integrate technology during inquiry-based learning with fifth grade teachers, but she also shared how she needed to be flexible to accommodate her plans based on the individual needs of the teachers and students:

I'll sit down with fifth grade and come up with a plan of what we're going to do on day one, but then I go to a different classroom within the same team doing the same project, and I need to go about it completely differently. Even though during the team meeting we all agreed that on a specific plan, there is always that one teacher or that one group of students that does it a little bit different or has different needs, or there are kids that don't have the background knowledge that you needed to start the project in order to move
ahead so then we need to back the project up and back the train up. It’s times like this when all the plans are instantly down the toilet. Sometimes we need to completely and totally pivot. We think that we need to go down this one road but then something might come up.

David (age 40, 7-13 years of experience, elementary school, low self-efficacy beliefs) explained how his background and experience as a school librarian has equipped him to quickly adapt to stakeholder needs and be flexible when integrating technology during inquiry-based learning:

My background has helped a lot because I am able to have a teacher walk in that morning and ask me to do something at the last minute and I can do what they would like. I don't know if everybody can do that, but I have that background and I can help them if I'm able to do it.

Christine (age 45, 7-13 years of experience, middle school, high self-efficacy beliefs) noted that adult stakeholder relationships are very important for integrating technology during inquiry-based learning and that this type of learning requires purposeful relationship building and trust. All the school librarian participants described the importance of their relationship with the principal to support their library program to allow for integrating technology during inquiry-based learning. Christine stated:

Anytime someone starts in a new building or in a school librarian position, I feel like there's a lot of relationship-building that needs to happen. The principal also needs to be supportive of inquiry-based learning or problem-based learning, oh, some people use those terms interchangeably.

Michelle (age 51, less than 7 years of experience, elementary school, low self-efficacy beliefs) shared a time when she was able to support a reluctant teacher embrace integrating technology during inquiry-based learning and how proud the principal was of her ability to get the reluctant teacher on board:
She was very resistant to it at first. She was part of that generation that didn't want to move forward with technology and was very skeptical of engaging in that. I can completely understand where that teacher came from. My principal cited this example in my evaluation and wrote that if I could get this teacher on board, I'm an excellent school librarian. This made me feel good about helping reluctant people and sticking with them even if they're hesitant to change with technology.

Lauren (age 62, 14-20 years of experience, elementary school, high self-efficacy beliefs) remarked that integrating technology during inquiry-based learning has been transformational for her students and described how this type of learning is an equitable way to empower all students in the classroom when engaging in this type of learning:

In terms of enabling things, for every single kid it can make a huge difference and I personally think that it is a little bit of a field leveler. If you assign students an inquiry-based learning project and one student has his parents go out to spend $80.00 at the craft store and another student is cutting everything out of construction paper with no help from parents, that's not quite right, but if you give them a device and have them make a presentation, or a video, or whatever, then they all have the same shot. I think in some ways technology is a divider, but in many ways, it is also a leveler.

Jackie (age 57, 14-20 years of experience, middle school, high self-efficacy beliefs) shared an example of how she empowered teachers and students through a project when integrating technology during inquiry-based learning:

It was unbelievable. This project was a big deal and now they want to do this with me on other projects. Other grade levels want to do something like this because they heard about the amount of fun this was, and it was just winning for everyone all the way around. Students that were not engaged became engaged for the first time and it was very fun and very satisfying.

Molly (age 43, 14-20 years of experience, high school, high self-efficacy beliefs) shared that her background as a classroom teacher before becoming a school librarian has helped her gain credibility and respect in her role as a high school librarian. She shared why this is important when integrating technology during inquiry-based learning:
I think that it builds rapport for school librarians to have been classroom teachers. It helps the teachers to know that you understand what it's like to have a full day of kids and classes. You know what it's like to lessen plan and to just be, you know, in the throes of that. I think it gives more credibility when you're trying to plan lessons with teachers and just express empathy for all the things they must do. I mean, I know we juggle a ton of things that nobody understands, right? But teachers do too, and I think it helps to build relationships when they know you have done this before.

However, Mary (age 49, 7-13 years of experience, middle school, low self-efficacy beliefs) shared her experience being a public librarian coming from a public library and then transitioning to a school library and compared the two types of libraries. She explained her thoughts on why there is such a discrepancy among school librarians and inconsistencies between library programs when determining the value of integrating technology during inquiry-based learning:

I feel like school libraries act like they are totally separate from the rest of the library world and this is very interesting to me. I think a lot of this is because a lot of school librarians are teachers first and then move up into the school librarian position. Therefore, I don't think that there is a huge culture of libraries within schools. I think that's one of the reasons why libraries have a collective identity crisis because we are all doing different things and no one can decide what we should be called. I just say it's the school library. I remember that I was in a meeting one time and an administrator said, “we should call the library ‘the studio.’” A lot of that comes from, ironically enough, that educators know nothing about libraries which is sad and mystifying to me. I feel like most school administration has no clue what our libraries or librarians do. Therefore, administrators don't necessarily value that school libraries need someone that has experience and knows what they're doing. I feel like I'm in that right now with my district because the program is being cut and we have people high up in administration that don't know what we do even though we try and tell them what we do. They are hiring people with zero experience or qualifications, literally no experience or qualifications and not even asking them to go back and get it.

Michelle (age 51, less than 7 years of experience, elementary school, low self-efficacy beliefs) advocated that school librarians need to communicate with administrators and other stakeholder groups to inform school communities about the role of school librarians since there are many discrepancies and misconceptions about school librarians and their role of integrating
technology during inquiry-based learning. If school librarians are not empowered or supported when integrating technology during inquiry-based learning, this type of learning will be less likely to happen:

School librarians need to go to board of education meetings and share what a school librarian does. It is not that you’re lucky enough to know this one diamond in a rough. Every librarian does this. It is what a librarian is. I feel like we should frontline with our administrators and share the Illinois Standards Aligned Instruction for Libraries from the Association of Illinois School Library Educators so administrators can read it before they meet us and know that the Illinois Standards Aligned Instruction for Libraries book is our playbook. We are not just all making this stuff up. It’s not just a fluke when you run into a good school librarian. We are all good school librarians. The success of a school librarian depends on if they can exercise their potential or if they are stifled and just be a substitute when someone is absent. How is the school librarian being used?

Also, Michelle (age 51, less than 7 years of experience, elementary school, low self-efficacy beliefs) reported that there is an issue throughout schools right now when integrating technology during inquiry-based learning which is making it very difficult for school librarians to engage and promote this type of learning:

One thing that makes a teacher brave enough to do innovative projects and innovative things is when they know they’re being supported by their administrators, but I don't know if teachers feel that way right now. I think that they're just holding on. It is not safe for them to make a mistake and learn and grow from it. It's more like “you did what?” This makes it hard for us as innovators to grasp this reachable goal, because teachers are not feeling that vibe right now from administration.

School librarian participants discussed how they have responded to negative and indifferent teachers when trying to integrate technology during inquiry-based learning. Kristin (age 42, 7-13 years of experience, high school, average self-efficacy beliefs) shared how she has handled stakeholder relationships when they do not want to integrate technology during inquiry-based learning:

I don’t have any magical tricks for getting the really stuck in the mud teachers on board. I just try to grin and bear it a little bit. It’s not like we have a lot of teachers who are that
way. It’s typically that the negative advocates are not just anti-librarian. They’re also anti-main office, anti-activities, and anti-athletics. You know, they’re just kind of an anti-person, but I do try to target teachers with the resources that will best support them.

Mary (age 49, 7-13 years of experience, middle school, low self-efficacy beliefs) shared her strategy to build relationships when she has been opposed by skeptical colleagues when trying to integrate technology during inquiry-based learning and wondered if it could be due to misconceptions held by teachers:

Even if I can get my foot in the door with just one person, then everyone wants it. I think it's interesting and very true, but I also feel like things have just changed since I started 13 years ago. I don’t know if people realize how much more is being piled on the classroom teachers. Even just social-emotional learning (SEL) stuff. I get that they feel like they must cover all of these things. But, if they would just take a step back and let me help them, I could say a “look you could knock out five standards in just this one thing that you do.” They have such blinders on and it can be very hard. The way I bring teachers in is that I go to where teachers are open and I work with those people and then those people see value.

School librarian participants described how their role is valuable for transforming student learning experiences when integrating technology during inquiry-based learning. Chelsea (age 33, less than 7 years of experience, elementary school, low self-efficacy beliefs) shared how her community has responded to her integrating technology during inquiry-based learning:

Any of the classroom teachers, any of the administrators are generally pretty psyched when I integrate technology during inquiry-based learning. I think a lot of times that it is just sort of expected at this point and it is going to be part of inquiry-based learning. I feel like my principal is really excited to show off projects and show off things like creating and publishing videos. They are still really excited that I'm doing stuff like that and seeing finished products from kids that are technology-based.

Michelle (age 51, less than 7 years of experience, elementary school, low self-efficacy beliefs) remarked on how she believed school community stakeholders within her building perceived her and stated the importance of the school librarian role when integrating technology during inquiry-based learning:
It was nice to be able to prove my value of purposefully integrating technology and for the most part I received a lot of positive feedback. I received a lot of positive feedback when integrating technology or doing inquiry-based learning or innovative projects.

Socialization Subtheme: Physiological Factors

In the (1b) physiological factors subtheme, school librarian participants shared physiological factors that influenced their self-efficacy beliefs about integrating technology during inquiry-based learning based on their perceptions and experiences. Respondents indicated both positive and negative physiological responses in their role as the school librarian. Some of the positive physiological factors included joy, excitement, and confidence when integrating technology during inquiry-based learning. However, some of the negative physiological factors that were reported included anxiety, nervousness, and a lack of confidence when integrating technology during inquiry-based learning. School librarian participants described how they have needed to adapt, evolve, and respond when trying to overcome negative physiological factors.

Chelsea (age 33, less than 7 years of experience, elementary school, low self-efficacy beliefs) admitted her lack of experience in her first year as a school librarian has caused her to feel anxiety and lack confidence when integrating technology during inquiry-based learning:

It is anxiety-inducing sometimes and I don't feel super confident with it, but the kids are great with helping each other and helping me, and I frame it as I'm learning this too. Sometimes, a kid will do something cool and I'll point that out to the other kids during class. I want to make it okay if students don't know everything because I don't know everything as the teacher and I don't want them to feel silly if they don't know everything. Why should they feel silly if I don't even know everything? I generally try to make it a very collaborative environment because it makes me feel less bad for one thing and I think it helps them too. The kid that gets the help feels really cool about it too. It's kind of a win-win situation when stuff like that comes up even when it's a little bit anxiety-inducing for me.
Kristin (age 42, 7-13 years of experience, high school, average self-efficacy beliefs) remarked how integrating technology during inquiry-based learning is very crucial for students to experience, but has felt pressured with additional responsibilities due to students having access to an overwhelming amount of information and misinformation that is now available compared to when she first became a school librarian:

I really feel like there is such a pressure and responsibility as a school librarian to support our students and our staff in that because our access to information and the information that is out there or misinformation, all of this, it is so overwhelming. How can we send our kids out of high school and out into the world as adults without having known how to even evaluate their social media feed? And yet, when I started as a librarian, nine years ago, those worlds didn't even exist. We used to do that minimally. I used to use Help Save the Endangered Pacific Northwest Tree Octopus from Extinction! (Zapato, 1998), but that's not even what they're up against anymore. They're not up against that. Yes, people still have those examples on their websites, but I know our kids are not up against that stuff anymore. They're up against their grandparents posting things and they're up against way different kinds of information that we—even I need to figure out, is this real or not?

Lauren (age 62, 14-20 years of experience, elementary school, high self-efficacy beliefs) stated that she believed integrating technology during inquiry-based learning can be a powerful instructional strategy and teaching method, but also shared concerns about the amount of technology that students are experiencing:

I am incredibly excited but I am also kind of careful to differentiate that we were actually doing something instead of just watching something. I think we need to start worrying about the mental health of all of our kids using technology because they have really had to go along with it way too much. I worry that they’re too much into it. I’m very excited but on the other hand, I see the dark side and I want to fight against it.

Michelle (age 51, less than 7 years of experience, elementary school, low self-efficacy beliefs) found it demoralizing when collaborating and co-teaching with certain teachers that negatively impacted her when integrating technology during inquiry-based learning. She shared how some stakeholders caused her to feel nervous and scared. This has caused her to not want to
integrate technology during inquiry-based learning as often in her library program with certain teachers:

Depending on who the teacher is and their comfortability level, you do face it with dread. And you just know that they're waiting for it to fail. The first time that you hit an obstacle, they say “see I told you the internet would be down.” And you're like, “Oh damn, why today?” But there are other times when you're working with people that are like, “yeah, let's try something new!” They don't mind that you're going to hit some bumps along the way because they're going to be so excited about their kids being excited so the personality of the teacher definitely factors into it. There are also times when I'm really hesitant to move along and move forward with the project because I'm wondering what’s going to go wrong.

Semi-Structured Interviews Primary Theme 2: Performance

In the Performance theme, school librarian participants described how their perceptions and experiences of preparation and performance influenced their self-efficacy beliefs about technology integration during inquiry-based learning. There were several ways that the self-efficacy beliefs of the participants influenced Performance and their practices. School librarian participants all discussed factors that impacted their opportunities to equip students and/or teachers with high-level authentic and meaningful skills. All participants described factors for how they facilitated and scaffolded their instruction when integrating technology and using digital tools. School librarians provided feedback and reflections for how they promoted this type of learning in their library programs. Respondents discussed what affected their ability to curate, integrate, model, and create print and digital instructional materials for school community stakeholders. Additionally, participants described what factors influenced their planning, collaboration, co-teaching, and barriers that they encountered in their library programs. The three subthemes that emerged in Performance included (2a) experience, (2b) modeling and creating,
and (2c) barriers. The overview of theme frequencies that emerged within the Performance theme during the semi-structured interviews can be viewed in Table 14.

Table 14
Overview of Performance Theme from Semi-Structured Interviews

<table>
<thead>
<tr>
<th>Subtheme</th>
<th>Codes for Performance</th>
<th>Number of Occurrences (N = 284)</th>
<th>Percent of Occurrences (N = 284)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience</td>
<td>Equipping students and/or teachers with high-level skills</td>
<td>64</td>
<td>22.54%</td>
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<tr>
<td></td>
<td>Facilitating and/or scaffolding instruction</td>
<td>57</td>
<td>20.07%</td>
</tr>
<tr>
<td>Modeling and Creating</td>
<td>Curating and integrating print and/or online resources</td>
<td>37</td>
<td>13.03%</td>
</tr>
<tr>
<td></td>
<td>Modeling/creating for other stakeholders</td>
<td>37</td>
<td>13.03%</td>
</tr>
<tr>
<td></td>
<td>Promoting student collaboration, feedback, and reflection</td>
<td>26</td>
<td>9.15%</td>
</tr>
<tr>
<td></td>
<td>Collaboration and/or co-teaching integrated in library program</td>
<td>36</td>
<td>12.68%</td>
</tr>
<tr>
<td>Barriers</td>
<td>Barriers to collaboration and co-teaching</td>
<td>16</td>
<td>5.63%</td>
</tr>
<tr>
<td></td>
<td>Barriers to integrating technology during inquiry-based learning</td>
<td>11</td>
<td>3.87%</td>
</tr>
</tbody>
</table>

Performance Subtheme: Experience

In the (2a) experience subtheme, school librarians shared their perceptions and experiences on equipping students and teachers with high-level skills and facilitating and scaffolding instruction. School librarians described how their experiences impacted student achievement and shared the ways teachers and students responded when integrating technology during inquiry-based learning. Participants noted that students were the most receptive to this type of teaching method and raising their achievement to meet high expectations, but teachers and administrators were more likely to be resistant and avoid integrating technology during inquiry-based learning. School librarians discussed that some teachers only used technology for low-level tasks. Participants advocated that they are active facilitators when integrating
technology during inquiry-based learning and that it is highly scaffolded, differentiated, and individualized based on student needs and learning objectives. All school librarians stated that they were influential within their schools in making sure students were successful when integrating technology during inquiry-based learning.

Michelle (age 51, less than 7 years of experience, elementary school, low self-efficacy beliefs) described how her role has helped equip students and teachers with high-level authentic and meaningful skills. She shared an example of an inquiry-based learning research project where she facilitated overhauling it to more deeply engage students. Her insights and guidance allowed students to take ownership of their learning and feel actively invested in the process. This is how her influence on the instructional design of a project when integrating technology during inquiry-based learning impacted student learning:

It used to be that you could choose one of the founding fathers or an inventor. It had to be someone really in the spotlight in this box so it was a pretty controlled research project. Now they are much broader with their definition of who you can choose and could be anyone who changed the course of history for the better. Now some kids are allowed to interpret some things differently. Maybe they will pick somebody that is a leader in social justice, or maybe they are somebody who is a sports person, and maybe when they became really rich they decided to start a foundation. We can support the kids in this project so we are digging for all kinds of information if kids can answer the research question of “how did they make the world better?”

Michelle (age 51, less than 7 years of experience, elementary school, low self-efficacy beliefs) added how she has positively impacted and helped teachers that she partnered with shift their mindset when integrating technology during inquiry-based learning to empower students and embrace this type of learning:

I love that because teachers did not give them that freedom before this. Before, research was like “nope, when were they born, when did they die, and what three things did they do that was important?” I love that now we don’t have to be the ones asking, “why don’t you put someone else in there?” I feel like the whole inquiry-based learning thing is kind
of new to teachers but they are willing to try. It is a huge control issue that they are giving up... School librarians facilitating inquiry-based learning projects where technology is integrated has made us more valuable because now they need our expertise to do that.

John (age 47, less than 7 years of experience, elementary school, high self-efficacy beliefs) noted that students have become more comfortable with technology which has enabled them to engage in high-level tasks with technology. This has allowed school librarians to engage students when integrating technology during inquiry-based learning:

The comfort level that the kids have with technology has been an enabler for integrating technology during inquiry-based learning. Years ago, it was like “this is how you hold an iPad, this is where the home button is, but now I can just say to my kindergarteners to swipe out of all of the apps and they know how to do it already. Or “you’re looking for an app that looks like this, a coding app, guys click on the one on the side that is the free hour of code thing and do that.” Students can move so much faster now where in previous years I felt like I needed to touch each iPad to get them there.

Lauren (age 62, 14-20 years of experience, elementary school, high self-efficacy beliefs) shared her recent experiences when integrating technology during inquiry-based learning and how students have responded to engaging in high-level and meaningful tasks. She shared an example of how students collaborated on an inquiry-based learning project to publish a book available for purchase:

There are some issues with students having the devices at home for a year without any supervision, but I feel like that's common around everywhere and that's just not us. We have some things that we need to rein in a bit to get back to the correct expectations with technology. But I firmly believe that there are so many things that kids can do with technology. It can be so creative for the kids that like to be creative. We just had a couple of 4th graders that collaborated through a learning management system and self-published a book through Amazon. The things that they can do if they're motivated and interested on their own or just amazing.

All the school librarian respondents discussed how they have facilitated and scaffolded learning opportunities when integrating technology during inquiry-based learning and when using digital tools. Mary (age 49, 7-13 years of experience, middle school, low self-efficacy beliefs)
beliefs) described how the role of the school librarian is crucial to support students and that students need scaffolded instruction when integrating technology during inquiry-based learning:

As we know with kids, they are not intuitive at anything except for what they want to do. People say that kids are so technology-savvy, but they are not. They are not technology-savvy at all. They only know exactly what they want to do. They are like us. We are good at technology with what we like to do.

Christine (age 45, 7-13 years of experience, middle school, high self-efficacy beliefs) provided an overview of how she structured and facilitated a research project with a colleague by scaffolding her instruction when integrating technology during this inquiry-based learning which took place throughout an entire quarter of school:

I think that over the years our curriculum has become a lot better and has made space for inquiry-based learning. One project that I have done is I have worked with the eighth grade health teacher and we do an inquiry-based learning project that takes place over the entire quarter. Every eighth grader is enrolled in her class at some point of the year. The students picked an issue related to health and the classroom teacher informed students that every issue in society comes back to a health issue. The students picked a problem and there's a whole list of criteria so when I came in, we talked about narrowing down the scope of their problem because there were a lot of big ideas. They needed help narrowing it down to what they needed to focus on and figured out what they're looking for. This way, when they started searching for information, it is something that they're going to have some success with. I reviewed our databases with them and we also took the time to teach them how to take notes. We utilized databases and applications that they used each day in the classroom and that fits very nicely with this inquiry. I teach them how to do that. I taught them how to utilize that technology and the students have some different options for using technology in their inquiry-based learning project. Then, the students presented to actual stakeholders which included teachers, administration, the superintendent, and we also had parents come in. That's the unit in a nutshell.

Chelsea (age 33, less than 7 years of experience, elementary school, low self-efficacy beliefs) commented that school librarians have a very important role collectively as a profession with curating resources and designing instruction to enhance and transform student learning experiences when integrating technology during inquiry-based learning:
Technology should enhance and enrich, it shouldn’t be used just to be used, but there is so much out there that we need to purposefully curate and be specific about what our goals are. This is something that is always going through my head. I need to make sure that I am on the same page with all of my district school librarian colleagues and determine how we can all move in the same direction. I am totally on board with helping make that happen.

Performance Subtheme: Modeling and Creating

In the (2b) modeling and creating subtheme, participants discussed the ways they modeled and created for others when integrating technology during inquiry-based learning. School librarian participants described how their self-efficacy beliefs were influenced based on seeing students and teachers having success or failures when integrating technology during inquiry-based learning. They shared their perceptions, observations, and experiences when collaborating and co-teaching with colleagues. School librarians reported modeling and creating for stakeholders, and curating resources for others to use. All school librarians reported that they more often modeled and created for others instead of observing and learning from the teachers that they work with. School librarians demonstrated perseverance and self-taught themselves if they felt unequipped when integrating technology during inquiry-based learning. They described that they were self-reliant within their schools, but valued input and feedback from other school librarians. Participants found themselves modeling, creating, and curating for others to meet their needs instead of relying on other stakeholders within their schools. School librarians reported that they valued student feedback and success but did not find as much value when observing teachers model lessons for them or when they received feedback from teachers when integrating technology during inquiry-based learning. Student feedback and success was more motivating
and inspiring for them compared to observing other teachers model for them when integrating technology during inquiry-based learning.

Chelsea (age 33, less than 7 years of experience, elementary school, low self-efficacy beliefs) stated that she modeled, created, and curated resources to promote opportunities to integrate technology during inquiry-based learning:

I like to go through the process first with them so I can give them examples and I prepare that way. I'll give them specific examples. For example, this is what I did for the start of an inquiry-based learning project with second graders. There was a student in a class doing research on woodchucks, but when we typed “woodchuck” in the search bar, “groundhog” popped up in the results so we discussed why that would be. This was because “groundhog” is another name for a “woodchuck.” I tried to give little examples like that. I wanted to show students how to search and find information and what to do if they got wrong or unexpected results that appeared. I wanted them to know what to do if they get lost or stuck. I wanted them to think of all the possibilities so I could show them how to do their research. That’s how I planned and facilitated the beginning of inquiry-based learning projects. I basically do it first so the students can understand my process.

Chelsea, Michelle, and John discussed the role of student modeling, collaboration, feedback, and reflection when integrating technology during inquiry-based learning and how this positively influenced their self-efficacy beliefs. Chelsea (age 33, less than 7 years of experience, elementary school, low self-efficacy beliefs) shared an example of when she does this with her fifth graders:

I'll ask one of the fifth graders to demonstrate a skill to help other fifth graders in the same classroom. The students like to help each other. A lot of the kids are willing to help each other out, and it's really cool to see because you didn't expect to see who really takes to it.

Michelle (age 51, less than 7 years of experience, elementary school, low self-efficacy beliefs) described how she valued student feedback when integrating technology during inquiry-based learning:
I get a lot of student feedback because students are excited about integrating technology during inquiry-based learning. One thing that they’re really excited about is that they get to search up information that maybe they did not have available to them before and when we’re doing inquiry-based learning projects like Genius Hour or other student-driven projects... The kid feedback that I receive is pretty good. The kids get excited about being handed over that autonomy.

John (age 47, less than 7 years of experience, elementary school, high self-efficacy beliefs) shared the impact that integrating technology during inquiry-based learning has had on his students and how it has also positively influenced him:

I don’t mind that it takes so many weeks because each time they are doing something different and they’re into it and they’re excited about it. That would be a time where it all comes together. They researched their topic, learned how to create and publish a video, learned how to write something, and had a chance to work together, and oh my gosh, this is so great!

Christine (age 45, 7-13 years of experience, middle school, high self-efficacy beliefs) shared how she has adapted her instruction by responding to the needs of the students when integrating technology during inquiry-based learning:

The teacher and I meet and debrief because it will usually be multiple periods that I'll be with them because we're in middle school so the students rotate classes. Usually after the first one, we do a quick pow wow and we figure out what we need to tweak are we need to figure out what we need to do differently for the next one.

School librarian respondents also noted how collaboration and co-teaching opportunities with colleagues impacted their instruction when integrating technology during inquiry-based learning. David (age 40, 7-13 years of experience, elementary school, low self-efficacy beliefs) described his experiences collaborating and co-teaching with colleagues when integrating technology during inquiry-based learning:

The library is sort of a last-minute world because teachers can get an idea at the last minute and they want to do it now so if you're able to help them then, that's awesome. That’s what happens a lot on the fly. I don't get a lot of teachers coming in in October asking to do a project with me in January. It's more like teachers will ask me to do
something within a week or in 20 minutes from now. It's on the fly and teachers will ask what we can do in 20 minutes. It's happened so much that it is no big deal to me.

Molly (age 43, 14-20 years of experience, high school, high self-efficacy beliefs) shared how she planned with colleagues when integrating technology during inquiry-based learning:

Planning is something that I do sitting one-on-one with teachers before integrating technology in inquiry-based learning. I start with what the teacher already has in mind and their rubric, or they have something in mind that they want to assess students with some kind of technology. It's really me finding out exactly what the teacher wants and I'm the support person then for that.

Chelsea, Jackie, Kristin, and Lauren all reported that they have met formally and informally with professional learning communities and co-plan and co-teach with individual teachers or whole grade level teams to design instruction when integrating technology during inquiry-based learning. Kristin (age 42, 7-13 years of experience, high school, average self-efficacy beliefs) shared her account of the instructional design process with teachers to integrate technology during inquiry-based learning:

If I could get in professional learning communities, at least like one or two people in a professional learning community on board, typically like the whole professional learning community ends up getting on board. It's like finding that one person who's really eager and there's always like these random people who are so eager to try everything and I feel like that is helpful. Sometimes planning with a teacher can feel pretty informal, someone sits down at my desk and they share what they're thinking about doing, we end up sketching it out, and then figure out the dates that we're going to do it. I usually co-teach with that teacher and do lessons throughout the unit. We always try to do a reflection when every unit is over. I try to take notes to make it better for next year or remind myself that this happens around this time of the year, or when it's happening next, or if something should be changed.

Christine (age 45, 7-13 years of experience, middle school, high self-efficacy beliefs) provided a detailed account of how she has co-planned, collaborated, and co-taught with colleagues when integrating technology during inquiry-based learning:
When a teacher is ready to integrate technology during inquiry-based learning, I look at what the unit is beforehand about several weeks before we sit down to talk to think about what I can do to help. I access the curriculum that I have available to me before meeting with them. I want to take the time before we meet to see what they're looking for and I pick out those things and I write questions out. I will write down if there is anything else that I need to know. Then, we meet together and I asked them what they have already created for the project, what instruction they've done with the kids, created any rubrics, or anything like that. I will ask the teacher questions and then I will collaborate with the teacher to tweak anything and we will discuss what they would like my role to be.

Classroom teachers like to have control, oh, they like to control their environment, so part of that relationship building is me is not infringing and what their comfort level is. That is why we meet so when we’re teaching in front of the kids we are a cohesive unit. Often, they will defer certain instruction to me or I'll jump in. There are some teachers that I work with so much that it just becomes natural, we just teach with each other, and I always want to discuss it afterwards. I always want to see the final projects. I don't do grading because that can be hairy because of trying to triangulate that. They also seek me out too which is nice. Some teachers co-teach alongside of me while other teachers might be grading while I teach with only listening with one ear but what it comes down to is what their actual need is.

Performance Subtheme: Barriers

In the (2c) barriers subtheme, all school librarian participants shared examples of how they promote integrating technology during inquiry-based learning, but the school librarian participants shared how barriers made integrating technology during inquiry-based learning more challenging to incorporate in their library programs. Participants described occurrences when integrating technology during inquiry-based learning when technology or their plans failed on them. They described scenarios where students would be given opportunities to conduct research online and they would stumble upon misinformation that was not accurate or reliable. All school librarians discussed examples when other teachers believed misconceptions about the school librarian role when collaborating and co-teaching which prevented integrating technology during inquiry-based learning.
Christine (age 45, 7-13 years of experience, middle school, high self-efficacy beliefs) indicated that some teachers that she has partnered with when integrating technology during inquiry-based learning were too reliant on technology and were not prepared if it fails on them:

Technology is wonderful and fantastic. It’s great and it really helps us do a lot of different things, but we’ve also become very dependent on it and there are times when technology fails... at that point, we were just punting. In the library, we have budgets that we need to be aware of so if we are using technology and it fails, I don’t necessarily have the print materials to support the curriculum needs for all those different topics because of their self-selected topics and I wouldn’t have had time to put them together. This is something that has happened a couple of times when I’ve been trying to teach.

Michelle (age 51, less than 7 years of experience, elementary school, low self-efficacy beliefs) shared how she is required to troubleshoot and fix technology instead of focusing on providing students with authentic and meaningful high-level tasks:

Unfortunately, sometimes our job can be shadowed by the maintenance of technology instead of the innovation of what the technology can actually do.

School librarians also described how they have faced collaboration and co-teaching barriers that have prevented them from integrating technology during inquiry-based learning. The school librarians highlighted how deeply they cared about the instructional design when integrating technology during inquiry-based learning but shared how other colleagues in their buildings did not share the same vision. Mary (age 49, 7-13 years of experience, middle school, low self-efficacy beliefs) described that technology itself can get in the way of collaborating and co-teaching when integrating technology during inquiry-based learning:

The teacher said that she wanted her students to create a movie and I thought that it was a great idea. Then, I asked the teacher what skills she wanted the students to learn along the way and what her objective was for this project. I sat and talked to this teacher who is a very sweet teacher for about twenty minutes asking what she wanted the students to learn and what skills we should apply and what the objective was, but even after 20 minutes the teacher said, "I just really want them to make a movie." I have found sometimes that it is better to pull back from technology because I feel like I can be a distraction and I feel
like I can be a crutch. I think it can allow for teachers to give kids projects for 3 weeks and not always do check-ins. This is frustrating to me because sometimes teachers will use something that they fully don't understand and then they send the students down to me thinking that I'll be able to fix it. I'll tell them that I haven't even used that specific application and I'm not sure what they want the kids to do with it so it's a little hard. I think we got caught up saying “isn't this cute” or “isn't this clever” and we have lost our focus on what the objective is and what the teachers wanted the students to learn from this, not just this is a cool way of putting this together.

Jackie (age 57, 14-20 years of experience, middle school, high self-efficacy beliefs) described difficulties with collaboration and co-teaching because there could be misconceptions about the actual role of the school librarian when integrating technology during inquiry-based learning:

I think a barrier, and I don’t want to sound negative, but sometimes throughout the years classroom teachers are the barriers because they don't or unable or they're too busy or they don't have a deep understanding of why students would need the tools that a librarian would have to offer for inquiry-based learning so they just go on their own and don't access me for the tools. Then, I need to work around the teacher in order to help the students. Now, I make sure to make a lot of announcements and a lot of posts for teachers to try. I try and get the teacher that loves it and then soon enough then a team of teachers wants my services. It never occurred to me that I needed to market what I had to offer. I'm still flabbergasted by that. I think it's because teachers are so busy to even bring in another adult or to look outside at what is in front of them so I think basically that's what it is. I think their attitude and passion are the barriers.

Integrating technology during inquiry-based learning has faced many obstacles and barriers recently according to the school librarian participants. However, Kristin (age 42, 7-13 years of experience, high school, average self-efficacy beliefs) advocated that integrating technology during inquiry-based learning should become a cornerstone in the instructional design for library programs because of the positive impact it can have on student achievement and learning:

This type of learning is so important. I mean, so many things that we do in schools are so important, but technology integration and inquiry-based learning should be prioritized more. I hope there are more opportunities for this type of learning and that it becomes
more of a part of our curriculum as a requirement because it is not prioritized by all others right now. Everything has its value, but I think it is time to let some things go in place of inquiry-based learning and technology integration. We don't need to feed the kids information anymore. We need to tell them what and how to find it and then what to do with it.

Lesson Plan Artifacts Analysis

Reviewing lesson plan artifacts after conducting semi-structured interviews provided additional insights into school librarian practices and how they integrate technology during inquiry-based learning. The last question on the interview protocol during the semi-structured interviews asked participants if they would be willing to share an exemplary lesson plan that they were proud of when they integrated technology during inquiry-based learning. The lesson plan artifacts submitted by the school librarian participants revealed two major themes that emerged. These two themes included Student-Centered Integration and Librarian-Centered Integration. Student-Centered Integration when integrating technology during inquiry-based learning was the most prevalent theme that emerged when lesson plan artifacts were reviewed. Lesson plan artifacts showed that school librarian participants valued providing students with opportunities to take ownership of their learning by facilitating constructivist pedagogical learning opportunities when integrating technology during inquiry-based learning. Three subthemes that emerged within Student-Centered Integration included (3a) student consumption, (3b) student creation, and (3c) student collaboration. Also, Librarian-Centered Integration was the second theme that emerged when reviewing lesson plan artifacts which revealed that teachers integrated technology themselves to support lessons. Lesson plan artifacts revealed that school librarian participants also implemented traditional teaching methods when integrating technology during inquiry-based learning to provide direct instruction, model examples or concepts, and curate resources to
support students during lessons. Two subthemes that emerged within Librarian-Centered Integration included (4a) modeling and creating and (4b) curating. The overview of theme frequencies that emerged within the lesson plan artifacts can be viewed in Table 15.

Table 15
Overview of Themes and Subthemes from Lesson Plan Artifacts

<table>
<thead>
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<th>Theme 1- Student-Centered Integration</th>
<th>Subtheme</th>
<th>Number of Occurrences ((N = 262))</th>
<th>Percent of Occurrences ((N = 262))</th>
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<td>Student creation</td>
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<td>Theme 2 – Librarian-Centered Integration</td>
<td>Modeling and creating</td>
<td>66</td>
<td>25.19%</td>
</tr>
<tr>
<td>Curating</td>
<td></td>
<td>38</td>
<td>14.50%</td>
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Lesson Plan Artifacts Primary Theme 1: Student-Centered Integration

The first major theme that emerged when reviewing lesson plan artifacts when school librarians integrated technology during inquiry-based learning was Student-Centered Integration which occurred 60.31% of the time throughout the lesson plan artifacts. The lesson plan artifacts from the school librarians revealed that school librarians facilitated and scaffolded lessons for students when technology was integrated during inquiry-based learning. School librarians provided students with a voice and choice in their learning while also providing appropriate support and guidelines when integrating technology during inquiry-based learning. It was apparent that school librarian participants promoted integrating technology during inquiry-based learning by providing students with authentic and meaningful tasks through consuming content, creating and demonstrating their learning, and collaborating with peers. Therefore, the three
subthemes for Student-Centered Integration in this study included (3a) student consumption, (3b) student creation, and (3c) student collaboration.

Student-Centered Integration Subtheme: Student Consumption

The most prominent subtheme that emerged was (3a) student consumption when reviewing lesson plan artifacts. Student consumption was when students took an active role when integrating technology during inquiry-based learning activities to conduct research or completed tasks to gain understanding of the content. This subtheme was prevalent in all of the lesson plans submitted by the school librarian participants and accounted for 27.48% of the time. An example of student consumption when reviewing lesson plan artifacts included having students conduct research using available databases purchased by their school district. Another example of student consumption was notetaking where students would conduct research and then write notes to gather important information. School librarian participants promoted student consumption by having them consume information from a variety of sources including print and digital resources including primary and secondary sources, books, articles, encyclopedias, databases, videos, and photographs. Student consumption was frequently promoted by school librarian participants to build background knowledge to equip students with sufficient information from a variety of curated sources to have students demonstrate their learning. School librarian participants provided students the opportunity to choose what sources to access information from to empower them in their learning. Student consumption frequently had students engaged in low-level technology tasks to allow students to focus on learning the content. One reason why student consumption was the most prominent subtheme that emerged in this study was that school
librarian participants promoted building background knowledge and equipped students with sufficient information to prepare students to be creative and demonstrate their learning.

**Student-Centered Integration Subtheme: Student Creation**

The second most prominent subtheme within Student-Centered Integration was (3b) student creation which occurred 20.23% of the time when reviewing lesson plan artifacts. Student creation was when students integrated technology for high-level tasks during an activity or assessment through demonstrating, producing, or publishing their learning. For student creation to occur, students needed to first build sufficient background knowledge by consuming information from a variety of sources (Spencer, 2018). School librarian participants promoted student creation in their lesson plans when integrating technology during inquiry-based learning once students had sufficient background knowledge and a good understanding of the content. Video creation for students to demonstrate their learning was one of the most popular types of student creation that was present in lesson plan artifacts. School librarian participants shared lesson plans where students would use digital tools to demonstrate their learning and then post their projects in a learning management system including Edmodo, Seesaw, or Google Classroom. The most prominent digital tools that were specified in the school librarian lesson plan artifacts that students used for high-level tasks when creating and demonstrating their learning included Google Documents, Google Slides, WeVideo, and Seesaw.
Student-Centered Integration Subtheme: Student Collaboration

The third most prominent subtheme that emerged for Student-Centered Integration was (3c) student collaboration which occurred 12.60% of the time when reviewing the lesson plan artifacts. Student collaboration was when students worked together with peers on activities to complete high-level tasks during lessons and projects with varying levels of technology integration. School librarian participants provided opportunities for students to collaborate during small group discussions during inquiry-based learning projects. They also promoted student collaboration by assigning shared research projects for small groups of students. Students were given opportunities to contribute together on shared graphic organizers and explore print and digital resources with peers. School librarians promoted peer collaboration among students during inquiry-based learning projects when students needed to paraphrase, cite sources to avoid plagiarism, and observe copyright guidelines. Peer evaluation and peer feedback were also strategies that were implemented by school librarian participants to promote student collaboration. Students examined primary and secondary sources to understand the significance of historical artifacts and were able to choose students within the class to collaborate with during inquiry-based learning projects. School librarian participants allowed opportunities for student collaboration to explore print and digital resources to build background knowledge and learn content. Lesson plan artifacts revealed that school librarians incorporated student collaboration when students used digital tools to publish a project or demonstrate their learning. Students were assigned different roles when using digital tools when creating a video or presentation. Lesson plan artifacts showed that school librarians promoted student collaboration when they explored electronic district purchased databases to access and locate relevant information when
conducting research. Student collaboration frequently occurred in inquiry-based learning lesson plans. However, guidelines and expectations for exactly what student collaboration looked like were not included in any of the lesson plans.

**Lesson Plan Artifacts Primary Theme 2: Librarian-Centered Integration**

The second major theme that emerged when reviewing lesson plan artifacts when school librarians integrated technology during inquiry-based learning was Librarian-Centered Integration which occurred 39.69% of the time throughout the lesson plan artifacts. The lesson plan artifacts from the school librarians revealed that school librarians used modeling to provide students with examples, demonstrate skills, or provide direct teaching. School librarians also created print and digital resources for students to use which included tutorials, pathfinders, and step-by-step directions to equip students when integrating technology during inquiry-based learning. It was apparent that school librarians thoughtfully and purposefully curated resources for the students to use that students could access during lessons. Therefore, the two subthemes for Librarian-Centered Integration that emerged when reviewing lesson plan artifacts included (4a) modeling and creating and (4b) curating.

**Librarian-Centered Integration Subtheme: Modeling and Creating**

The most prominent subtheme within Librarian-Centered Integration was (4a) modeling and creating which occurred 25.19% of the time. Modeling and creating was when the school librarian integrated technology during inquiry-based learning to demonstrate a task, explain a concept or content through direct teaching, or create materials to support student learning.
School librarian participants used modeling during live instruction to demonstrate a task and allowed students to refer to examples later if they needed clarification. Also, it was evident in the school librarian lesson plan artifacts that school librarians explained concepts and content through direct teaching. Additionally, lesson plan artifacts revealed that school librarians were purposeful and intentional with their instructional design and created a variety of materials to support student learning.

School librarian participants used modeling and creating to demonstrate tasks and provide examples for how students could meet lesson objectives. The lesson plan artifacts provided by the school librarians demonstrated how students could use resources and digital tools. It was reflected in the lesson plan artifacts that school librarian participants created tutorials to model accessing print and digital resources like navigating the library collection or accessing information online using databases. Evidence from lesson plan artifacts demonstrated that school librarians implemented modeling throughout the inquiry-based learning process and created tutorials with how to use digital tools to equip students with how to use them. For example, one school librarian created a tutorial with screenshots of WeVideo and included step by step directions to demonstrate how to access WeVideo, use the various features within it for a specific project, and then publish the final project. Students could use the WeVideo tutorial created by the school librarian to make sure they were including all necessary components that were expected.

School librarian participants integrated technology during inquiry-based learning activities to explain a concept or content through direct teaching. Lesson plan artifacts revealed that school librarians taught grade level content directly to students when they needed to build
background knowledge. This instructional strategy in the lesson plan artifacts was purposeful and brief to introduce students to new concepts or content. School librarians implemented direct teaching of concepts and content to quickly equip students with necessary information so that students could then take ownership of their own learning. Lesson plan artifacts indicated that direct teaching from the school librarian participants were brief instances during lessons to allow students to transition from consuming information to being able to take ownership of their learning to demonstrate their learning.

School librarian participants created many examples of finished projects to model their expectations to their students. Lesson plan artifacts revealed that school librarians created materials for students to use during inquiry-based learning activities. Several of the lesson plan artifacts included examples of the school librarian creating a video or presentation so students could see an example of the final result of their research project. Lesson plan artifacts included many examples of ways that school librarians created materials for students including graphic organizers, outlines, activities, and assessments. School librarians created these types of materials when integrating technology during inquiry-based learning to reach the learning objectives and fulfill target standards. Lesson plan artifacts revealed that school librarians adopted the role of instructional designer to use their expertise to meet student needs.

Librarian-Centered Integration Subtheme: Curating

The second most prominent subtheme to emerge in Library-Centered Integration was (4b) curating. Lesson plan artifacts from the school librarians revealed that curation of resources was an integral part of their instructional design when integrating technology during inquiry-
based learning which occurred 14.5% of the time. The AASL (2018b) stated that curation is when school librarians “make meaning for oneself and others by collecting, organizing, and sharing resources of personal relevance” and is a leader for the “selection, integration, organization, and sharing of digital resources and tools to support transformational teaching and learning and develops the digital curation skills of others” (p. 7). Evidence of curation was present in the lesson plan artifacts submitted by the school librarian participants. School librarian curation does not limit or censor resources or options for students, but rather it is empowering to students to use resources that are from reliable sources that have been vetted by the school librarian. Curation allows students to learn from the best resources and not be inhibited by misinformation or sources with hidden biases. There were many examples in the lesson plan artifacts that included how school librarians used the curation of resources to empower students when integrating technology during inquiry-based learning.

One example of curation that was included in the lesson plan artifacts was when the school librarian facilitated an inquiry-based learning activity on food safety quality and integrated technology for internet research. The school librarian shared a curated list of websites that were evaluated and were from trustworthy sources of information. Some of the websites included the Centers for Disease Control and Prevention, U.S. Food & Drug Administration, and the U.S. Department of Agriculture. This curated list created by the school librarian participant enabled their students to conduct research using trustworthy and credible sources filled with reliable information.

Another example of curation that was included in the lesson plan artifacts was that a school librarian created and designed a pathfinder for students to conduct research on their
assigned animal topic. A pathfinder is “a subject bibliography designed to lead the user through the process of researching a specific topic, or any topic in a given field or discipline, usually in a systematic, step-by-step way, making use of the best finding tools the library has to offer” (Reitz, 2004). The pathfinder that was included in the lesson plan was helpful to students because the school library structured the pathfinder so that students would be able to be self-directed learners during their inquiry-based learning research project.

A third example of school librarian curation was during a lesson with fifth grade students that was a lesson on library resources where students would learn about district purchased databases available for students in the collection. In this lesson plan, the school librarian curated a list of the nine most relevant district purchased databases to provide an overview for the fifth grade students. The lesson plan also revealed that the school librarian taught students about what makes a source ‘credible. The school librarian participant explained the reasons as to why the district purchased databases were not biased. Additionally, the lesson plan included information to be taught to students about when to use a database and when it was appropriate to use a search engine on the internet to find information. This lesson plan revealed that the school librarian explained why the nine specific databases for this lesson were chosen and included this information on a Google Slide that was shared with students:

They are trusted sources with credible creators. District librarians have vetted these sources to make sure that they are not being paid for by sponsors who may be biased. Additionally, we make sure that the sources have highly educated researchers who are backed in their fields.

Overall, the lesson plan artifacts revealed that school librarians promoted curation in their library programs and incorporated this into their teaching practices. School librarians were intentional about equipping students with strategies to empower them to become curators of
knowledge in their own research during inquiry-based learning activities. They also compiled and shared purposeful resources with students to support student learning during lessons. The lesson plan artifacts revealed that school librarians are purposeful about curation in their school library programs.

Data Mixing and Integration

The third research question for this study was a mixed methods question and asked, “In what ways does the qualitative data of exploring the practices of school librarians about integrating technology during inquiry-based learning help to explain the quantitative strand of data of their self-efficacy beliefs?” Creswell and Creswell (2018) stated that mixed methods studies should incorporate “a mixed methods research question that directly addresses the mixing or integration of the quantitative and qualitative strands of the research” (p. 142). This study utilized an explanatory sequential mixed methods design so quantitative data was collected and analyzed which helped inform how to implement the qualitative phase. Creswell and Creswell (2018) recommended that “a final procedure involved merging the two forms of data in a table or a graph. This is called a joint display of data” (p. 220). A joint display was developed for this study that demonstrated how the quantitative and qualitative phases provided insights into how each phase can be explained. Creswell and Plano Clark (2018) stated that an explanatory sequential mixed methods design should “drill down into specific quantitative results by using qualitative results to provide further insight and explanation. A better approach therefore is to determine how the qualitative themes and codes provide additional insight into and nuances about the quantitative database” (p. 238). The joint display for this study included all three data
sources for this study including lesson plan artifact subthemes, quotes from the semi-structured interviews, and scores from the quantitative survey instrument that indicated low or high self-efficacy beliefs. The joint display that highlighted the mixing and integration of the quantitative and qualitative data can be viewed in Table 16.

Table 16

Joint Display for Mixing and Integrating Quantitative and Qualitative Data

<table>
<thead>
<tr>
<th>Lesson plan artifacts</th>
<th>Student-Centered Integration: Subtheme (3a) student consumption – students take an active role when integrating technology during inquiry-based learning activities to conduct research or completed tasks to gain understanding of the content.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low self-efficacy beliefs</td>
<td>Michelle (age 51, less than 7 years of experience, elementary school, low self-efficacy beliefs), I show students websites at higher reading levels and age levels when I know the kid is going to be mature enough to use it the right way and when the teacher has approved the topic. I just don’t make willy-nilly decisions and be like “hey why don’t you try out this website, the high school loves it!” If the kid has an educational mission and this is the way to meet it because the classroom teacher has approved it, I will help them explore. But, in my school district, the things that I am fearful about and need to ask myself are “will this upset a parent? Is this going to upset an administrator or even my principal? Even though the information that this kid is looking for is available out there for the general world, am I going to get in trouble for showing a kid how to access it? This is something that has become first and foremost in my mind after going through a book challenge recently. I think “oh no, am I going to be accused of doing something wrong helping a kid do what they are entitled to do which is seek out information.” I honestly hate that feeling and I hate second guessing myself... there is a constant fear that I do not want to give access or information and get in trouble for it. It’s sad because it is true information, but I might get in trouble so I am not going to give it to students that want or need it.</td>
</tr>
<tr>
<td>High self-efficacy beliefs</td>
<td>Lauren (age 62, 14-20 years of experience, elementary school, high self-efficacy beliefs), I am incredibly excited, but I am also kind of careful to differentiate that we were actually doing something instead of just watching something. I think we need to start worrying about the mental health of all of our kids using technology because they have really had to</td>
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</tbody>
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(Continued on following page)
go along with it way too much. I worry that they’re too much into it. I’m very excited but on the other hand, I see the dark side and I want to fight against it.

Lesson plan artifacts

Student-Centered Integration: Subtheme (3b) student creation – students integrate technology for high-level tasks during an activity or assessment through demonstrating, producing, or publishing their learning.

Low self-efficacy beliefs

Chelsea (age 33, less than 7 years of experience, elementary school, low self-efficacy beliefs), I have had to consciously make the decision to integrate technology during inquiry-based learning in my library program. This year, especially being my first year, I tend to be a more tactile and arts and crafts type of person as opposed to naturally gravitating towards technology. For example, today we made kindness postcards. This is because I gravitate more towards art than technology when it comes to having students do an activity. I know that my kids need technology and I want to use the technology resources that we have for activities like inquiry-based learning... next year, I will have an even better understanding of how I could use technology with my students since I will be in my second year of teaching. I am working on it now, but I think that next year will be a lot better.

High self-efficacy beliefs

John (age 47, less than 7 years of experience, elementary school, high self-efficacy beliefs), There has been a shift with how students can utilize technology. Before it was, “this is how you use this piece of technology,” but now the kids already know how to use the basics for it, but need to know all the things they can do with it. For example, students know how to put a Google Slides presentation together like adding an image and change the fonts, but now students can demonstrate their learning by building, creating, and designing.

Lesson plan artifacts

Student-Centered Integration: Subtheme (3c) student collaboration – students work together with peers on activities to complete high-level tasks during lessons and projects with varying levels of technology integration.

Low self-efficacy beliefs

David (age 40, 7-13 years of experience, elementary school, low self-efficacy beliefs), I like to forget about the times when I’ve done a bad job integrating technology during inquiry-based learning. I just know that they are there. An example is the first time I did a video creation and special effects lesson. The students did not have a planning sheet but I presented the lesson to the students with some examples and showed them how I did it. I put them in groups and wanted them to collaborate. I saw them talking together, but it turned out that the groups did nothing and they were not ready to continue the lesson when they came back the
following week. I asked the students why they didn’t complete it. I said that I had their group written down for them to complete it, but they said they didn’t know how to do it.

**High self-efficacy beliefs**

*Lauren (age 62, 14-20 years of experience, elementary school, high self-efficacy beliefs)*, I firmly believe that there are so many things that kids can do with technology. It can be so creative for the kids that like to be creative. We just had a couple of 4th graders that collaborated through a learning management system and self-published a book through Amazon. The things that they can do if they’re motivated and interested on their own or just amazing.

**Low self-efficacy beliefs**

*David (age 40, 7-13 years of experience, elementary school, low self-efficacy beliefs)*, I always have a slight anxiety that I might fail, but then I just punt, and I can always push it to next week where I will have something better for them. I don’t want to get so nervous that I don’t want to even try.

**High self-efficacy beliefs**

*John (age 47, less than 7 years of experience, elementary school, high self-efficacy beliefs)*, Technology has really changed in the last few years with how content is delivered. In the past, I would have used a lot more paper-based activities or needed to create content in preloaded apps, but now I use a learning management system where I can model what they need to do on their assignment and show them how to be successful. The delivery method has changed dramatically over the last several years.

**Low self-efficacy beliefs**

*Michelle (age 51, less than 7 years of experience, elementary school, low self-efficacy beliefs)*, Some kids, you just hand them a book and that is the end of it and other kids are like “hey I saw in Trueflix last week that they had an article on the deforestation in Brazil so that might have something to do with this.” This is why I love my job because we have so many different ways to meet the needs of our patrons. It is challenging. Our job is never the same day to day. It is also like that with the teachers that we
deal with. You’ve got some teachers that are just checking the box off and just say “we want every animal book you have because we are going to do this report.” But then you have other teachers that say “wow! We are really interested in this. What else can you help us find from other libraries. What other apps or other websites can we go to so we can find these answers.” Then you can dig as much or as little as you want and this is where I really love technology because for that higher order thinking you can go with resources that we have in our district like Pebble Go or you can say “hey, I noticed that the ALA site recommends National Geographic Kids so let’s go look there. Let’s go look at the DK website because they have diagrams of a tiger and we will see why tiger claws are important to them. That’s the cool part about using technology as well as books and having that larger picture of inquiry instead of we are just meeting this goal.

**High self-efficacy beliefs**  
*Molly (age 43, 14-20 years of experience, high school, high self-efficacy beliefs),* I believe that school librarians are more important now than ever before. I feel like we are making great strides in helping to ramp up media literacy and internet safety, which is not really happening anywhere else. I know our Regional Office of Education is coming down on our district and I hope we can really improve the curriculum for that. It is very important to evaluate sources and information as well as keeping that love of reading alive too. I think that is really important. We are offering it in different ways like including electronic versions of books. Even with our databases, there are all of these tools that we can really help students and teachers to utilize for reading and research.

Table 16 revealed several insights as to how the quantitative and qualitative phases were synthesized in this study. Based on the joint display in Table 16, school librarians with low self-efficacy beliefs were more likely to discuss how other stakeholders (i.e. students, teaching colleagues, administration, and parents) negatively impacted their ability to successfully integrate technology during inquiry-based learning. For example, Michelle (age 51, less than 7 years of experience, elementary school, low self-efficacy beliefs) shared that she was fearful of providing students with access to information when integrating technology during inquiry-based learning because she was afraid of backlash from her building principal, district administration,
and parents in her school community. David (age 40, 7-13 years of experience, elementary school, low self-efficacy beliefs) attributed his feeling of having anxiety when integrating technology during inquiry-based learning to not wanting to have his colleagues see him fail at implementing this type of instruction. However, school librarians with high self-efficacy beliefs were more likely to discuss how technology integration has evolved from when they first started in their roles and were purposeful with how they implemented this type of instruction. For example, Lauren (age 62, 14-20 years of experience, elementary school, high self-efficacy beliefs) shared her concerns about just using technology for the sake of using technology and the negative impact it is having on students. She stated how excited she is when integrating technology during inquiry-based learning and advocated that technology should be used with a purpose to positively impact student learning. John (age 47, less than 7 years of experience, elementary school, high self-efficacy beliefs), who was previously an instructional technology specialist before becoming a school librarian, described how using technology has evolved from students engaging in low-level tasks and consuming information to students being able to create, design, and publish. Also, school librarians with high self-efficacy beliefs were more likely to share their vision for what they hoped effective technology integration would look like in the future. For example, Molly (age 43, 14-20 years of experience, high school, high self-efficacy beliefs) advocated that she believed school librarians are now more important than ever and can be advocates for change going forward. School librarians with high-self efficacy beliefs were more likely to attempt innovative and authentic activities when integrating technology during inquiry-based learning. School librarians with low self-efficacy beliefs shared how past failures of integrating technology during inquiry-based learning caused them less likely to engage in this
type of instruction in the future. The joint display in Table 16 provided examples for how the semi-structured interviews and lesson plan artifacts provided insights into the quantitative data findings and trends.

Overall, chapter 4 provided a detailed description of the results from the quantitative and qualitative phases for this explanatory sequential mixed methods study. In chapter 5, a summary of the findings are discussed as well as the conclusions and recommendations of the study.
CHAPTER 5
DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

Summary of the Findings

Integrating technology during inquiry-based learning can provide students with high-level authentic and meaningful experiences. There are many benefits to integrating technology during inquiry-based learning, but teachers have not utilized this type of instruction to its fullest potential in the classroom despite the benefits it can have on student learning (Lonergan et al., 2019; Mohammed & Amponsah, 2021). School librarians have an opportunity to be leaders within their school communities to ensure that this type of learning occurs. This is because school librarians have been equipped with the knowledge to effectively integrate technology during inquiry-based learning and are tasked with implementing this type of learning in their library programs (AASL, 2018b; ALA & AASL, 2010; ALA, AASL, & CAEP, 2019). However, school librarians might value integrating technology during inquiry-based learning and try to implement it in their library programs, but there are barriers and challenges that they have encountered that make it difficult for them to be successful in their efforts. Therefore, this study used an explanatory sequential mixed methods design to examine and explore the self-efficacy beliefs and practices of school librarians about integrating technology during inquiry-based learning.

Research Question 1 (QUAN): What are the self-efficacy beliefs of school librarians about integrating technology during inquiry-based learning?

There were 115 school librarians that participated in the quantitative phase of this study.
that included males (13%) and females (87%). Years of experience for participants included school librarians that had less than 7 years (33%), 7-13 years (33.9%), 14-20 years (21%), 21-27 years (12.2%), and 28 or more years (2.6%). Participant ages included school librarians that were 30 years old or younger (5.2%), 31-40 years old (26.1%), 41-50 years old (36.5%), 51-60 years old (24.3%), and 61 years old or older (7.8%). The grade levels taught for school librarians included elementary school (52.2%), middle school (25.2%), and high school (20%). There were also three school librarians that taught at both a preschool and elementary school (2.6%). The quantitative data analysis provided four noteworthy findings using descriptive statistics.

Participants that had less than seven years of experience as a school librarian were more likely to have low self-efficacy beliefs while school librarians with more years of experience were more likely to report high self-efficacy beliefs about integrating technology during inquiry-based learning. This finding is different than findings from Gorder (2008) and Weber (2017). Gorder (2008) found that there was no significant difference for teachers integrating technology and their years of experience while Weber (2017) found that there was no significance for the years of experience of school librarians and their self-efficacy beliefs about the multiple literacies. However, the findings in this study were similar to Shoulders and Krei (2015) which found that educators with more teaching experience were more likely to have higher self-efficacy beliefs compared to less experienced educators.

Younger school librarians were more likely to have low self-efficacy beliefs based on the findings from this study. Prensky (2001) advocated that younger individuals were more likely to be equipped to use technology compared to older individuals, Gorder (2008) found no significant differences based on teacher age and technology integration, and Rowston et al. (2022) found
that the ages of preservice educators did not impact the self-efficacy beliefs about technology integration. Loesch (2010) and Mersand (2015) described how some people perceive older and more experienced librarians as unable to support their technology needs. However, the findings in this study revealed that school librarians that were older were more likely to have high self-efficacy beliefs about technology integration during inquiry-based learning.

Middle school and high school librarians reported higher self-efficacy beliefs about integrating technology during inquiry-based learning compared to elementary school librarians with high school librarians reporting the highest self-efficacy beliefs. This finding differs from Thompson et al. (2021) which found no differences in school librarian self-efficacy beliefs for depending on the grade levels taught. However, Christensen and Knezek (2019) and Gorder (2008) reported findings consistent with this study that differed from Thompson et al. (2021). Christensen and Knezek (2019) found that elementary and middle school teachers integrated technology less than high school teachers, elementary school teachers were more likely to report low self-efficacy beliefs about technology integration compared to educators that taught at older grade levels, and that elementary school teachers were more likely to not be equipped to effectively integrate technology in their classrooms compared to educators teaching at older grade levels. Gorder (2008) found that elementary and middle school teachers integrated technology less than high school teachers. There were no high school librarians that reported low self-efficacy beliefs in this study.

School librarians that were not highly qualified reported the second lowest self-efficacy beliefs about integrating technology during inquiry-based learning compared to any other demographic group. The only demographic group that scored lower than school librarians that
were not highly qualified were school librarians who were 30 years old or younger. Francis and Lance (2011) and Lance and Kachel (2018) advocated for why highly qualified school librarians are needed in schools. There is a positive impact on student learning when highly qualified school librarians are staffed in school libraries compared to schools employing unqualified staff in the library (Francis & Lance, 2011). Lance and Kachel (2018) found “the most substantial and consistent finding is a positive relationship between full-time, qualified school librarians and scores on standards-based language arts, reading, and writing tests, regardless of student demographics and school characteristics” (p. 16). Qualified school librarians can design library programs that instruct all students while collaborating and co-teaching frequently with all classroom teachers to have an impact on student learning. School librarians that are highly qualified are better equipped to effectively manage their school library program to have the greatest impact on student learning. Lance and Kachel (2018) found that “librarians today are often on the cutting edge of education technology. And because librarians work directly with all teachers and all students, they have a big picture view that can make them major assets on building and district leadership committees that assess curriculum, technology, and other programs that affect the entire school community” (p. 18). If school librarians are not highly qualified, they will struggle to manage and facilitate successful library programs. Additionally, Lance and Kachel (2018) stated that “qualified school librarians have been educated and certified to perform interlinked, interdisciplinary, and crosscutting roles as instructional leaders, program administrators, educators, collaborative partners, and information specialists” (p. 20). The results from this mixed methods study were consistent with Francis and Lance (2011) and Lance and
Kachel (2018) which further revealed the importance of staffing school libraries with highly qualified school librarians.

The quantitative findings in this study showed how school librarian age, years of experience, qualifications, and grade level taught influenced the self-efficacy beliefs about integrating technology during inquiry-based learning for school librarian participants. The findings from this study provided evidence that school librarians that were younger, less experienced, or not highly qualified were more likely to have low self-efficacy beliefs. However, the findings provided evidence that school librarian participants were more likely to have high self-efficacy beliefs if they were older, more experienced, or were highly qualified (Christensen & Knezek, 2019; Francis & Lance, 2011; Lance & Kachel, 2018; Shoulders & Krei, 2015).

Research Question 2 (qual): How do school librarians describe their practices when integrating technology during inquiry-based learning?

Ten school librarian participants were selected using maximum variation sampling to participate in the qualitative phase in this explanatory sequential mixed methods study. The qualitative phase included collecting and analyzing data from semi-structured interviews and reviewing lesson plan artifacts. The major themes that were revealed during the semi-structured interviews included Socialization and Performance. Socialization was the most prevalent theme that emerged from the semi-structured interviews and included subthemes of (1a) stakeholder relationships and (1b) physiological factors. Performance was the second theme that emerged during the semi-structured interviews which included subthemes of (2a) experience, (2b) modeling and creating, and (2c) barriers. The major themes that were revealed when reviewing lesson plan artifacts included Student-Centered Integration and Librarian-Centered Integration.
Student-Centered Integration was the most prevalent theme that emerged when reviewing lesson plan artifacts and included subthemes of (3a) student consumption, (3b) student creation, and (3c) student collaboration. Librarian-Centered Integration was the second major theme that emerged when reviewing lesson plan artifacts and included subthemes of (4a) modeling and creating and (4b) curating.

Semi-structured interviews were conducted with ten school librarian participants to explore how they integrated technology during inquiry-based learning. Socialization and Performance were the two major themes that were revealed from the semi-structured interviews. Subthemes emerged within each of the major themes. Socialization was the most prevalent theme that emerged from the semi-structured interviews and included subthemes of (1a) stakeholder relationships and (1b) physiological factors. Performance was the second most prevalent theme that emerged from the semi-structured interviews and included subthemes of (2a) experience, (2b) modeling and creating, and (2c) barriers.

Socialization was the most prevalent major theme during the semi-structured interviews where the participants described how their perceptions and experiences of observations and interactions with administration, colleagues, parents, and students influenced their self-efficacy beliefs and their practices about technology integration during inquiry-based learning. School librarian participants described their experiences and perceptions for interactions with stakeholders, level of respect and value, culture perceptions of their role, level of relevance and importance, and physiological factors. Socialization had two subthemes including (1a) stakeholder relationships and (1b) physiological factors. In the stakeholder relationship subtheme, the school librarian participants shared how positive and negative experiences in these
types of ways impacted their self-efficacy beliefs and their practices when integrating technology during inquiry-based learning. In the physiological factors subtheme, participants described how stress, frustration, and anxiety negatively impacted their self-efficacy beliefs and how these factors inhibited their practices when integrating technology during inquiry-based learning.

In subtheme (1a) stakeholder relationships, school librarians reported that stereotypes, misconceptions, and a perception of being undervalued impacted their self-efficacy beliefs about integrating technology during inquiry-based learning and influenced their teaching practices. Participants reported that building principals had a large impact on whether school librarians had success in their library programs when integrating technology during inquiry-based learning. Principals that were positive advocates of their library program enabled school librarians to have effective school library programs while negative advocates hindered using school librarians in the most effective ways. These findings were consistent with Kachel and Lance (2018), Levin (2019), and Seminelli (2016) which described how stereotypes or misconceptions might negatively impact school librarians. Collaboration and co-teaching with other teaching colleagues also impacted the self-efficacy beliefs of school librarians about integrating technology during inquiry-based learning and how they implemented these practices in their school library programs. School librarians need to continue to advocate for their role and partner with school community stakeholders to successfully integrate technology during inquiry-based learning (Wine, 2016). School librarians that were supported and empowered to integrate technology during inquiry-based learning held higher self-efficacy beliefs and implemented these practices more often in their school library programs. Feedback from school community
stakeholders affected the self-efficacy beliefs and practices of the school librarians which is consistent with Akkuzu (2014).

In subtheme (1b) physiological factors, school librarians reported negative and positive factors that influenced their self-efficacy beliefs about integrating technology during inquiry-based learning and how it influenced their practices. Negative physiological factors included school librarians being anxious, frustrated, and stressed in their roles due to not being valued within the school community. Misconceptions about the role of the school librarian also contributed to negative physiological factors for school librarian participants. Positive physiological factors included school librarians being motivated, empowered, and excited. Akkuzu (2014) found “positive feelings enhanced the student teachers’ self-confidence and therefore contributed to their active participation in the lessons” (p. 61). Building principals and teaching colleagues that valued school librarians integrating technology during inquiry-based learning empowered and motivated school librarians to continue to engage in this type of learning. However, school librarians that were not supported in their role by their principal experienced anxiety, frustration, and stress when integrating technology during inquiry-based learning. Bandura (1977) discussed that anxiety and fear caused individuals to avoid and be reluctant to engage in certain tasks. School librarians that experienced anxiety and fear were less likely to integrate technology during inquiry-based learning due to the negative impact this had on their self-efficacy beliefs. The relationship between principals and teaching colleagues contributed to negative or positive emotional states for the school librarian participants. Principals and teaching colleagues that did not value school librarians integrating technology during inquiry-based learning contributed to anxiety, frustration, and stress. This caused school
librarians to avoid integrating technology during inquiry-based learning. The findings in this study regarding the physiological states of school librarian participants are consistent with Unal et al. (2017) regarding positive and negative emotions experiences.

Performance was the second most prevalent major theme that emerged during the semi-structured interviews where the participants described how their perceptions, experiences, preparation, and performance influenced their self-efficacy beliefs about integrating technology during inquiry-based learning. There were several factors that influenced school librarian Performance and the practices that they engaged in. Performance included three subthemes which were (2a) experience, (2b) modeling and creating, and (2c) barriers. In the experience subtheme, school librarians shared their perceptions and experiences on equipping students and teachers with high-level skills and facilitating and scaffolding instruction when integrating technology during inquiry-based learning. In the modeling and creating subtheme, school librarians discussed the ways they modeled and created for others when integrating technology during inquiry-based learning. In the barriers subtheme, school librarian participants shared the barriers and obstacles they experienced when attempting to integrate technology during inquiry-based learning.

In the subtheme (2a) experience, school librarians described how their self-efficacy beliefs and teaching practices were influenced when integrating technology during inquiry-based learning. School librarians shared how they equipped students and/or teachers with high-level skills when engaging in this type of learning. They also described how they actively facilitated and scaffolded instruction when integrating technology during inquiry-based learning. Akkuzu (2014), Bandura and Adams (1977), and Lebeau et al. (2018) discussed that performances and
practices are enhanced with a higher level of self-efficacy beliefs. Akkuzu (2014) found that “feedback affected student teachers’ self-efficacy beliefs. In particular, successful experiences, a constructive classroom environment and working in a cooperative environment with their peers increased their self-efficacy beliefs” (p. 60). In this study, school librarians that had successful experiences and performances in the past when integrating technology during inquiry-based learning continued to engage in this type of instruction. Pajares (1992) described how self-efficacy beliefs for teachers have an impact on their teaching practices but are very difficult to change. School librarians reported that integrating technology during inquiry-based learning was a valued teaching method and advocated for this type of instruction in their roles. However, school librarians reported difficulties when integrating technology during inquiry-based learning. School librarian participants revealed that the largest reason for not integrating technology during inquiry-based learning was lack of support from school administration and trying to collaborate with teachers who did not want to engage in this type of learning. Bandura (1977) noted that individuals with higher self-efficacy beliefs will persevere when facing obstacles or adverse experiences. Despite challenges to integrate technology during inquiry-based learning, the school librarian participants persisted to advocate for this type of instruction through positive and negative experiences. Unal et al. (2017) found that the self-efficacy beliefs of preservice teachers were mostly affected by mastery experiences. In this study, mastery experiences and repeated success that school librarians experienced when integrating technology during inquiry-based learning led to school librarians implementing this type of instruction more in their school library programs.
In the subtheme (2b) modeling and creating, school librarian participants described how their self-efficacy beliefs were affected by how they modeled tasks and created content when integrating technology during inquiry-based learning during semi-structured interviews. School librarians also curated print and digital resources for school community stakeholders to access when integrating technology during inquiry-based learning. All school librarian participants shared that they collaborated with colleagues and that co-teaching was integrated into their library program when integrating technology during inquiry-based learning. The AASL (2020c) advocated that school librarians should model and create a culture within the school that provides inquiry-based learning experiences for students and teachers. In this study, school librarian participants created inquiry-based learning experiences for students. They also modeled for students and teachers how to engage in inquiry-based learning experiences. Banchi and Bell (2008) provided a continuum for different levels of support during inquiry-based learning experiences that teachers can use when designing this type of instruction. The four levels of support for inquiry-based learning that Banchi and Bell (2008) described included confirmation inquiry, structured inquiry, guided inquiry, and open inquiry. School librarian participants partnered and supported classroom teachers to identify the most appropriate type of instruction. It was found that school librarian participants had key insights and expertise when partnering with teachers to determine how to effectively integrate technology during inquiry-based learning. Kao et al. (2020) recommended that teachers needed to receive professional development to be equipped and prepared to integrate technology for high-level tasks. It was revealed in this study that school librarian participants would model for teachers how to do this effectively with their students when integrating technology during inquiry-based learning experiences. School librarian
participants reported that modeling integrating technology during inquiry-based learning would typically come from them and they would influence classroom teachers rather than classroom teachers influencing them. It was also reported that school librarian participants would often create and model for classroom teachers since school librarian participants believed they had specialized training to support the classroom teachers.

In the subtheme (2c) barriers, school librarian participants discussed and revealed barriers that they encountered when integrating technology during inquiry-based learning. There were several reasons that barriers occurred for school librarians when trying to integrate technology during inquiry-based learning. One way that school librarian participants experienced barriers during this type of instruction when co-teaching was if they experienced technology failures in the past. Some classroom teachers were resistant to trying to integrate technology during inquiry-based learning after experiencing a technology failure. Bandura (1977) stated “after strong efficacy expectations are developed through repeated success, the negative impact of occasional failures is likely to be reduced” (p. 195). School librarian participants revealed that experiencing rare failures when integrating technology during inquiry-based learning did not contribute to them avoiding this type of instruction. However, school librarian participants revealed that some of the classroom teachers that they worked with were negatively impacted by failures when integrating technology during inquiry-based learning. School librarian participants shared several concerns about how classroom teachers used technology in the classroom. They shared concerns that some students were not able to use technology properly or know how to access reliable and credible information. Ertmer (2005) and Keser et al. (2015) discussed that some teachers attempted to use technology, but it was not integrated at high-levels. School librarian participants
were influential and promoted integrating technology at high-levels for authentic and meaningful experiences. School librarian participants revealed that they would influence classroom teachers when integrating technology during inquiry-based learning, but their self-efficacy beliefs were not impacted by classroom teachers compared to other stakeholders. School librarian participants revealed that they continued to persevere and value integrating technology during inquiry-based learning despite dealing with obstacles and challenges by other stakeholders.

In addition to conducting semi-structured interviews with school librarian participants, lesson plan artifacts were reviewed to gather data from an additional source to explore how they integrate technology during inquiry-based learning. Student-Centered Integration and Librarian-Centered Integration were the two major themes that were revealed when reviewing lesson plan artifacts. Student-Centered Integration was the most prevalent theme that emerged when reviewing lesson plan artifacts and included subthemes of (3a) student consumption, (3b) student creation, and (3c) student collaboration. Librarian-Centered Integration was the second major theme that emerged when reviewing lesson plan artifacts and included subthemes of (4a) modeling and creating and (4b) curating.

The most prominent theme that emerged when reviewing lesson plan artifacts was Student-Centered Integration. School librarian participants provided opportunities for students to take ownership of their learning by facilitating constructivist pedagogical learning opportunities when integrating technology during inquiry-based learning. Student-Centered Instruction occurred when students were responsible for consuming information, designing and creating to demonstrate their learning, and collaborating with others. Subthemes for Student-Centered
Instruction when reviewing lesson plan artifacts included (3a) student consumption, (3b) student creation, and (3c) student collaboration.

In subtheme (3a) student consumption, lesson plan artifacts were reviewed to explore how school librarians provided students with opportunities to conduct research or complete tasks to gain understanding of the content. Lesson plan artifacts revealed that school librarians provided students opportunities to consume information and build background knowledge by using a variety of print and digital resources. Students were given opportunities to consume information to build background knowledge when integrating technology during inquiry-based learning based on the lesson plans submitted by the school librarian participants. Spencer (2018) advocated that "consuming isn’t inherently bad. However, what we want are for students to be critical consumers so that they can become makers. And often, this requires a journey from awareness through critical consuming and then eventually creation” (p. 1). School librarian participants purposefully designed lesson plans to provide students with opportunities to consume information and build background knowledge. This was a critical component that was present in lesson plan artifacts that were reviewed.

School librarians used direct instruction within lesson plan artifacts when integrating technology during inquiry-based learning which provided equitable learning opportunities for all students to build background knowledge (Spencer, 2021). Lesson plan artifacts revealed that school librarian participants were purposeful in their instructional design and scaffolded the process when integrating technology during inquiry-based learning. Researcher John Hattie found that inquiry-based learning does not have a high Cohen’s D effect size and described that this finding was because teachers do not equip students with adequate background knowledge.
and a deep understanding of the content before beginning inquiry-based learning (Hattie, 2022). Hattie (2022) stated the reason that inquiry-based learning has such a low effect size is “because most teachers introduce it far too early” (p. 1). However, lesson plan artifacts submitted by the school librarian participants revealed that they appropriately scaffolded content and supported students to build background knowledge to allow for success when integrating technology during inquiry-based learning.

In subtheme (3b) student creation, lesson plan artifacts were reviewed to explore how school librarians provided students with opportunities to integrate technology for high-level tasks during an activity or assessment through demonstrating, producing, or publishing their learning. School librarians were purposeful to teach content and equip students with sufficient background knowledge to enable students to create and demonstrate their learning. Lesson plan artifacts revealed that school librarians provided opportunities to create artifacts individually or collaboratively using digital tools or demonstrate their learning in other ways. Student creation occurred once students had built sufficient background knowledge and had a deep understanding of the content (Spencer, 2018). Lesson plan artifacts revealed that school librarian participants connected their objectives for students to demonstrate their learning to curriculum goals and relevant standards. Technology tools that school librarian participants implemented to enable students to demonstrate their learning were aligned with curriculum goals and lesson content objectives (Banas & York, 2014; Harris et al., 2010).

In subtheme (3c) student collaboration, lesson plan artifacts were reviewed to explore how school librarians facilitated opportunities for students to work together with peers on activities to complete high-level tasks during lessons and projects with varying levels of
technology integration. Lesson plan artifacts revealed that school librarians purposefully
structured time for students to collaborate during small group discussions and group work. Peer
evaluation and peer feedback were also components that were included in lesson plan artifacts
when integrating technology during inquiry-based learning. Lesson plan artifacts revealed that
school librarian participants promoted student collaboration to build background knowledge.
Spencer (2018) advocated that student collaboration provided students with meaningful
opportunities to shift from consuming information to creating and demonstrating their learning.
Lesson plan artifacts revealed that school librarian participants promoted student collaboration to
create and demonstrate their learning and understanding of the content (AASL, 2018b; ALA,
AASL, & CAEP, 2019). Expectations for students when collaborating were not described in
lesson plans when integrating technology during inquiry-based learning although guidelines and
expectations for student collaboration were discussed during lessons.

Librarian-Centered Integration was the second most prominent theme that emerged when
reviewing lesson plan artifacts. School librarian participants integrated technology for
themselves during lessons using traditional teaching methods to support student learning.
Librarian-Centered Integration occurred when the school librarian modeled concepts for
students, created and designed instruction, and curated print and digital resources. Subthemes for
Librarian-Centered Integration included (4a) modeling and creating and (4b) curating.

In subtheme (4a) modeling and creating, lesson plan artifacts were reviewed to explore
how school librarian participants integrated technology during inquiry-based learning to
demonstrate a task, explain a concept or content through direct teaching, or create materials to
support student learning. Lesson plan artifacts revealed that school librarian participants modeled
examples for students so that students could vicariously understand how to be successful (Akkuzu, 2014; Bandura, 1977; Bandura, 1997). School librarian participants purposefully created instructional designs that would provide students with authentic and meaningful experiences. Lesson plan artifacts demonstrated that school librarian participants were intentional about when to integrate technology during inquiry-based learning to enhance student learning and achievement (Khalaf & Zin, 2018). An important component of school librarians creating and designing lesson plans when integrating technology during inquiry-based learning was collaborating with classroom teachers. School librarian participants collaborated with classroom teachers to create lesson plan artifacts together and sharing their expertise in their role when integrating technology during inquiry-based learning was very beneficial for student learning and achievement (McKenney et al., 2016). Acikgul (2020) found that the TPACK self-efficacy beliefs of preservice teachers increased when they were given opportunities to practice integrating various content, technology, and their pedagogical approach when designing lesson plans. In this study, school librarian participants demonstrated that they were able to demonstrate their TPACK expertise by designing and creating lesson plans when integrating technology during inquiry-based learning. Lesson plan artifacts submitted by the school librarian participants demonstrated how they blended their pedagogical knowledge, content knowledge, and technological knowledge together to design lessons to enhance student learning (Dikmen & Demirer, 2022).

In subtheme (4b) curating, lesson plan artifacts that were reviewed revealed that curation was an integral part of their instructional design when integrating technology during inquiry-based learning (AASL, 2018b). Lesson plan artifacts revealed that school librarians curated
resources to empower students to use trustworthy and credible sources to support their learning. School librarian participants curated print and digital resources in their lesson plan artifacts so that students could quickly access resources which enabled students to engage in high-level learning tasks (Mardis, 2015). Resources that school librarian participants curated when integrating technology during inquiry-based learning were from reliable sources and vetted to ensure that students could access trustworthy information. Print and digital resources were carefully and specifically curated in lesson plan artifacts by school librarian participants which provided students with reliable sources to use from trustworthy and credible creators (Dempsey et al., 2014).

Mixed Methods Research Question: In what ways does the qualitative data of exploring the practices of school librarians about integrating technology during inquiry-based learning help to explain the quantitative strand of data of their self-efficacy beliefs?

The quantitative results for this study provided evidence that school librarian participants who were older and had more years of experience were more likely to have stronger self-efficacy beliefs about integrating technology during inquiry-based learning compared to school librarians who were younger or had less years of experience. The qualitative phase of this study provided in-depth meaning for the quantitative results as to what impacted the self-efficacy beliefs of school librarians when integrating technology during inquiry-based learning. School librarians revealed the barriers they faced when attempting to integrate technology during inquiry-based learning, but it seemed as if the self-efficacy beliefs of the school librarians were sometimes not negatively impacted by some of the challenges that they encountered. Interview participants discussed how school community stakeholder support, or lack thereof, was a large determining
factor for how they were valued within the school community when integrating technology during inquiry-based learning. School librarian participants revealed a willingness to collaborate and co-teach with classroom teachers, but sometimes were opposed by skeptical and negative colleagues. Although school librarian participants encountered skeptical and negative colleagues when integrating technology during inquiry-based learning, the skeptical and negative colleagues did not appear to have as much of an impact on the self-efficacy beliefs of school librarians compared to other stakeholder groups like the principal or other administrators. Lesson plan artifacts revealed that school librarian participants were able to construct lessons using a strong TPACK framework when integrating technology during inquiry-based learning. School librarian participants demonstrated in the lesson plan artifacts how they provided students with authentic and meaningful experiences when integrating technology during inquiry-based learning. School librarian participants reported during semi-structured interviews and demonstrated in their lesson plan artifacts how they successfully maintained high self-efficacy beliefs when integrating technology during inquiry-based learning.

The joint display included in chapter 4 in Table 16 provided helpful insights for how conducting semi-structured interviews and reviewing lesson plan artifacts provided insights into the trends that were found in the quantitative phase. Mixing and integrating the findings revealed that school librarians that reported high-self efficacy beliefs were more likely to attempt authentic and innovative activities when integrating technology during inquiry-based learning, but school librarians that reported low-self efficacy beliefs were less likely to engage in this type of instruction in the future due to past failures or previous negative experiences. The qualitative
findings for semi-structured interviews and lesson plan artifacts provided insights for the quantitative survey results.

The findings in this study provide evidence that school librarians were equipped to facilitate opportunities for students to integrate technology during inquiry-based learning and that school librarians were committed to engaging in this type of instruction. School librarians had a specialized understanding and charge for how to integrate technology during inquiry-based learning, but their school communities did not always value the school librarian role (Lance, 2018; Kletter, 2021). The findings in this study demonstrated the importance of the school librarian role when integrating technology during inquiry-based learning and provided guidance for how the role of the school librarian could be used most effectively to transform student learning. School librarians had specialized training when integrating technology during inquiry-based learning and provided students with authentic and meaningful experiences (AASL, 2018b; ALA, AASL, & CAEP, 2019). The findings revealed that school librarians who were confident and held high self-efficacy beliefs about integrating technology during inquiry-based learning due to positive and successful previous experiences (Bandura, 1977; Bandura, 1997). School librarians that were older, had more experience, and were highly qualified were more likely to report higher self-efficacy beliefs compared to school librarians that were younger, less experienced, or not qualified for their roles. Participants demonstrated perseverance when facing occasional barriers and challenges when integrating technology during inquiry-based learning. School librarians that had mastery experiences did not have their self-efficacy beliefs swayed by occasional challenges or skeptical colleagues. However, school librarians described that they
were more likely to have their self-efficacy beliefs influenced by administrators instead of other teaching colleagues, students, or parents.

The findings in this study indicated that school librarians who were older and had more experience were more likely to have higher self-efficacy beliefs when integrating technology during inquiry-based learning. This evidence is contrary to previous research about school librarian stereotypes and demonstrated the effectiveness of older and more experienced school librarians (Seminelli, 2016; Wine, 2016). It also contradicts previous research that suggested that older and more experienced educators might not be as equipped to successfully integrate technology compared to younger educators (Bunch et al., 2012; Prensky, 2001). School librarian participants described how their successes during previous experiences of integrating technology during inquiry-based learning helped them maintain high self-efficacy beliefs during future attempts at this type of instruction.

Implications of the Findings

The findings in this study revealed that school librarians who were older and had more years of experience were more likely to have higher self-efficacy beliefs about integrating technology during inquiry-based learning compared to younger and less experienced school librarians (Shoulders & Krei, 2015). School librarian participants advocated for the benefits of integrating technology during inquiry-based learning and the positive impact that this type of instruction can have on student learning. School librarians have been uniquely tasked with being leaders that can facilitate this type of instruction to transform student learning (AASL, 2018a; AASL, 2018b; ALA, AASL, & CAEP, 2019). However, school librarians were not always
utilized or valued by other stakeholders due to misconceptions about the school librarian role (Kachel & Lance, 2018; Levin, 2019; Seminelli, 2016). The findings in this study have the potential to help school librarians be effective in their roles and demonstrate their importance to other school community stakeholders. School librarians described how they collaborated and co-taught with other teaching colleagues. They shared how they facilitated lessons by effectively integrating technology during inquiry-based learning and modeled this type of instruction for their colleagues. School librarians that were utilized by other teaching colleagues and valued by administrators when integrating technology during inquiry-based learning were empowered to enhance and transform student learning through authentic and meaningful learning experiences (AASL, 2010; Johnston, 2012; Kachel & Lance, 2018; Levitov, 2016). This study highlighted the importance of the school librarian role and how they could most effectively integrate technology during inquiry-based learning (AASL, 2016; AASL, 2018a; AASL, 2020c; ALA/AASL/CAEP, 2019).

Limitations of the Study

The first limitation of this study is that all of the school librarian participants in the quantitative phase (N = 115) and qualitative phase (N = 10) were employed at public schools within the same county in the Chicago suburbs. School librarians employed in rural or urban areas might report different experiences based on their school demographics. However, the quantitative phase and qualitative phase for this study provided helpful insights into the self-efficacy beliefs of school librarians about integrating technology during inquiry-based learning.
The second limitation of this study is that the qualitative themes for conducting semi-structured interviews and reviewing lesson plan artifacts had separate themes that emerged. Different qualitative themes emerged from the different data sources. Semi-structured interviews were conducted first before reviewing lesson plan artifacts so participants were not able to be asked about their lesson plans when being interviewed. The themes of Socialization and Performance were the two themes that emerged during the semi-structured interviews, but these themes could not be identified by only reviewing the lesson plan artifacts. Following the semi-structured interviews, the themes of Librarian-Centered Integration and Student-Centered Integration emerged when reviewing the lesson plan artifacts. Due to the lesson plan artifacts being the second data source collected, qualitative participants could not be asked questions about Socialization and Performance during the semi-structured interviews and if these themes were associated with their lesson plans. If the lesson plan artifacts were reviewed before conducting semi-structured interviews, it would have allowed for more overlap in the themes and added context for the lesson plan artifacts. However, implementing three data sources including a survey, semi-structured interviews, and reviewing lesson plan artifacts provided deep and meaningful insights for this study. The reason why semi-structured interviews were conducted before reviewing lesson plan artifacts was to build trust with the participants so that they would be comfortable with sending lesson plan artifacts.

The third limitation of this study is that it only included school librarian participants reporting on their own self-efficacy beliefs about integrating technology during inquiry-based learning and their own practices, but did not include participants from other school community stakeholder groups (i.e. classroom teachers, students, parents, and administrators). School
librarians shared their personal experiences interacting with these other stakeholders and how these groups influenced their self-efficacy beliefs, but other stakeholders did not participate in this study. However, the findings from this study could be used by other school librarians and stakeholder groups to provide insights on the self-efficacy beliefs of school librarians about integrating technology during inquiry-based learning and their practices.

**Recommendations for Future Research**

There are several recommendations for future research that can build upon this study and provide additional insights into school librarian self-efficacy beliefs about integrating technology during inquiry-based learning and their practices. Recommendations for future research include how COVID-19 impacted school librarians, how library scheduling and budgets impacted school librarians, and how professional development impacted school librarians in their role.

Responding to COVID-19 ($N = 25$), time and money ($N = 89$), and professional development ($N = 154$) were topics that emerged during the qualitative phase of this explanatory sequential mixed methods study. These three areas of future research would benefit school librarians and other school community stakeholders for how school librarians can be most effective in their roles.

First, data collection occurred during the 2021-2022 school year during a time when school librarians were still impacted by COVID-19 mitigation protocols (AASL, 2020b; Centers for Disease Control and Prevention, 2020; United States Department of Education, 2021). School librarians pivoted to take on creative and unusual roles beginning in March 2020 due to necessary mitigation efforts in response to COVID-19, and many of these changes for their role remained in place during the 2021-2022 school year (ALA, 2021, Follett, 2020; Witteveen,
During the qualitative phase of this study, school librarian participants shared how COVID-19 continued to impact their role and library program \((N = 25)\). Many COVID-19 restrictions and mitigation protocols have now been lifted, but it would be beneficial in future research to further examine and explore how COVID-19 impacted school librarians and their role of integrating technology during inquiry-based learning.

Second, it would be worth examining and exploring how library scheduling and budgeting impacted school library programs. School librarians reported during the qualitative phase that time and money \((N = 89)\) impacted their library programs positively or negatively. Participants discussed the enablers and barriers for library scheduling and how this influenced their ability to have successful library programs. Also, school librarian participants discussed the ways that their budgets benefited their library programs or how budget cuts negatively impacted their ability to facilitate and manage their library programs.

Third, school librarian professional development \((N = 154)\) would be a recommended area of future research. The quantitative findings revealed that there was a large discrepancy between school librarians that were highly qualified and school librarians that were not highly qualified. Highly qualified participants \((N = 102, M = 87.65, SD = 9.95)\) accounted for 88.7% of respondents for this study while school librarian respondents that were not highly qualified \((N = 13, M = 68.46, SD = 15.17)\) accounted for 11.3% of this study. School librarians that were not highly qualified reported the second lowest self-efficacy beliefs compared to any other demographic group. The only demographic group that scored lower than school librarians that were not highly qualified were school librarians who were 30 years old or younger. However, for school librarian participants that were highly qualified, it would be beneficial to have future
research examine and explore what kinds of professional development had the greatest impact on them and their library programs.

Conclusion

The purposes of this explanatory sequential mixed methods study were to examine the self-efficacy beliefs of school librarians about integrating technology during inquiry-based learning during the quantitative phase and then explore how these practices about technology integration during inquiry-based learning were being implemented during the qualitative phase. The findings from this study revealed that school librarians were more likely to have high self-efficacy beliefs about integrating technology during inquiry-based learning if they were older, more experienced, or were highly qualified. School librarians reported experiences of being misunderstood, not valued, or supported in their roles. However, school librarians showed perseverance and were committed to integrating technology during inquiry-based learning in their library programs. The findings from this mixed methods study demonstrated how school librarians were leaders in their school communities to provide students with authentic and meaningful learning experiences when integrating technology during inquiry-based learning.
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APPENDIX A

SOLICITATION COMMUNICATION
Hi ______________,

I have been a school librarian since 2013 at Washington Elementary School in Community Unit School District 200 located in Wheaton, Illinois. I am currently a PhD in instructional technology candidate at Northern Illinois University studying the self-efficacy beliefs of school librarians about integrating technology during inquiry-based learning.

It would be great if you could help me by completing a survey that will take about 15 minutes to finish. This research can have a positive impact on our collective roles as school librarians as technology integration has become increasingly more central to our position.

If you would like to help me with my research by providing authentic and meaningful data, please complete the survey that can be found at: ____________.

Sincerely,

Joseph Babb
APPENDIX B

INFORMED CONSENT
Title of Study: Self-Efficacy Beliefs of School Librarians about Integrating Technology during Inquiry-Based Learning: A Mixed Methods Study

Investigator: Joseph Babb, (630)805-4154, Department of Educational Technology, Research and Assessment

Key Information
- This is a voluntary research study on examining the self-efficacy beliefs of school librarians about integrating technology during inquiry-based learning and exploring their practices.
- This study involves conducting surveys of school librarians. School librarians that complete the survey can choose to participate in the qualitative phase that includes reviewing lesson plan artifacts and conducting semi-structured interviews. Interviews will try to be conducted in-person at schools and the researcher will take precautions and mitigation efforts to reduce any risks tied to potential COVID-19 exposure. If in-person interviews are not able to be conducted, virtual interviews will be conducted instead.
- The project will benefit school librarians to better understand how to effectively integrate technology during inquiry-based learning in their library programs.

I agree to participate in the research study titled “Self-Efficacy School Librarians about Integrating Technology during Inquiry-based Learning: A Mixed Methods Study” being conducted by Joseph Babb, a Ph.D. candidate at Northern Illinois University. The purpose of this study is to gather data from practicing school librarians about what factors influence their self-efficacy beliefs about integrating technology during inquiry-based learning.

I understand that I can choose to keep my results anonymous and I can choose to have no personal identifiable information collected from me. I am not required to share any personal identifiable information. However, I understand that if I would like to participate in an interview and share several examples of lesson plans to this study and choose to include personal identifiable information, it will be used to contact me. If you choose not to participate in an interview or you are not selected, personally identifiable information does not need to be included. Any personal identifiable information shared will be confidential and secured in a password protected file.

I am aware that my participation is voluntary and may be withdrawn at any time without penalty or prejudice, and that if I have any additional questions concerning this study, I may contact Joseph Babb at z1758095@students.niu.edu or (630)805-4154, or Dr. Hsu at pshu@niu.edu or (815)753-6025, who is the research advisor for this project. I understand that if I wish further information regarding my rights as a research subject, I may contact the Office of Research Compliance at Northern Illinois University at researchcompliance@niu.edu or (815)753-8588.

I understand that the intended benefits of this study include helping school librarians enhance and transform their instruction when integrating technology in inquiry-based learning and providing students with authentic and meaningful learning opportunities. I have been informed
that there are no foreseeable or expected risks during this study. I understand that all information gathered during this experiment will be kept confidential by the researcher and research team. I can choose to remain anonymous or voluntarily choose to share personal identifiable information that will be kept confidential if I agree to be interviewed and provide examples of lesson plans during the second qualitative phase of this study.

I realize that Northern Illinois University policy does not provide for compensation for, nor does the University carry insurance to cover injury or illness incurred as a result of participation in University sponsored research projects. I understand that my consent to participate in this project does not constitute a waiver of any legal rights or redress I might have as a result of my participation, and I acknowledge that I have received a copy of this consent form. I give my consent by clicking the agree button below to begin the survey.

If you select “I agree” at the bottom of this page, you agree that you are currently a practicing school librarian, have understood this consent form, and agree to participate in this study.

I agree I do not agree

I also agree to allow the interview to be audiotaped.

I agree I do not agree
APPENDIX C

SURVEY INSTRUMENT
<table>
<thead>
<tr>
<th>Item #</th>
<th>Technology Integration Self-Efficacy Scale (Wang et al., 2004)</th>
<th>Modified survey items used in study</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>For each statement below, indicate the strength of your agreement or disagreement by circling one of the five scales.</td>
<td>For each statement below, indicate the strength of your agreement or disagreement by selecting one of the five scales.</td>
</tr>
<tr>
<td></td>
<td>Below is a definition of technology integration with accompanying examples: Technology integration: Using <em>computers</em> to support students as they construct their own knowledge through the completion of authentic meaningful tasks.</td>
<td>Below are definitions of technology integration and inquiry-based learning with accompanying examples: Technology Integration: Using <em>devices</em> to support students as they construct their own knowledge through the completion of authentic and meaningful tasks.</td>
</tr>
<tr>
<td></td>
<td>Examples: Students working on research projects, obtaining information from the Internet. Students constructing Web pages to show their projects to others. Students using application software to create student products (such as composing music, developing PowerPoint presentations, developing HyperStudio stacks).</td>
<td>Inquiry-based Learning: Student-centered focused learning where students construct meaning while the teacher provides appropriately scaffolded support. The three components of inquiry-based learning are posing a question, following a process, and determining an outcome. The teacher provides purposeful scaffolded support throughout the learning process while maximizing student choice and voice in their learning. Examples: Students working on research projects, obtaining information from print and online sources. Students constructing Web pages or publishing content to show their projects to others. Students using application software to create student products (such as composing music, developing PowerPoint or Google Slides presentations, developing podcasts or video projects).</td>
</tr>
<tr>
<td></td>
<td>Using the above as a baseline, please circle one response for each of the statements in the table: SD = Strongly Disagree, D = Disagree, NA/ND = Neither Agree nor Disagree, A = Agree, SA = Strongly Agree</td>
<td>Using the above as a baseline, please select one response for each of the statements in the table: SD = Strongly Disagree, D = Disagree, NA/ND = Neither Agree nor Disagree, A = Agree, SA = Strongly Agree</td>
</tr>
<tr>
<td></td>
<td>I feel confident that I understand computer capabilities well enough to maximize them in my classroom.</td>
<td>I feel confident that I understand device capabilities well enough to maximize them when integrating technology during inquiry-based learning.</td>
</tr>
<tr>
<td>---</td>
<td>------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>2</td>
<td>I feel confident that I have the skills necessary to use the computer for instruction.</td>
<td>I feel confident that I have the skills necessary to integrate technology during inquiry-based learning.</td>
</tr>
<tr>
<td>3</td>
<td>I feel confident that I can successfully teach relevant subject content with appropriate use of technology.</td>
<td>I feel confident that I can successfully teach relevant subject content with appropriately integrating technology during inquiry-based learning.</td>
</tr>
<tr>
<td>4</td>
<td>I feel confident in my ability to evaluate software for teaching and learning.</td>
<td>I feel confident in my ability to evaluate software and digital tools for integrating technology during inquiry-based learning.</td>
</tr>
<tr>
<td>5</td>
<td>I feel confident that I can use correct computer terminology when directing students' computer use.</td>
<td>I feel confident that I can use correct technological terminology when directing students' device use during inquiry-based learning.</td>
</tr>
<tr>
<td>6</td>
<td>I feel confident I can help students when they have difficulty with the computer.</td>
<td>I feel confident I can help students when they have difficulty with technology during inquiry-based learning.</td>
</tr>
<tr>
<td>7</td>
<td>I feel confident I can effectively monitor students' computer use for project development in my classroom.</td>
<td>I feel confident I can effectively monitor students' device and internet use for inquiry-based learning for project development in my library program.</td>
</tr>
<tr>
<td>8</td>
<td>I feel confident that I can motivate my students to participate in technology-based projects.</td>
<td>I feel confident that I can motivate my students to participate in projects when integrating technology during inquiry-based learning.</td>
</tr>
<tr>
<td>9</td>
<td>I feel confident I can mentor students in appropriate uses of technology.</td>
<td>I feel confident I can mentor students in appropriately integrating technology during inquiry-based learning.</td>
</tr>
<tr>
<td>10</td>
<td>I feel confident I can consistently use educational technology in effective ways.</td>
<td>I feel confident I can consistently integrate educational technology in effective ways during inquiry-based learning in my library program.</td>
</tr>
<tr>
<td>11</td>
<td>I feel confident I can provide individual feedback to students during technology use.</td>
<td>I feel confident I can provide individual feedback to students when integrating technology during inquiry-based learning.</td>
</tr>
<tr>
<td>12</td>
<td>I feel confident I can regularly incorporate technology into my lessons, when appropriate to student learning.</td>
<td>I feel confident I can regularly integrate technology during inquiry-based learning, when appropriate to student learning.</td>
</tr>
<tr>
<td>13</td>
<td>I feel confident about selecting appropriate technology for instruction based on curriculum standards.</td>
<td>I feel confident about integrating technology during inquiry-based learning based on curriculum standards.</td>
</tr>
<tr>
<td></td>
<td>I feel confident about assigning and grading technology-based projects.</td>
<td>I feel confident about assigning and grading inquiry-based learning projects when technology is integrated.</td>
</tr>
<tr>
<td>---</td>
<td>------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>14</td>
<td>I feel confident about keeping curricular goals and technology uses in mind when selecting an ideal way to assess student learning.</td>
<td>I feel confident about keeping curricular goals and technology uses in mind when selecting an ideal way to assess student learning during inquiry-based learning.</td>
</tr>
<tr>
<td>15</td>
<td>I feel confident about using technology resources (such as spreadsheets, electronic portfolios, etc.) to collect and analyze data from student tests and products to improve instructional practices.</td>
<td>I feel confident about using technology resources (such as spreadsheets, electronic portfolios, Google Classroom or other online learning management systems, etc.) to collect and analyze data from student tests and products to improve inquiry-based learning instructional practices.</td>
</tr>
<tr>
<td>16</td>
<td>I feel confident that I will be comfortable using technology in my teaching.</td>
<td>I feel confident that I will be comfortable integrating technology during inquiry-based learning.</td>
</tr>
<tr>
<td>17</td>
<td>I feel confident I can be responsive to students’ needs during computer use.</td>
<td>I feel confident I can be responsive to students’ needs when integrating technology during inquiry-based learning.</td>
</tr>
<tr>
<td>18</td>
<td>I feel confident that, as time goes by, my ability to address my students’ technology needs will continue to improve.</td>
<td>I feel confident that, as time goes by, my ability to address my students’ needs when integrating technology during inquiry-based learning will continue to improve.</td>
</tr>
<tr>
<td>19</td>
<td>I feel confident that I can develop creative ways to cope with system constraints (such as budget cuts on technology facilities) and continue to teach effectively with technology.</td>
<td>I feel confident that I can develop creative ways to cope with system constraints (such as budget cuts on technology facilities) and continue to teach effectively when integrating technology during inquiry-based learning.</td>
</tr>
<tr>
<td>20</td>
<td>I feel confident that I can carry out technology-based projects even when I am opposed by skeptical colleagues.</td>
<td>I feel confident that I can carry out integrating technology during inquiry-based learning even when I am opposed by skeptical colleagues.</td>
</tr>
</tbody>
</table>
APPENDIX D

REVIEW OF LESSON PLAN ARTIFACTS RUBRIC
### TPACK-Based Technology Integration Assessment Rubric (Harris et al., 2010)

<table>
<thead>
<tr>
<th>Criteria</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Curriculum Goals &amp; Technologies</strong></td>
<td>Technologies selected for use in the instructional plan are strongly aligned with one or more curriculum goals.</td>
<td>Technologies selected for use in the instructional plan are aligned with one or more curriculum goals.</td>
<td>Technologies selected for use in the instructional plan are partially aligned with one or more curriculum goals.</td>
<td>Technologies selected for use in the instructional plan are not aligned with any curriculum goals.</td>
</tr>
<tr>
<td><strong>Instructional Strategies &amp; Technologies</strong></td>
<td>Technology selection(s) are exemplary, given curriculum goal(s) and instructional strategies.</td>
<td>Technology selection(s) are appropriate, but not exemplary, given curriculum goal(s) and instructional strategies.</td>
<td>Technology selection(s) are marginally appropriate, given curriculum goal(s) and instructional strategies.</td>
<td>Technology selection(s) are inappropriate, given curriculum goal(s) and instructional strategies.</td>
</tr>
<tr>
<td><strong>Technology Selection(s)</strong></td>
<td>Content, instructional strategies and technology fit together strongly within the instructional plan.</td>
<td>Content, instructional strategies and technology fit together within the instructional plan.</td>
<td>Content, instructional strategies and technology fit together somewhat within the instructional plan.</td>
<td>Content, instructional strategies and technology do not fit together within the instructional plan.</td>
</tr>
<tr>
<td><strong>“Fit”</strong></td>
<td>Content, instructional strategies and technology fit together strongly within the instructional plan.</td>
<td>Content, instructional strategies and technology fit together within the instructional plan.</td>
<td>Content, instructional strategies and technology fit together somewhat within the instructional plan.</td>
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</tbody>
</table>

### Modified Rubric Based On TPACK-Based Technology Integration Assessment Rubric (Harris et al., 2010)

<table>
<thead>
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<th>Criteria</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Curriculum Goals &amp; Technologies</strong></td>
<td>Technologies selected for use during inquiry-based learning in the instructional plan are strongly aligned with one or more curriculum goals.</td>
<td>Technologies selected for use during inquiry-based learning in the instructional plan are aligned with one or more curriculum goals.</td>
<td>Technologies selected for use during inquiry-based learning in the instructional plan are partially aligned with one or more curriculum goals.</td>
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<td>---</td>
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<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>Technology Selection(s)</strong> (Compatibility with curriculum goals &amp; instructional strategies)</td>
<td>Technology selection(s) are exemplary, given curriculum goal(s) and instructional strategies during inquiry-based learning.</td>
<td>Technology selection(s) are appropriate, but not exemplary, given curriculum goal(s) and instructional strategies during inquiry-based learning.</td>
<td>Technology selection(s) are marginally appropriate, given curriculum goal(s) and instructional strategies during inquiry-based learning.</td>
<td>Technology selection(s) are inappropriate, given curriculum goal(s) and instructional strategies during inquiry-based learning.</td>
</tr>
<tr>
<td><strong>“Fit”</strong> (Content, pedagogy and technology together)</td>
<td>Content, instructional strategies and technology fit together strongly within the inquiry-based learning instructional plan.</td>
<td>Content, instructional strategies and technology fit together within the inquiry-based learning instructional plan.</td>
<td>Content, instructional strategies and technology fit together somewhat within the inquiry-based learning instructional plan.</td>
<td>Content, instructional strategies and technology do not fit together within the inquiry-based learning instructional plan.</td>
</tr>
</tbody>
</table>
Interview Questions

1. Tell me about your story about how you became a school librarian and your experiences with integrating technology during inquiry-based learning.

2. How have you integrated technology during inquiry-based learning in your library program and how has evolved as you’ve gained more experience in your career?

3. Tell me what barriers and enablers you have experienced when trying to integrate technology during inquiry-based learning.

4. How do you invest time integrating technology during inquiry-based learning?

5. How do you plan, assign, and grade curriculum with colleagues when integrating technology during inquiry-based learning?

6. How do you collaborate and teach lessons with skeptical colleagues when integrating technology during inquiry-based learning?

7. How do you feel when integrating technology during inquiry-based learning?

8. Can you please tell me about a time when you did a good job integrating technology during inquiry-based learning?

9. Can you please tell me about a time when you did a bad job integrating technology during inquiry-based learning?

10. What feedback have other school community stakeholders (students, parents, teaching colleagues, administration) given you when integrating technology during inquiry-based learning?

11. Would you be willing to share an exemplary lesson plan that you’re proud of when you have integrated technology during inquiry-based learning?
APPENDIX F

DEMOGRAPHIC SURVEY
1. Are you currently a practicing school librarian?
   - Yes
   - No

2. How many years of experience do you have as a school librarian?
   - Less than 7 years
   - 7-13 years
   - 14-20 years
   - 21-27 years
   - 28 or more years

3. What is your age?
   - [Click here to enter text]

4. Gender
   - All
   - Male
   - Female
   - Trans Male
   - Trans Female
   - Nonconforming

5. Are you a full-time or part-time school librarian?
   - Full-time
   - Part-time

6. Currently employed in
   - Preschool
   - Elementary School
   - Middle School
   - High School

7. What is your official job title assigned to you in your school district?
   - [Click here to enter text]

8. What is the student population size at your school?
   - [Click here to enter text]

9. What best describes the ratio of student devices (iPads, Chromebooks, etc.) to students in your school?
   - 1 device for every 1 student
   - 1 device for every 2 students
   - 1 device for every 3 students
   - 1 device for every 4 or more students

10. What endorsement, certification, or degree have you earned to be a highly qualified school librarian?
    - [Click here to enter text]
    - I do not have an endorsement, certification, or degree to be a highly qualified school librarian.

11. Please list your degrees, endorsements, certifications, and degrees
    - [Click here to enter text]
12. What would best describe your library program scheduling?
   - [ ] I am on a fixed library schedule
   - [ ] I am on a flexed library schedule
   - [ ] I am on a hybrid library schedule with fixed lessons and flexed lessons
Hi back, Joseph! Nice to "meet" you in this way.

There is no need to get permission to use any of our instruments, since they are published in the Creative Commons. We ask only that you cite our work in yours, as is specified in the Creative Commons (CC) license under which the instruments are made freely available to researchers. There's a link at the bottom of the downloadable documents (instruments, including the TIA) that leads you to the CC webpage that describes the parameters of the instrument's Creative Commons license.

The TIA instrument, article, and related instruments and publications are posted here: https://activitytypes.wm.edu/Assessments/assessmentsindex.html. The 2010 article that you cited explains how to interpret the score. There is an observation instrument linked on that page that we developed, tested, and released that may also be of assistance to you. Please read the associated papers for each instrument to understand how to use them. The observation tool also has a User Guide that's linked on the Assessments page. We also developed and published a parallel form of the TIA to be used with experienced teachers that uses a set of interview questions rather than written lesson plans, since inservice teachers' lesson plans usually don't include enough detail to analyze their TPACK. None of the instruments were tested with school librarians, though.

Since the lesson-plan-based TIA was tested and validated using preservice teachers' lesson plans, it is only reliable and valid when used in other studies to examine preservice teachers' written lesson plans, and only if the wording is not changed. As long as you cite our work in your research, we're OK with you changing the wording of the instrument. However, if you change the wording or the use of the instrument (e.g., the sample members being librarians, rather than preservice teachers), the reliability and validity results that are in the paper about the TIA cannot be claimed in your research without doing your own instrument reliability and validity tests with the revised instrument and different sample members.

Hope that helps. Best of luck with your research!

-Judi

Judi Harris, Ph.D. (she, her, hers)  
Professor and Pavey Family Chair in Educational Technology
Hi Dr. Harris,

I am a PhD in instructional technology candidate at Northern Illinois University and I am working on my dissertation. The purposes of my study are to examine the self-efficacy beliefs of school librarians about integrating technology during inquiry-based learning and explore how these practices are being implemented in library programs.

I would like to use the rubric that you created with Dr. Grandgenett and Dr. Hofer in 2010 in my study. I believe it would be very helpful in my study. Would I be able to have permission to use it in my study? Also, am I able to modify the items to include the term "inquiry-based learning" for the items on the rubric?

The rubric that I am requesting to use can be found in this study:


Thank you for your consideration.

Regards,

Joseph Babb
APPENDIX H

PERMISSION TO USE STUDY FOR QUANTITATIVE SURVEY
Joseph,
You have permission to use the survey instrument you cite above and can modify items as needed for the purposes of your research. Good luck with your work!

Peg Ertmer

Peggy A Ertmer
Professor Emerita
Purdue University

Hi Dr. Ertmer,

I am a PhD in instructional technology candidate at Northern Illinois University and I am working on my dissertation. The purposes of my study are to examine the self-efficacy beliefs of school librarians about integrating technology during inquiry-based learning and explore how these practices are being implemented in library programs.

I would like to use the survey instrument that you developed with Dr. Wang and Dr. Newby in 2004 in my study. I believe it would be very helpful in my study. Would I be able to have permission to use it in my study? Also, am I able to modify the items to include the constructs that I am measuring in my study?

The instrument that I am requesting to use can be found in this study:


Thank you for your consideration.

Regards,

Joseph Babb