THE IMPACT ON SCHOOL LIBRARIES OF GOING 1:1

by

Elizabeth E. Hoskins

An Abstract
of a thesis submitted in partial fulfillment
of the requirements
for the degree of
Educational Specialist
in the Department of Educational Leadership and Human Development
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With the advent of new technology, educators are changing the way they use technology devices in the classroom. An increasing number of school districts are implementing 1:1 initiatives in which each student has a technology device at his or her disposal. In order to discover how school libraries have been impacted, a survey was sent out to school librarians in schools with 1:1 initiatives in place. The survey asked questions to determine the impact seen thus far, how school demographics fit in, and how school libraries have evolved in response to the implementation of 1:1 computing. The results of the survey showed half of responding librarians experienced a reduction in library usage, some reported continued collaborative efforts with faculty, and others reported the need to be innovative in order to retain relevance.
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CHAPTER 1
INTRODUCTION

Education, as a field, is in a state of constant evolution. Increased understandings of the way people learn, changing ideas of how to deliver information, and government legislation have been decisive factors in this evolutionary process (Woolls 1-10). Throughout these changes, the school library has also evolved to meet the ever-changing needs of students. “To meet the needs of students, teachers, and curriculum as defined by the school community … the library media specialist should build from both the perspective of the past and from a vision of the future” (Woolls 11).

One of the largest influences on change in the library has been technology. The school librarian has moved, over the last 100 years, from being primarily focused on collecting books to being a hub for technology within the school. As technology is integrated more deeply within the community and the curriculum, it is necessary for the school librarian to be not only reactive, but also proactive, as they strive to meet the needs of the school and create an environment conducive to learning. One of the current technology trends that school librarians are currently working to integrate is one-to-one (1:1) computing.

One-to-one environments are those schools in which each student is provided with a technology device to be used in, and sometimes out of, school to enhance learning. Some 1:1 environments allow students to use their own device (rather than providing one). These environments are known as Bring Your Own Device (BYOD). School administrators have several reasons for implementing 1:1 initiatives, but one of the primary reasons for doing so is to improve upon students' 21st-century skills (Prettyman, Ward, Jauk, and Awad 6-7).
As with any major change to the school environment, 1:1 computing has already made visible impact. The outcomes following 1:1 implementation vary from one school to the next, but they have included improvements in test scores, behavior, attendance, and student engagement. Changes in the instructional approaches being utilized in the classroom have also been observed. In addition to an increased focus on 21st-century skills, teachers have reported shifting to more student-centered, rather than lecture-based, approaches to teaching (Dunleavy, Dextert, and Heinecke 441).

The outcomes of the shift to 1:1 computing are not limited to the classroom. School librarians have also seen some changes in the way the library is utilized. School librarians have reported reduced student/faculty use of the physical space of the library and increased demand for eBooks (LaGarde n. pag.; Foote n. pag.). In addition to this, some school librarians have also reported opportunities to become leaders in the technology initiatives being implemented in their schools (Cohen 16).

Historically, school libraries have evolved to meet the changing needs of the school community. Just as school libraries have evolved in the past, they must continue to evolve as 1:1 environments become more prevalent. If librarians are to use the perspective of the past to build their vision for the future, it is necessary to take an in-depth look at how 1:1 initiatives have impacted school libraries.

**Statement of the Problem**

School librarians have been charged by the American Association of School Librarians (AASL) with the tasks of ensuring that their students become skilled users of information in all formats and being leaders in the evolution of 21st-century skills (Empowering Learners 11, 17). This emphasis on digital literacy and 21st-century skills
continues to grow as technology devices are put into more and more student hands.

Though some research has been conducted on how 1:1 computing has impacted school libraries and school librarians, it has not been extensive. In order for school librarians to remain relevant and prepared as effective leaders and instructional partners, it is necessary to research the impact observed in libraries thus far.

Purpose of the Study

The purpose of this research project was to examine how the implementation of 1:1 initiatives has impacted school library programs and how libraries have evolved in response. The review of literature explores how 1:1 programs have been implemented in schools, the impact 1:1 initiatives have had in schools to date, and how school libraries can adapt and change to find their place in 1:1 environments. The research component of this study used data from school librarians currently working in schools with 1:1 initiatives. These data were analyzed to determine the impact 1:1 computing has had on school libraries, if variable aspects of the school environment correlate to the observed impact, and how school libraries have evolved as a result of 1:1 implementation. This information has also been discussed as it relates to future implications for the evolution of school libraries. Just as school libraries have evolved in the past, they must continue to evolve in order to remain relevant and to meet the changing needs of school communities with 1:1 initiatives.

Research Questions

In addition to a review of existing literature, school librarians currently working in schools with 1:1 initiatives were invited to take a survey about the impact
implementation of these programs has had on their school libraries. The questions in the survey focused on answering three main research questions:

1. What impact has the shift to 1:1 environments had on school library programs?

2. Does grade level, location, or socioeconomic status of a school, or the type of device employed make a difference in the impact 1:1 computing has on the school library?

3. How have school libraries evolved in response to a change to 1:1 computing?

Limitations of the Study

The review of literature in this research project included a limitation in the number of research studies available on the impact of 1:1 initiatives on school libraries to date. In order to combat this limitation, the research was supplemented with articles in reputable library publications, with articles/blogs by reputable school librarians, and with articles explaining the impact of 1:1 initiatives on the school at-large.

The research component of this study asked librarians working in 1:1 environments to respond to survey questions about the impact going 1:1 has had on their libraries. Though responding librarians may have used empirical data (circulation numbers, headcounts, and other records) to choose their responses, they may have also used observation and opinion. This limitation of the study means that the results may not be generalized as reliably as purely quantitative data may be.

A second limitation of the research is the composition of the sample. The open invitation to school librarians to participate in the survey yielded unpredictable
demographics from the participating schools. This made it difficult to determine if the demographic variables are statistically significant factors in the impact 1:1 initiatives have on school libraries. Future research is needed in order to gain more in-depth perspective on those variables.

The third limitation to the study is the phrasing of the survey questions. The survey questions allowed for respondents to indicate reductions they saw in services, but did not have questions specifically phrased to indicate observed increases in these same services. Though the survey included no questions about increases in the use of specific library services, an open-ended question invited respondents to share improvements they had observed since the implementation of 1:1 initiatives in their schools.

Finally, many factors involved in a school community could impact the school library. Change in library staff, administration, faculty, and curriculum are just a few of the potential variables that could be considered. Changes in the use of the school library and library services could potentially be attributed to one of these factors rather than the implementation of a 1:1 initiative. Because data were collected anonymously in this project, follow-up with school librarians whose schools appear as outliers in the data was not possible as a strategy to supply additional information. Future researchers may collect identifying information in order to allow for follow-up interviews.

**Definition of Terms**

1:1 environment: School environment that provides each student with a technology device to be used for the purpose of meeting specific learning and teaching goals (Corn, Tagsold, and Argueta 217).
21\textsuperscript{st}-century skills: Skills or competencies that students need in order to be successful in modern life and work environments (American Association of School Librarians, \textit{Standards} 9).

BYOD (bring your own device) environment: School environment in which students may bring their own technology device to school to be used for educational purposes.

Learning commons: A learning space that is both physical and virtual, designed to improve student engagement in research, practice, and group work through exploration experimentation, and collaboration (Loertscher and Koechlin, “Virtual Learning Commons” 20.)

Socioeconomic status (SES): For the purpose of this study, SES is the status of the school in relation to the economic and social standings of the enrolled students. Specifically, this will be determined by the percent of students receiving free/reduced lunch.

Technology device: For the purpose of this study, technology devices are electronic tools such as iPads, laptops, tablets, Chromebooks, or smartphones.

\textbf{Research Design}

The literature review of this study focused on previously published information on how 1:1 programs have been implemented in schools to date, what kind of impact the 1:1 movement has had in schools already, and how school libraries adapt and change to find their place in 1:1 environments.

Articles were retrieved via \textit{Academic Search Complete}, \textit{Academic Search Elite}, \textit{Academic Search Premier}, \textit{Business Source Premier}, \textit{Education Research Complete}, \textit{ERIC}, \textit{Knowledge Quest}, \textit{Library Literature and Information Science Full Text} (H.W.)
Wilson), and MasterFILE Premier. Search terms included “1:1 computing,” “1:1 initiatives AND education,” “1:1 initiatives” AND “school libraries,” “one-to-one,” “learning commons,” “bring your own device,” “BYOD,” and “21st-century skills.”

Additional electronic resources were retrieved from the American Association of School Librarians, the International Society for Technology in Education (ISTE), School Library Journal online, and Jennifer LaGarde’s website. Lastly, print resources from the American Association of School Librarians and Libraries Unlimited were used to supplement the electronic resources.

The research component of this study examined the reductions and increases in use of school library resources and programs following the implementation of 1:1 computing. School librarians working in schools with 1:1 initiatives at the time of the survey were invited to participate in an anonymous survey. The invitation was sent via LM_NET, Twitter, and email communication. The survey data were then analyzed to determine the impact 1:1 initiatives have had in participating school libraries and to look for emerging trends in the resulting evolution of school library programs.

Conclusion

Just as school libraries have evolved in the past, they must continue to evolve in order to remain relevant and to meet the changing needs of school communities with 1:1 initiatives. This study includes five chapters related to the impact 1:1 computing has had on schools and school libraries to date and how school libraries continue to evolve to meet the ever-changing needs of their school communities. Chapter two is a review of the literature. Chapter three explains the methodology of the research component of this study. Chapter four will discuss the results of the research survey as they relate to
the research questions. Lastly, chapter five will include a discussion of the conclusions and recommendations based on the literature review and research.
Over the last several years, some school districts have begun to make a move toward providing each student with his or her own technology device for educational purposes. These 1:1 environments provide students with either a laptop or tablet, such as an iPad, to be used in, and sometimes out of, school to enhance learning. The research in this review presents a look at how the move toward 1:1 technology in schools has changed the school environment. Specifically, this paper will present three different aspects of this shift in education including: how 1:1 programs have been implemented in schools as of 2014, what kind of impact the 1:1 movement has had in schools, and how school librarians adapt and change the library in order to find their place in 1:1 environments. The research included shows that the school library continues to evolve as 1:1 environments become more prevalent.

Understanding 1:1 Environments

Basic details about 1:1 environments are helpful when examining the impact of implementing 1:1 computing on the school library. Some of these details include defining exactly what a 1:1 environment is, understanding the types of 1:1 initiatives that have been implemented, and determining the motivation behind moving to a 1:1 environment.

School environments that provide each student with a technology device for learning (typically a laptop or tablet) are considered to be 1:1 environments. Corn, Tagsold, and Argueta provide a more comprehensive definition of 1:1 when they explain that these devices are used “to meet specific teaching and learning goals [...] such as increasing equity of access to technology, transforming quality of instruction, increasing
student engagement, improving academic achievement and technology literacy, increasing economic competitiveness and enhancing home-school connections” (217). Though, in order to be considered 1:1, a school must provide each student with a technology device, the rest of the program may vary from school to school. Factors that differ from one location to the next include funding, device type, software, training, and professional development (Bebell and O’Dwyer 6). Bebell and O’Dwyer point out that providing each student with ongoing access to technology does not dictate educational practices (6). This array of factors, and approaches to teaching, means that no two schools using 1:1 computing will appear the same.

Over the years that 1:1 computing has become popular, several different types of devices have been employed. School Library Journal conducted a survey in early 2013, inviting librarians to answer questions about technology and librarian roles with technology in their schools. Over 750 librarians responded. Though this is a small fraction of all the school librarians in the United States, it provides some insight into the types of technology being used in schools. Through the survey it was found that laptops are still the most prevalently used device, but that tablets are gaining ground (4). Richardson et al. expand on the device types involved in 1:1 computing by including netbooks and even smartphones (5). Smartphones are often found in bring your own device (BYOD) initiatives. Some argue that BYOD initiatives should not be considered 1:1 environments (Richardson, et al. 5). Even though school communities using this approach may not fit into a succinct definition of 1:1, they still have an impact on both the classroom and the library, as a large majority of the students have access to technology in their backpacks. As access to technology outside of the library increases,
it will continue to be important for librarians to make evolutionary changes in the library in order to meet the shifting needs of students.

School district officials have had a variety of reasons for embarking on the foray into 1:1. One of the primary motivating reasons has been to increase student achievement and performance (Holcomb 49). In addition to this basic reason, more intricate thought processes exist in school administrators’ decisions to make a change in their computing environments. Great Lakes Middle School (GLS) cites the need to provide students with 21st-century skills (Prettyman, Ward, Jauk, and Awad 6-7).

According to Prettyman et al., a change in the knowledge and skills needed in order to thrive in the 21st-century workplace has occurred, specifically saying “these shifts have resulted in the need for the development of expert thinking and complex communication… the ability to think and act creatively..., and the tolerance for ambiguity” (7). Richardson et al. also cite reasons including increasing equity among students, enhancing competitiveness, and transforming the learning process (5). No matter what the original intent of going 1:1, a variety of outcomes in schools in general, and in school libraries, after making the move to a 1:1 environment have emerged.

Impact of Going 1:1

The outcomes of going 1:1 vary from one initiative to the next. This is due in part to the aforementioned factors that shape 1:1 programs, such as device type, software, and professional development offered. Additionally, a bevy of classroom achievement outcomes, behavioral changes, and pedagogical changes in classrooms have been observed. Even though the vast majority of the literature focuses on how going 1:1 has
changed these particular outcomes, a discussion about how going 1:1 impacts the school library and school librarians has also begun.

One of the primary outcomes of 1:1 is in the area of student achievement. This outcome is one of the primary purposes for making the shift to 1:1 computing. In 2006 Gulek and Demirtas conducted a study of the laptop immersion program at Harvest Park Middle School. Their goal was to determine what kind of impact the use of laptops had on student GPA, course grades, writing skills, and standardized test scores (Gulek and Demirtas 7). The results of this study compared students who participated in the school’s laptop immersion program to students in the same school who did not participate; both groups exhibited similar academic performance prior to the use of laptops. The outcomes of the study showed that students using the laptops had higher GPAs, higher end-of-course grades, higher quality writing, and improved test scores (Gulek and Demirtas 13-29). This is not the only study that shows this kind of academic improvement by students in a 1:1 environment. Holcomb cites a 2006 Metiri Group report that found students in 1:1 programs show increased scores in writing and mathematics, as well as increased overall grade-point averages (50). This same study reported that students saw the biggest improvement in their writing, including improved scores on standardized tests (Holcomb 50). Dunleavy and Heinecke conducted a study that revealed increased science post-test scores by students using laptops as part of instruction as compared to a control group that did not use the laptops (13). The outcomes of these studies support the hypothesis that students who have ongoing access to technology will have improved learning outcomes as compared to students without the same access.
Academic and instructional outcomes are not the only benefits that have been found in schools that have implemented 1:1 programs. Spektor-Levy and Granot-Gilat included several criteria in their 2012 study of how going 1:1 impacted students in two middle schools. In their study, these authors had both the intervention (with device) and the control group (without device) complete the same assignment and were scored against a detailed rubric. The students in the intervention group not only scored higher on the assignment, they also showed significant differences in several criteria, such as following instructions, organizing information, and processing and linking digital content and media (90). In another example, educators in Maine implemented a statewide 1:1 program and saw a 7.7% increase in attendance and reduced behavior referrals (Holcomb 49). Rosen and Beck-Hill studied fourth and fifth grade students in a Texas elementary school. Their study showed similar results with a 29.2% reduction in unexcused absences and a 62.5% decrease in disciplinary issues (Rosen and Beck-Hill 234).

Other outcomes are less measurable, but still evident, in the studies that have been conducted in 1:1 environments. In their 2007 research, Dunleavey, Dextert, and Heinecke found an increase in student engagement. This engagement was seen through student reflection on their own work and through the use of software that allowed students to learn at their own pace (450). An increase in student engagement can also aid in explaining the improved grades, increased attendance, and improved behavior. When students are more engaged in the learning process, they are more apt to do well in school overall.
Another outcome discussed by Spektor-Levy and Granot-Gilat is increased media and information literacy. These authors found that students in their study were better equipped to locate and select information, evaluate reliability and credibility of information, and produce higher quality products using computerized tools (93). This outcome supports reasoning that 1:1 computing can help achieve the goal of instilling 21st-century skills in students.

Students are not the only ones seeing changes as a result of 1:1 initiatives. Analysis of these programs shows that teachers also exhibit changes in their instructional techniques (Holcomb 51). The improved access to extended resources has made it possible for them to use more innovative techniques in their teaching. Prettyman et al. found that teachers are more frequently employing project-based learning (PBL) in classrooms with 1:1 technology (10). English and Kitsantas explain project-based learning as a teaching method in which students use an extended inquiry process to examine authentic problems (130). This type of learning also coincides with the concept of striving to improve the 21st-century skills of students by encouraging communication, collaboration, and problem solving (Prettyman et al. 10).

The International Society for Technology in Education, an organization dedicated to helping educators develop connected learners, supports the concept of evolving 21st-century skills with their standards for teachers and students. These standards require that educators promote and model work, learning, and citizenship through digital age learning experiences and assessments (International Society for Technology in Education, n. pag.). The evolution of 1:1 environments makes it possible for teachers to meet these expectations on an ongoing basis.
Another instructional change that has occurred in some of these programs is a shift from lecture-based to student-centered lessons. Teachers have reported that they find themselves spending less time speaking in front of the class and more time “facilitating or guiding students in the learning process” (Dunleavy, Dextert, and Heinecke 441). The use of technology has also allowed teachers to make their instruction more individualized, leading to improved student self-efficacy, especially among students with special needs (Corn, Tagsold, and Argueta 222). Rosen and Beck-Hill also noted a difference in the instructional techniques of teachers in their experimental 1:1 group versus their control group. Specifically, they observed teachers making more frequent adjustments to their lessons to account for student progress and interests in the experimental group as well as an increase in independent learning time (Rosen and Beck-Hill 235). The research demonstrates that the growing prevalence of technology is causing change throughout the educational environment.

Lastly, students in 1:1 environments have access to the most current information (Dunleavey, Dextert, and Heinecke 441). Static information (print resources) is still relevant and adequate in some instances. However, in the digital age, information changes quickly and students who have access to current information are at an advantage over those who do not. Because libraries have long been a source of information in print for students, this kind of change in student access means that student use of the library is rapidly changing. As students have fewer “traditional” needs for the library, librarians will have to implement change in the library just as rapidly in order to remain relevant.
Impact on School Libraries of Going 1:1

Student access to current information is not the only aspect of 1:1 environments that impacts school libraries. As more and more technology is infused into student life, it becomes necessary for librarians to consider where they fit in this picture. Librarian Jennifer LaGarde surveyed librarians in 1:1 and BYOD environments in order to find out what kind of impact the shift to 1:1 had on the library. She found that most librarians reported that the impact on their library was significant; she also reported that the impact for most libraries was positive, though issues were evident (n. pag.). For example, LaGarde found that librarians have seen a significant drop in the number of students/classes coming into the library (n. pag.). Where students previously had to come to the library in order to do research, they now have access to information in their hands on an ongoing basis. Ray points out that this access redefines how students learn and thereby causes not just incremental, but disruptive, change to libraries (n. pag.). However, Dunleavy and Heinecke, in describing their study of one middle school, explained that part of the 1:1 environment included the library’s provision of online resources via the Web (11). This is a support service that may have been previously included in the school computer lab, but has now been extended to ensure access and support to additional devices.

The School Library Journal’s “School Technology Survey” also revealed another change for librarians in 1:1 environments: finding ways to get students and teachers into the library. One respondent noted that she found that teachers have become unwilling to leave their classrooms (10). Cohen found, when her school began their 1:1 initiative, that she was able to keep students and teachers in the library by becoming an expert on which apps worked best for different types of educational purposes. She shared these
apps with her peers, created sessions to teach students how to use library resources with their iPads, and developed a 21st-century skills course in which each student was required to participate (Cohen 16).

Another change, noted by Foote, has been the increased demand for eBooks, especially in 1:1 environments with iPads or other tablets (n. pag.). For Foote, this meant that she had to seek additional training in order to meet student needs. These challenges and new services require that librarians seek new knowledge, as Foote and Cohen did, and find new and innovative ways to meet the school community’s needs.

As with any change, more than one side of the story exists. Even though there are several positive results of going 1:1, the results are not always promising. In Donovan, Green, and Hartley’s study, students reported that they did not see their school-issued laptops as an enhancement to learning (438). The authors attributed this attitude to the lack of opportunities for learning with technology provided by the teachers in this scenario and hypothesized that outcomes may have been different given higher expectations by teachers (Donovan, Green, and Hartley 438). Harris highlights the Los Angeles Unified School District’s iPad rollout by pointing out that they went over budget, student hackers compromised their security, and they were overall not prepared to use the devices effectively (n. pag.). Holcomb also points out that the way in which 1:1 computing is implemented can make a difference in the outcomes, saying that teacher training and support is critical to successful implementation (53). The combination of successes and failures has provided educators with a learning platform from which to launch future programs.
Future Implications for Libraries in 1:1 Environments

The studies on how moving to a 1:1 program impacts the library and school librarians are limited at this time. However, looking at what has been discussed and the history of how technology has changed the library over time, it can be seen that the library will continue to evolve in order to meet the ever-changing needs of students and staff. This evolution will include changes in collaborative efforts with teachers, library lesson plans, and physical and virtual offerings of the library. In addition to the changes to the library itself, librarians will have the opportunity to take on leadership roles in the shift to 1:1 computing.

Librarians can be an essential part of the shift to a 1:1 environment. As previously mentioned, a greater focus on instilling students with 21st-century skills now exits. This aligns directly with the goals of the American Association of School Librarians. The American Association of School Librarians has published standards for the 21st-century learner that guide librarians as they shape their learning programs. This document places a heavy emphasis on information literacy and marries it to digital, visual, textual, and technological literacy (Standards 2). With the focus librarians have on promoting these standards, they are already poised to assist students and other educators in 1:1 environments as they pursue 21st-century skills. Ray points out that librarians can be a critical component by shifting their mindset from one of provision of resources to provision of services. This can include things such as “training, support, collaboration, and leadership” (Ray n.pag.). He points out that librarians may need to make a change to focus on teaching more about digital citizenship and literacy, seeking
out digital content to meet student needs, and thinking beyond the walls and typical hours of the library (Ray n. pag.).

Lawrence also supports a shift in librarians’ focus to look beyond traditional services. At the time that her district began to discuss 1:1 computing, she began to work on changing the district perception of the school library program (65). Lawrence did this by increasing the library’s web presence, using flexible scheduling of library resources, and creating a “menu” of instructional services that could be used in the library or in the classroom. Lawrence used the shift to 1:1 computing in her district as a springboard to support the multiple literacies of 21st-century skills through new programming and outreach.

Digital literacy is something that many students already possess. Students, having grown up surrounded by technology, often seem to be naturals when it comes to computers, tablets, phones, and other devices. However, misconceptions about how much students really know exist in both the minds of educators and the minds of the students themselves (Williams 9). Though Williams wrote about the role that public libraries can play in increasing digital literacy for teens, much of what she says is applicable to school libraries as well (9-11). School librarians can collaborate with classroom teachers to create engaging programs that familiarize students with the technology tools they need in order to be successful. In 1:1 environments this may include helping students learn how to use a word processor, take notes effectively on their device, use Web 2.0 tools, and other strategies for using their laptop or tablet to their academic advantage.
The American Association of School Librarians has taken strides to support librarians in their endeavor to promote these 21st-century skills by providing resources related to their published standards. One such resource is the American Association of School Librarians Best Websites list. This list provides educators with several resources that promote creativity, collaboration, participation, and advancement (Jacobs-Israel and Moorefield-Lang 16). By 2013 there were 125 websites included in the list. In addition to this list, the American Association of School Librarians has also responded to the increasing number of handheld devices being used in schools by adding a Best Apps list that features software applications (apps) and tools for iOS and Android devices.

Jacobs-Israel and Moorefield-Lang stress the importance for educators to have a plan for how they will transform their teaching. In addition to the Best Websites and Best Apps list, they suggest the use of Ruben Puentedura’s Substitution Augmentation Modification Redefinition (SAMR) Model (16-17). The SAMR Model allows educators to determine if the digital tool they choose will enhance (SA) or transform (MR) their lessons. At the substitution level a digital tool may be used to replace a paper and pencil tool without making improvements to the lesson. For example, using an iPad to take class notes instead of writing them out would be considered substitution. Augmentation is the next level in which the tool is intended to lead to improvements. This may include using tools such as Edmodo where student assignments can be posted and turned in online. This allows for improvements such as access to information, paperless work, and prompt feedback for student work. Modification and redefinition are considered to be transformational because the use of technology makes
a more significant change to the lesson or classroom. Modification uses technology to redesign a task. An example of modification may include using software to create a slideshow to accompany a student report or presentation. Lastly, redefinition is the final level where technology tools are used to create new tasks and ideas. Redefinition includes projects that would not be possible without the technology. Jacobs-Israel and Moorefield-Lang share the example of using augmented reality at this level (17). Augmented reality applications make it possible to superimpose computer-generated images on the user’s view of the real world (Tutunea 216). Applications such as Layar and DAQRI allow for the integration of websites, audio, video, and more into student presentations. The combination of the American Association of School Librarians “Best” lists and the SAMR model provides educators with scaffolding to support the implementation of 21st-century skills in 1:1 environments.

While the use of tools such as these and offering collaborative opportunities to faculty are a place to start, the evolution of the library will likely need to be much more dramatic in order to remain relevant and continue to meet student and staff needs. The school librarian can implement many different changes in order to accommodate these needs. In the past, librarians have often been the keepers of books and then the gateway to technology. Providing each student with their own technological device reduces their need to visit the physical library for these items. Bossaller and Adkins point out that librarians are relying more and more on online resources, especially when it comes to filling out the reference collection (153). In a 1:1 environment, the focus is on bringing resources to students where they are. This may include providing virtual reference services, 24/7 access to databases and other resources, and teaching
students how to use these resources. These services are part of what Loertcher and Koechlin consider being the Virtual Learning Commons ("Virtual Learning Commons" 20). Because the needs of the school community reach beyond the library and school walls, it is necessary for librarians to create a virtual space where staff and students find resources.

The invention of new ways to transmit information has always made it necessary for libraries to evolve. Educating students to be successful in the 21st-century included adding computer labs, Smartboards, and other changes to the library space. As 1:1 computing is included in more school districts, libraries will evolve once again. Loertscher and Koechlin have written about the Learning Commons concept since 2008, following a conference where it was announced that with the advent of new technology school librarians would soon no longer be needed ("Climbing" E2). The learning commons concept addresses the need for the librarians to make a shift from the “traditional” format to a new space that allows students to “maximize learning and learn how to learn in school” (Koechlin, Luhtala, and Loertscher 21). In a 1:1 computing environment, the librarian guides students as they learn. In addition to this, Loertscher and Koechlin also identified the learning commons as a place to experiment, play, think, make, collaborate, and grow ("Climbing" E3). They explain, “Although the learning commons will look and feel different in every school, it must be the center of inquiry, digital citizenship, project-based learning, collaborative intelligence, advanced literacy, as well as the center of creating, performing, and sharing” ("Climbing" E4). Shannon Robinson found that making a change from the traditional library format to an updated learning commons made a significant difference in the use of the library space in her
high school where neither students nor staff had been utilizing the library (32). She attributes this more to the philosophical change than to the physical change and plans to continue to update both the physical and virtual spaces in ways that will help the student population thrive as independent creators and learners. The evolution from a traditional library to a modern learning commons could be the solution that keeps the library relevant in the move to 1:1 computing. As seen in the research, 1:1 environments emphasize many of the same concepts found in the learning commons. These include digital citizenship and project-based learning.

Librarians have an opportunity to make the change to 1:1 environments a leadership opportunity. American Association of School Librarians’ *Empowering Learners: Guidelines for School Library Media Programs* calls for librarians to be leaders in their schools. The American Association of School Librarians suggests this may come in the form of leading their school through the digital revolution, joining committees such as technology committees, providing professional development opportunities to faculty and staff, and building strong relationships throughout the school community (*Empowering Learners* 45-48).

The digital revolution brought on by 1:1 environments includes the possibility of converting to eTextbooks. Mardis and Everhart see the shift to digital textbooks as an opportunity for librarians to extend their leadership role by being actively involved in the selection and implementation of texts (8). Working with faculty and administration in this process allows the librarian to become intimately involved with the selection of the base resources for the school. In some instances this will mean working at the district level rather than at the school level. In addition to assisting with textbook selection,
Mardis and Everhart suggest that the shift to digital textbooks can also be the impetus for curating digital content for classroom use and cataloging digital items in the online public access catalog (10). This process will encourage classroom use of the library’s virtual space, familiarize the librarian with the school curriculum, and provide additional opportunities for collaboration.

Working in a school that utilizes BYOD in their 1:1 initiative provides librarians with multiple opportunities to help lead the charge. John Crook believes that librarians can propel BYOD environments. His suggestions include enabling BYOD access to the library by making online resources readily available in and out of school walls, developing an information sharing culture, promoting digital literacy, and assisting in the development of the school’s BYOD policy (23-24). Elizabeth Marcoux also emphasizes the importance of librarians finding ways to facilitate the expansion of BYOD in their schools. An issue that is found primarily in BYOD environments is the need for cross-platform functionality of digital resources. Marcoux suggests that librarians (in BYOD schools) focus on finding tools that have cross-platform functionality since BYOD environments will be using both iOS and Android platforms (65). Marcoux asserts that librarians can also take the lead in providing workshops that help students and teachers better understand how to be effective learners and users of the BYOD environment (65). Though these suggestions are targeted to librarians in BYOD environments, it is possible to apply them to schools that provide devices as well.

The research indicates that librarians are already taking steps to lead their school communities through the shift to 1:1 computing and inclusion of technology in general. Abilock, Harada, and Fontichiaro explore the role of the librarian in delivering
technology-related professional development. They conclude, “Digital resources, laptop carts, 1:1 initiatives, and assignment to multiple buildings have fundamentally shifted how librarians function in schools and districts. Professional development ... is a powerful way for librarians to leverage their expertise, perspectives, and skills” (13).

One-to-one and other technology initiatives provide clear opportunities for librarians to offer their leadership to the school community. By using their knowledge and following the expectations that are already in place for their profession, librarians can take strides to bring the school community up to date with 21st-century skills. Mabry explains how Henrico County (Virginia) uses the librarian role to lead teachers through a program designed to bring 21st-century skills to the classroom (68). In this scenario the librarian joined with a leadership group and helped facilitate a school-wide program that encouraged teachers to write new lesson plans that focused on 21st-century skills.

Librarians can also reach out to their school and district community through initiatives that extend beyond professional development. Norton suggests that librarians can make an impact both in and out of the library by participating in the writing of a strategic plan for the implementation of technology. By being a part of the committee that plans for technology, Norton believes “School librarians can influence the integration of technology in a meaningful way- and advocate for the school library program…” (66). Being involved in the technology in this way gives librarians an opportunity to ensure that the library program can reflect what is happening with technology in the school and district. This also allows them to become an advocate for
their programs, showing school and district administrators how the library can contribute to and propel technology plans.

**Conclusions**

Technology keeps schools in a state of constant change. As 1:1 computing becomes more prevalent, it becomes easier to understand what the impacts of this change look like. Even with this understanding, it is clear that a variety of factors, including device type, implementation, program goals, and faculty preparedness, play into the outcomes that result from this change. Already school personnel have seen improvement in student grades, test scores, and 21st-century skills. These, and less measurable outcomes such as student engagement and improved behavior, show that a change to 1:1 computing can make a big impact on school environments. Changes in instruction are also emerging as teachers become more comfortable with having technology in every student’s hand. Lectures are becoming less the norm in 1:1 schools as project-based learning and other innovative instruction styles take hold.

Though the research on how 1:1 environments impact school libraries is somewhat limited, the studies that have been conducted to date show an increasing need for virtual library presence, access to e-books, and new library programs to keep faculty and students coming to the library. The natural evolution to coincide with technology has libraries largely prepared to keep stride with the change to 1:1 computing. Specifically, 1:1 environments fit well with the vision Loertscher and Koechlin have for the learning commons; together, the two concepts can aid in preparing students as 21st-century learners. The American Association of School
Librarians has already set the expectations that librarians be technology leaders through both *Empowering Learners* and *Standards for the 21st-Century Learners*.

Librarians have an emerging opportunity to embrace change and become leaders in the digital revolution and the shift to 1:1 computing in schools.
CHAPTER 3
METHODOLOGY

Overview

The review of literature has shown that 1:1 initiatives have an impact on school libraries. The purpose of this study was to examine how the implementation of 1:1 initiatives has impacted school library programs and how libraries have evolved in response. This study examined the reductions and increases in use of school library resources and programs following the implementation of 1:1 computing. The data collected were also analyzed in order to determine if factors such as socioeconomic status and device type have any effect on the perceived impact of 1:1 computing on the school library. Additionally, this study examined the changes librarians have made in their school libraries in response to the implementation of 1:1 computing in their schools. The research questions include the following: What impact has the shift to 1:1 environments had on school library programs? Does grade level, location, socioeconomic status of a school, or the type of device employed make a difference in the impact 1:1 computing has on the school library? And, how have school libraries evolved in response to a change to 1:1 computing?

Participants

The sample used for this study came from school librarians employed in elementary and secondary schools with 1:1 computing programs. School librarians were invited to participate in the 1:1 School Library Survey through the LM_NET listserv, Twitter (with the hashtags #tlchat, #libchat, and #edchat), and email. Email invitations were sent to each state school library association president and included a request that the 1:1 School Library Survey be sent to their members. Participation in
the survey was voluntary and there was not any recompense for participation. Surveys were submitted anonymously, though school names were collected in order to ensure that each school was represented only once in the results. Participants were allowed to voluntarily include their email address if they wanted to receive information about the survey results. A total of 140 librarians responded to the survey.

**Material and Design**

This study was designed to produce qualitative and quantitative data on the impact of the implementation of 1:1 computing on school libraries. Google Forms was used to administer the survey. The survey link was included in LM_NET posts, Twitter posts, and email messages. The survey responses were populated in a Google spreadsheet automatically following each respondent’s survey submission.

**Procedure**

**Data Collection**

The 1:1 School Library Survey was sent out to school librarians through LM_NET, Twitter, and email October 6, 2014. Reminders about the survey were sent out once a week on LM_Net and daily on Twitter until the survey closed. The survey remained available until October 24, 2014. School librarians were provided with a link that directed them to the survey via Google Forms. Librarians responded to the survey and their answers were automatically recorded in a Google spreadsheet. Data collected included demographic information, descriptions of each school’s 1:1 program, librarian perceptions on the impact 1:1 initiatives have had on their library, and narrative feedback on programs or services they have implemented in response to 1:1 computing.
Data Analysis

The researcher analyzed the information recorded in the Google spreadsheet. First, descriptive statistics were recorded in order to determine the demographics of the represented schools. The demographics recorded included school location (state) and socioeconomic status (determined by percent of free and reduced lunch). Schools were categorized into regions based on the United States Census region map (see fig. 1). Regions include Northeast, South, Midwest, West, and Pacific.

Figure 1. United States Census Regions

Socioeconomic status was divided into three categories: low, average, and high. For the purpose of this study, schools with 70% or higher free and reduced lunch (FRL) were included in the low-SES category, schools with 20% or lower FRL were included in
the high-SES category, and all remaining schools were included in the average-SES category.

The survey results were then analyzed to determine what percent of responding 1:1 school librarians perceived a difference (reduction or increase) in the utilization of the library/library services, what specific areas were impacted, and if there is a correlation between the perception of the impact of 1:1 and socioeconomic status, region, grades served, or device type. The Chi Square test was used in order to determine if there was statistical significance in any identified positive correlations. Lastly, the Cramer’s V test was used to determine the strength of association in those variables found to show statistical significance.

Lastly, content analysis was applied to respondents’ narrative feedback to questions regarding changes they have made in their library programs since the implementation of 1:1 computing. The researcher used quasi-statistics to identify patterns and emerging trends in the way school libraries are evolving in response to 1:1 environments.
CHAPTER 4
RESULTS

The purpose of this study was to examine how the implementation of 1:1 initiatives has impacted school library programs. In addition to this, the study examined how school libraries have evolved in response to going 1:1. The following questions were used to guide the research:

1. What impact has the shift to 1:1 environments had on school library programs?
2. Does grade level, location, socioeconomic-status of a school, or the type of device employed make a difference in the impact 1:1 computing has on the school library?
3. How have school libraries evolved in response to a change to 1:1 computing?

School librarians in schools with 1:1 initiatives in place were invited to complete the 1:1 School Library Survey (Appendix B). One hundred forty school librarians completed the survey. Some librarians elected not to answer every question on the survey. This means that some statistics are based on a sample population of less than 140. The number of respondents will be noted in these instances.

Survey Results

Demographics

Grade level served was the first

Figure 2. Grade Levels Represented in Sample

Grade Levels Represented

- High School: 44%
- Middle School: 22%
- K-12: 11%
- Secondary: 16%
- Elementary: 7%
- K-12: 11%

K-12
demographic reported on the survey. Of the 140 librarians who completed the survey
10 work in elementary schools (7%), 30 work in middle schools (22%), 61 work in high
schools (44%), 15 work in K-12 schools (11%), and 22 work in secondary schools containing grades
ranging from 5 to 12 (16%) (see fig. 2).

The second area of demographics considered was the socioeconomic status of the school.
Forty-three survey participants reported high-SES (31%), 53 reported average-SES (38%), 18 reported low-SES
(13%), and 26 responded that they didn’t know the percent of their student population
eligible for free and reduced lunch (18%) (see fig. 3).

The third area of concern was the region in which the schools were located.
These regions were determined based on the United States Census regions as represented in Figure 1.
Twenty-four librarians reported being located in the Northeast (17%), 24 reported being located in the South
(17%), 65 reported being located in the Midwest (47%), 25 reported being located in the West (18%), and 1

Figure 3. Socioeconomic Status of Responding Schools

Figure 4. Region of Responding Librarians
school reported being in the Pacific (1%) (see fig. 4).

The last variable taken into consideration was the type of device being used in each 1:1 program. The survey options included laptops, tablets/iPads, eReaders, and Chromebooks. There was also an option to indicate a different device. Fifty-one school librarians indicated the use of laptops in their program (36%), 54 reported using tablets/iPads (39%), and 29 reported using Chromebooks (21%). Six respondents chose to indicate an alternate device. One of these reported a Bring Your Own Device environment (1%), and 5 reported Multi-Device environments (4%) (see fig. 5). The Multi-Device environments reported a combination of laptops and tablets being used.

**Quantitative Data**

This section provides an overview of the data collected in the 1:1 School Library Survey. These survey results show how the shift to 1:1 has impacted the school library programs of the responding librarians. Tables 1 through 4 represent the recorded responses to the survey questions.

The first research question asked in this study was “What impact has the shift to 1:1 environments had on school library programs?” The selected response portion of
this survey asked librarians questions about changes they saw in their library programs following the implementation of 1:1 initiatives.

Table 1 shows that 50% of respondents reported they felt as though there was not a reduction in the use of the school library following the implementation of the school’s 1:1 program, while 50% did see a reduction. Of those who saw a reduction, 20 said fewer students used the library, 10 said fewer faculty used the library, and 40 said that fewer of both students and faculty used the library.

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Reduction</td>
<td>69</td>
<td>50%</td>
</tr>
<tr>
<td>Yes, fewer students</td>
<td>20</td>
<td>14%</td>
</tr>
<tr>
<td>Yes, fewer faculty</td>
<td>10</td>
<td>7%</td>
</tr>
<tr>
<td>Yes, fewer of both</td>
<td>40</td>
<td>29%</td>
</tr>
</tbody>
</table>

Table 1: Reduction in Library Usage

Respondents were asked to indicate in which areas of the library services they saw a reduction in usage (if they saw reductions at all). Table 2 shows that 50% [N = 70] of those who saw a reduction saw a reduction in circulation, 53% saw a reduction in the use of the computer lab, 27% saw a reduction in collaboration with teachers, 18% saw a reduction in participation in library programs, and 38% saw a reduction in visits to the library by students.
If there were reductions, which of the following areas were impacted?

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percent of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circulation</td>
<td>46</td>
<td>50%</td>
</tr>
<tr>
<td>Computer Lab</td>
<td>49</td>
<td>53%</td>
</tr>
<tr>
<td>Collaboration</td>
<td>25</td>
<td>27%</td>
</tr>
<tr>
<td>Participation in Library Programs</td>
<td>17</td>
<td>18%</td>
</tr>
<tr>
<td>Visits to Library by Students</td>
<td>35</td>
<td>38%</td>
</tr>
</tbody>
</table>

*Table 2: Areas of library impacted*

Those respondents who saw reduction [N=46] in circulation were asked to indicate which areas of the collection were most affected. Table 3 shows that 35% of respondents saw a reduction in fiction circulation, 83% saw a reduction in non-fiction circulation, and 63% saw a reduction in reference circulation.

<table>
<thead>
<tr>
<th>If you saw a reduction in circulation, which areas of the collection were affected more?</th>
<th>Response</th>
<th>Frequency</th>
<th>Percent of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiction</td>
<td>19</td>
<td>35%</td>
<td></td>
</tr>
<tr>
<td>Non-fiction</td>
<td>45</td>
<td>83%</td>
<td></td>
</tr>
<tr>
<td>Reference</td>
<td>34</td>
<td>63%</td>
<td></td>
</tr>
</tbody>
</table>

*Table 3: Areas of circulation impacted*

The final area about which respondents were asked to give specific responses was collaboration with faculty. Table 4 shows that of those respondents who saw a reduction in collaboration [N= 25], 61% saw a reduction in collaboration with English Language Arts faculty, 24% saw a reduction in Math collaboration, 52% saw a reduction in Science collaboration, and 64% saw a reduction in collaboration with Social Studies faculty.
If you saw a reduction in collaboration, which subject areas are you working less with?

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percent of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>English Language Arts</td>
<td>20</td>
<td>61%</td>
</tr>
<tr>
<td>Math</td>
<td>8</td>
<td>24%</td>
</tr>
<tr>
<td>Science</td>
<td>17</td>
<td>52%</td>
</tr>
<tr>
<td>Social Studies</td>
<td>21</td>
<td>64%</td>
</tr>
</tbody>
</table>

Table 4: Areas of collaboration impacted

The second research question looked at by this study was “Does grade level, location, socioeconomic status of a school, or the type of device employed make a difference in the impact 1:1 computing has on the school library?” In order to determine if any of these variables had a relationship with the impact going 1:1 had on school libraries, each variable was measured with a Chi Square Test of Independence against the response to the question “Do you feel as though there was a reduction in library usage following the implementation of the 1:1 program?” Variables showing a relationship in the Chi Square Test of Independence were then tested with Cramer’s V test in order to determine the strength of this relationship. Tables 5-8 (see Appendix C) show the detailed results of these tests.

For each Chi Square test there was a null hypothesis ($H_0$) that there was no relationship between the variables and an alternate hypothesis ($H_a$) that there was a relationship between the variables. The alpha level for each variable was set to 0.05. This means that there was 5% chance of rejecting the null hypothesis when it was true. Lastly, the critical value for each test was determined using the Chi Square distribution table.
Grade level was the first variable examined for a relationship with the impact of 1:1 initiatives on school libraries.

H₀: The grade level of the school is independent of impact of going 1:1 on the school library.

Hₐ: The grade level of the school is associated with the impact of going 1:1 on the school library.

The Chi Square test for this variable resulted in $X^2 (4, N=138) = 11.724$, $p < .05$ with the critical value being 9.48. In this test, the resulting number being larger than the critical value means that the null hypothesis is rejected and there is a relationship between the two variables. In this case that means that there is a relationship between grade level served and the impact going 1:1 has on the school library. Since the Chi Square test showed a relationship between the variables, Cramer’s V was used to determine the strength of the relationship. Cramer’s V resulted in $\phi_c = .291$. According to Crewson (2014) this result shows a low association between the two variables (n. pag.).

The second variable examined was region in which schools were located.

H₀: The region in which the school is located is independent of impact of going 1:1 on the school library.

Hₐ: The region in which the school is located is associated with the impact of going 1:1 on the school library.
The Chi Square test for this variable resulted in $X^2 (3, N=138) = 0.91$, $p. < .05$ with the critical value being 7.814. In this test, the resulting number being lower than the critical value means that there is no relationship between the region in which a school is located and the impact going 1:1 has on the school library. For this variable the null hypothesis was not rejected.

The third variable examined was socioeconomic status of the school.

$H_0$: The socioeconomic status of the school is independent of impact of going 1:1 on the school library.

$H_a$: The socioeconomic status of the school is associated with the impact of going 1:1 on the school library.

The Chi Square test for this variable resulted in $X^2 (2, N=113) = 1.52$, $p. < .05$ with the critical value being 5.991. This result shows that there is no relationship between the socioeconomic status of a school and the impact going 1:1 has on the school library and the null hypothesis was not rejected.

The final variable examined was the device type employed in the 1:1 initiative.

$H_0$: The device type employed in the 1:1 initiative is independent of impact of going 1:1 on the school library.

$H_a$: The device type employed in the 1:1 initiative is associated with the impact of going 1:1 on the school library.

The Chi Square test for this variable results in $X^2 (2, N=134) = 2.23$, $p. < .05$ with the critical value being 5.991. This result shows that there is no relationship between the
device type employed and the impact going 1:1 has on the school library and the null hypothesis was not rejected.

**Qualitative Data**

The remainder of the survey was open-ended questions in which the respondents were able to offer narrative feedback that would explain how their programs have evolved in response to the shift to 1:1 computing in their schools. The narrative feedback for each question was analyzed for recurring themes using quasi-statistics.

The first open-ended question on the survey was “What role, if any, does the librarian play in the 1:1 program in your school?” One hundred thirty-eight of the 140 respondents chose to answer this question. Of the 138 responding to this question, there were 19 who indicated that they did not have any role in the 1:1 program. Sixty-three of the respondents indicated that they provide some form of tech support for their 1:1 program. This may be in the form of troubleshooting/first response, collecting information for tech support, or serving as the coordinator for the entire program. In addition to this, 36 respondents indicated that they played a role in rolling out the devices to their students. Other roles indicated included purchasing eBooks and other electronic resources, teaching digital citizenship and use of online resources, providing professional development opportunities to faculty, and collaborating with faculty on finding ways to integrate the 1:1 devices into the classroom.

The second open-ended question on the survey asked respondents to indicate if there was any change in the way they “advertised” the library following the implementation of their 1:1 program. One hundred twenty-two respondents chose to
answer this question. Of those responding to this question, 17 responded that they have not made any changes in the way they promote the library to their students. The most common emerging theme was in a shift toward using social media, such as Twitter, Instagram, and Facebook, to advertise the library (with 18 respondents indicating they had made this change). The next most commonly seen response was the use of email to let students know about what was going on in the library. Other commonly mentioned strategies were improving the library website, increased emphasis on the eBook collection, increased collaboration with faculty, and increased promotion of print fiction.

The third question respondents answered was “After the implementation of 1:1, did you add any new programs to increase library usage by students?” One hundred seven respondents chose to respond to this question. Of the 107 respondents, 19 indicated that they had implemented no new programs. The most commonly mentioned new program was the addition of eBooks to the library (16 respondents indicated they had done this). Seven librarians had implemented contests in the library and seven had created maker spaces in the library. Maker spaces, according to Britton, are areas made to support learning in science, technology, and design; they facilitate informal learning, develop a culture of creating, and foster play and exploration (20). Other strategies mentioned included the creation of Book Clubs and Learning Commons.

The fourth open-ended question posed on the survey asked respondents if they had added any new programs to encourage use of the library by faculty. One hundred eight respondents chose to answer this question. Of the 108 responding to this question, 19 reported that they had not added any programs directed to faculty. The
most commonly reported change was extending invitations to faculty to use the library. Also reported by 10 responding librarians, was the shift to pushing into classrooms rather than having classes come to the library. The next most common trend was a simple continuation of the existing collaborative efforts (reported by 8 respondents). Other new programs mentioned included technology training for faculty, attending faculty departmental meetings, and adding books to the collection that would appeal to faculty.

The fifth open-ended question on the survey, responded to by 120 librarians, inquired about any general changes to the way the library functions as a result of the implementation of the 1:1 program. Eleven of the 120 librarians responding to this question indicated that there were no changes to the way the library functions. The most common emerging theme was a physical rearrangement of the library space. This included rearranging the collection, adding comfortable seating, adding a maker space, adding a café, and other changes to the library layout. Another emerging theme was a change in the use of technology to run the library. This included not only an increase in their virtual presence, but also inclusion of electronic sign-in to the library, electronic notices to students, and self-checkout options. Finally, there were a few librarians who indicated that the shift to 1:1 had prompted them to weed the collection—some of these entirely eliminated their reference or non-fiction sections.

Though the survey focused primarily on the reductions that librarians might have experienced in circulation, collaboration, and use of other library services, there was also an open-ended question requesting that respondents share any improvements they have seen in their library program following the implementation of their 1:1 program.
Of the 106 responding to this question, 16 indicated that there were no improvements to the library program following the implementation of their 1:1 program. The most common theme in respondents’ answers was a change to the view of the librarian as a technology leader in the school. The second most mentioned improvement was in the increased use of electronic resources. There were also 6 respondents who indicated that they had seen an improvement in the circulation of print fiction.
CHAPTER 5
CONCLUSIONS AND RECOMMENDATIONS

The results of the School Library 1:1 Survey can be used to begin to answer the research questions of this study. The interpretation of the quantitative data and the content analysis of the qualitative data provide some insight into how the implementation of 1:1 programs have impacted school libraries and the ways in which the school library has evolved via the efforts of school librarians as a result. School librarians may be able to use the results of this study to help plan for pending implementation of 1:1 programs or respond to already existing programs.

Interpretation of Results of this Study

Research Question One

The first research question asked in this study was “What impact has the shift to 1:1 environments had on school library programs?” Even though there have been 1:1 programs in place in some locations for more than five years, little data is available about how these programs have impacted school libraries. The survey data collected in this study gives some insight into this question. First, out of 139 respondents, 69 said that they saw no reduction in the use of the library. If this data were to be generalized, that would mean 50% of school library programs will see reductions in library use after implementing 1:1

![Figure 6: Reduction in Library Services](image)
computing and 50% will not see a reduction in the use of library services following implementation. Of those who did see a reduction in their program, 29% reported seeing a reduction in use by both faculty and staff. It is possible in these cases that librarians will need to find new and innovative ways to reach out to both students and faculty in order to remain relevant in their changing environment.

The respondents who saw a reduction in circulation reported the greatest reduction in nonfiction. As previously mentioned, students in 1:1 environments have access to the most current information via the devices they have been issued (Dunleavey, Dextert, and Heinecke 441). This being the case, paired with evidence of reduction in use of nonfiction collections, some librarians reported that they are putting more funding into electronic nonfiction resources while others reported eliminating the print nonfiction and reference sections of their collections (1:1 Survey n. pag.) Even though nonfiction circulation appears most likely to be impacted by going 1:1, 67% of total respondents indicated no reduction in this area.

These results give librarians a mixed set of outcomes to consider. It seems clear that librarians in 1:1 environments can anticipate a change in the way their students interact with nonfiction resources. However, there is still a lack of clarity in how the fiction collection may be impacted. While half of all respondents saw a reduction in circulation, only 14% of total respondents saw a reduction in the fiction circulation. There were also some librarians reporting an increase in the circulation of print fiction.

A smaller group of respondents (24%) saw a reduction in collaboration with faculty. Within this group, 61% saw a reduction of collaboration with English Language Arts faculty and 64% saw a reduction in collaboration with Social Studies faculty.
Though there was a relatively small group who saw a reduction in collaboration, it is still something that school librarians should be aware of as their schools embark on their 1:1 journeys.

**Research Question Two**

The second research question asked in this study was “Does grade level, location, socioeconomic-status of a school, or the type of device employed make a difference in the impact 1:1 computing has on the school library?” After testing each of these variables with the Chi Square test, the only one that showed evidence of a relationship to impact was grade level. Cramer’s V revealed that there was low association between the two variables with $\phi_c = .291$. It can be noted that at $\phi_c = .30$ association would become moderate.

When the survey results are broken down, it is seen that of the 10 elementary school librarians who responded, all 10 reported no reduction in use of the library. This data indicates, at a 95% confidence interval (based on the Chi Square test with the alpha level set to 0.05) that elementary school libraries are the least likely to see a negative impact on their program following implementation of 1:1 initiatives. Of the 10 elementary librarians, 2 reported having seen improvements in their programs. One librarian reported improved access to resources and the other reported improved communication with students (1:1 Survey n. pag.)

The remaining 130 librarians in K-12, Middle, High, and Secondary settings showed approximately half observing reductions in the use of library services. Of the 130, 41 (31.5%) reported improvements in their programs.
Location, socioeconomic status, and device type did not show a relationship to the impact of going 1:1 on school libraries. Librarians in these varying environments will have less predictability as they roll out 1:1 programs.

Research Question Three

The third research question asked in this study was “How have school libraries evolved in response to a change to 1:1 computing?” This question was addressed via the narrative feedback to the open-ended survey questions. One of the main ways in which school librarians report changing is in their increased role in technology leadership. This coincides directly with the American Association of School Librarians’ call for librarians to lead their schools through the digital transformation (Empowering Learners 45-48). Survey answers indicated that librarians are playing key roles in providing technology support to both faculty and students, rolling out technology to the school community, and locating additional electronic resources. One respondent said,

I have tried to create a hub/learning commons where learning is supported, a place where tech and library intersect. I have tried to work closely with teachers to improve and expand their tech and research skills. Students are the primary users and they hold flexible, open-minded views on how the library is central on campus. (1:1 Survey n. pag.)

Other respondents also reported making a change towards a learning commons model, creating an inviting/comfortable physical space, or introducing a café or maker space into their library. Though the learning commons model is not a new concept, the shift to 1:1 computing is giving some librarians additional incentive to adopt this model.
Librarians were also asked to share any new programs they have implemented in order to encourage students and faculty to use the library. One common theme in answers to new programs for students was a renewed emphasis on reading celebration events such as Banned Books Week, Teen Read Week, Read Across America, and other similar events. Though many libraries have participated in these events for an extended period of time, librarians are using them in an attempt to renew student interest in the resources available in the library whether they are print or digital. Other commonly mentioned efforts were contests and the addition of eBooks to collections. For individual school or districts that did not have existing eBook collections, librarians reported this being a large endeavor.

While librarians reported efforts to bring students into the library following 1:1, when it came to faculty the more common theme was offering to go to them. Pushing into classrooms, attending departmental meetings, and breaking the boundaries of the traditional library were repeated by several librarians as the ways in which they have changed to meet faculty needs.

**Implications for the Professional Field**

Just as school libraries have evolved in the past, they must continue to evolve in order to remain relevant and to meet the changing needs of school communities with 1:1 initiatives. Doug Johnson says that school leaders and librarians should be open-minded about the functions of school libraries and consider how the library program can support the goals of the school (85). Though the results of this research project did not yield definitive answers regarding how school libraries are impacted by the shift to 1:1 computing, it is clear that school librarians are experiencing both positive and negative
changes, finding new ways to interact with their school communities, and adopting new visions for their programs.

Professionally, librarians will need to continue on the path set forth by the American Association of School Librarians to be technology leaders in their schools. This may be in the form of providing technical support to students or professional development to faculty. In addition to this, they will need to be willing to view the library less as a specific physical space, and more as a space that knows no physical or virtual boundaries. Along with this vision of the library, there must also be plans and policies in place for collection development to meet the needs of this boundless library/learning commons. Librarians must be prepared to be advocates for their programs in environments where questions are being asked about the relevance of a physical library. Lastly, this also means that the university programs that prepare future school librarians must provide their students with the tools that allow them to thrive in both environments with and without 1:1 computing.

**Suggestions for Future Research**

Research is imperfect by nature. As this is the case, there is always room for expansion upon an existing study. In the future it will be valuable to conduct further research on how school libraries continue to be impacted and how school librarians continue to grow their programs in response to these changing environments. In addition to this, future researchers may wish to conduct Response to Intervention research. This would allow for a more direct, specific, and long-term observation of how the implementation of a 1:1 initiative can impact an individual school or collection of schools. Finally, a research study that takes into account the relationship of other
variables may give librarians deeper insight into what they can expect as their schools go 1:1.

**Conclusions**

This study gathered insight from 140 school librarians who have experienced 1:1 programs. Results can be generalized, but there is no certainty in what librarians may experience. Going 1:1 may result in “positive” or “negative” changes in the library program. The perceptions of which end of the spectrum the changes are in are debatable. Regardless of the perceived impact, school libraries must be prepared to meet the changing needs of their school communities. If they are not prepared, or are unwilling to change, they risk becoming irrelevant. Those libraries that evolve their programs to keep pace with their community’s needs will position themselves to be a vital part of the mission and vision of their school.
WORKS CITED

1:1 School Library Survey. Web. 6 Nov. 2014.


Impact on School Libraries of Going 1:1


Impact on School Libraries of Going 1:1


APPENDIX A:
COMMUNICATION

Letter of Invitation

Dear School Librarian,

I am conducting research on the impact of 1:1 initiatives on school libraries for my Educational Specialist Thesis. In order to complete my research I need to collect information from librarians working in schools with 1:1 programs in place. The URL below will take you to a brief survey about how 1:1 computing has impacted your library since implementation as well as how your library has evolved in response.

http://goo.gl/7k1vSa

I appreciate your willingness to participate in this study. If you have any questions regarding the survey or my research, you may contact me at eeh54110@ucmo.edu or 816-351-0053. If you have any questions about your rights as a research participant, please contact the University of Central Missouri’s Human Subjects Protection Program by email at humansubjects@ucmo.edu or by phone at (660) 543-4621.

Thank you for your time.

Sincerely,

Elizabeth E. Hoskins
Informed Consent

As part of an effort to better understand the impact that 1:1 computing has on school libraries, the above survey has been made available to librarians in 1:1 environments. Participation is voluntary and anonymous. School names have been collected only to ensure that each school is represented only once in the survey results and will not be used in resulting publications. The results will be recorded in my Education Specialist thesis. Consent to participate is assumed when you submit this survey.

Thank you for participating! Please feel free to contact Elizabeth Hoskins with any questions at eeh54110@ucmo.edu. If you have any questions about your rights as a research participant, please contact the University of Central Missouri’s Human Subjects Protection Program by email at humansubjects@ucmo.edu or by phone at (660) 543-4621.
APPENDIX B:
SURVEY

1:1 School Library Survey

As part of an effort to better understand the impact that 1:1 computing has on school libraries, the above survey has been made available to librarians in 1:1 environments. Participation is voluntary and anonymous.
School names will be collected only to ensure that each school is represented only once in the survey results and will not be used in resulting publications. The results will be recorded in my Education Specialist thesis. Consent to participate is assumed when you submit this survey.

1. Does your school have a 1:1 initiative in place?
   Yes
   No

2. School Name

3. Grades Served

4. State Where Your School Is Located

5. What percentage of your student body is eligible for free/reduced lunch?
   10% or less
   11-19%
   20-50%
   51-69%
   70% or more
   Unknown
6. Device Type
   Laptop
   Tablet/iPad
   eReader
   Chromebook
   Other:

7. How many years has your school been 1:1?
   1
   2
   3
   4
   5 or more
   Unknown

8. Are the students in your school allowed to take their device home?
   No
   Yes
   Other:

9. What role, if any, does the librarian play in the 1:1 program in your school?

10. Do you feel as though there was a reduction in library usage following the implementation of the 1:1 program?
    No
    Yes, fewer students used the library following implementation
    Yes, fewer faculty used the library following implementation
    Yes, fewer of both students and faculty used the library following implementation
11. If there were reductions, which of the following areas were impacted (saw reductions)? Check all that apply
   - Circulation
   - Computer Lab
   - Collaboration with Faculty
   - Participation in Library Programs
   - Visits to Library by Students
   - Other:
   - No Reduction

12. If you saw a reduction in circulation, which areas of the collection were affected more? Check all that apply
   - Fiction
   - Non-fiction
   - Reference
   - Specific Genres within Fiction
   - Other:
   - No Reduction

13. If you saw a reduction in collaboration, which subject areas are you working less with? Check all that apply
   - English Language Arts
   - Mathematics
   - Science
   - Social Studies
   - Other:
   - No Reduction

14. After the implementation of 1:1, did you change the way you "advertise" the library to students? If so, what did you do differently?
15. After the implementation of 1:1, did you add any new programs to increase library usage by students? If so, what kinds of programs were successful?

16. After the implementation of 1:1, did you add any new programs to increase library usage by faculty (such as collaboration or inviting them to bring classes to library)? If so, what kinds of programs were successful?

17. Are there other ways you have changed the way the library works in your school as a result of the implementation of the 1:1 program?

18. Did you see improvements in your library program as a result of the implementation of the 1:1 program in your school? If so, what were they?

19. If you are interested in finding out the results of this research, please include your email address below:

Thank you for participating! Please feel free to contact Elizabeth Hoskins with any questions at eeh54110@ucmo.edu If you have any questions about your rights as a research participant, please contact the University of Central Missouri’s Human Subjects Protection Program by email at humansubjects@ucmo.edu or by phone at (660) 543-4621.
APPENDIX C:  
STATISTICAL TABLES

Table 5: Grade Level Chi-Square Results

<table>
<thead>
<tr>
<th>Grade Level</th>
<th>Observed Responses</th>
<th>Expected Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>K-12</td>
<td>16</td>
<td>14</td>
</tr>
<tr>
<td>Elementary</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Middle</td>
<td>35</td>
<td>26</td>
</tr>
<tr>
<td>High</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Secondary</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>69</td>
<td>69</td>
</tr>
</tbody>
</table>

\[ X^2 = 11.724 \]
\[ \alpha = 0.05 \]
\[ \text{df} = 4 \]
\[ \text{p-value} = 0.019526143 \]
\[ \chi^2 \text{ crit} = 9.487729037 \]

Cramer’s V test was performed on these results in order to determine the strength of the relationship between these variables.

\[ \Phi_c = .291 \]
### Table 6: Region Chi-Square Results

<table>
<thead>
<tr>
<th>Region</th>
<th>Observed Responses</th>
<th>Expected Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Northeast</td>
<td>11</td>
<td>13</td>
</tr>
<tr>
<td>South</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Midwest</td>
<td>35</td>
<td>30</td>
</tr>
<tr>
<td>West</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>69</td>
<td>69</td>
</tr>
</tbody>
</table>

\( \chi^2 \) 0.91

\( \alpha \) 0.05

\( df \) 3

p-value 0.844

\( \chi^2 \) crit 7.814
Table 7: Socioeconomic Status Chi-Square Results

**Socioeconomic Status**

<table>
<thead>
<tr>
<th>Socioeconomic Status</th>
<th>Observed Responses</th>
<th>Expected Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Low Poverty</td>
<td>23</td>
<td>19</td>
</tr>
<tr>
<td>Average</td>
<td>29</td>
<td>24</td>
</tr>
<tr>
<td>High Poverty</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>59</td>
<td>54</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 1.52 \]

\[ \alpha = 0.05 \]

\[ df = 2 \]

\[ p\text{-value} = 0.713 \]

\[ \chi^2 \text{ crit} = 5.997 \]
Table 8: Device Type Chi-Square Results

**Device Type**

<table>
<thead>
<tr>
<th>Device Type</th>
<th>Observed Responses</th>
<th>Expected Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Laptop</td>
<td>29</td>
<td>22</td>
</tr>
<tr>
<td>Tablets/iPads</td>
<td>24</td>
<td>30</td>
</tr>
<tr>
<td>Chromebooks</td>
<td>17</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>64</td>
</tr>
</tbody>
</table>

\[ X^2 = 2.23 \]
\[ \alpha = 0.05 \]
\[ df = 2 \]
\[ p-value = 0.851 \]
\[ X^2 \text{ crit} = 5.991 \]
APPENDIX D:
HUMAN SUBJECTS APPROVAL

9/26/2014

Elizabeth Hoskins

eeh54110@ucmo.edu

Dear Elizabeth Hoskins,

Your research project, 'The Impact on School Libraries of Going 1:1', was approved by the Human Subjects Review Committee on 9/26/2014.

Please note that you are required to notify the committee in writing of any changes in your research project and that you may not implement changes without prior approval of the committee. You must also notify the committee in writing of any change in the nature or the status of the risks of participating in this research project.

Should any adverse events occur in the course of your research (such as harm to a research participant), you must notify the committee in writing immediately. In the case of any adverse event, you are required to stop the research immediately unless stopping the research would cause more harm to the participants than continuing with it.

At the conclusion of your project, you will need to submit a completed Project Status Form to this office. If you have any questions, please feel free to contact me.

Sincerely,

Janice Putnam Ph.D., RN
Research Compliance Officer
putnam@ucmo.edu
PUBLICATION AGREEMENT

Author Name: Elizabeth Hoskins

Street Address: 19238 Cherokee Court

City and State (or Province): St. Joseph, MO

Postal or Zip Code, Country: 64505

Title of Work: The Impact on School Libraries of Going 1:1

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**AUTHOR:**

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Print Name: __Elizabeth E. Hoskins_______________________________

E-mail: ___eeh54110@ucmo.edu_________________________________

Date: ______________________________________

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Warrensburg, MO  64093   USA

**BY:** __________________________________________________________

Signature: _____________________________________________________

Date: ___________________________________________
TRANSMITTAL FORM

Student Name: Elizabeth Hoskins

Graduate Degree Program: Educational Specialist in Educational Leadership and Human Development

Thesis Completion Date:

Thesis Title: The Impact on School Libraries of Going 1:1

Dr. Patricia Antrim _____________________________________________________
Print Name of Committee Chair Chair Signature

Dr. Jennifer Robins ____________________________________________________
Print Name of Committee Member Committee Signature

Ms. Rene Burress _________________________________________________
Print Name of Committee Member Committee Signature

DEPARTMENTAL APPROVAL:

______________________________
Signature of Department Chair