Are School Librarians Ready to Lead Mandated Digital Integration? A Survey of Florida's K-12 School Library Professionals

Jennifer R. Luetkemeyer
Appalachian State University, USA

Primary and secondary educators are making the move to using digital learning resources, and are increasingly integrating technology into the curriculum. With training as both a teacher and an information specialist, the school librarian is in a position to help facilitate this transition to digital. The purpose of this research was to examine the extent to which Florida school librarians perceive that they are prepared to act in the role of facilitator, in light of Florida's statute mandating a move to an all-digital curriculum by the end of the 2015-2016 school year.

Introduction

While a shift from print to digital learning resources is beginning to occur, many states and districts have been slower to make that move due to a variety of internal and external barriers (Fletcher, Schaffhauser, & Levin, 2012). Central to the implementation of digital resources is teacher preparedness to use them. As schools make the move to digital textbooks and other digital resources as the primary learning materials in the classroom (LEAD, n.d.), there is a need for a school-based professional to foster digital literacy among teachers and students to support this move (Mardis & Everhart, 2013; Kang & Everhart, 2014). Digital literacy is defined as proficiency in using digital technology, networks and communication tools to effectively manipulate information in a variety of formats and from a variety of digital sources (U.S. Digital Literacy, 2015).

Underpinning the digital literacy educators require to shift to digital resources is the set of information literacy skills specifically related to not only recognizing when they have an information need, but also to be able to find that information and to evaluate it and use it effectively (ACRL, 2011). Due to their training both as educators and as information professionals, school librarians are well positioned to assist both students and teachers in acquiring information literacy skills. As such, it is important to understand how prepared school librarians perceive themselves to be to assist in the integration of technology and digital learning resources. In Florida, this process has been mandated by Florida statute 1006.29(3): "beginning in the 2015-2016 academic year, all adopted instructional materials for students in kindergarten through grade 12 must be provided in an electronic or digital format" (The Florida Legislature, 2015). This statute reflects the ongoing move to digital learning resources in the United States (LEAD, n.d.). The advent of this statute raises the question of how the school librarian might fit into its implementation, and the purpose of this research was to explore the school librarian's role in technology integration, both in this instance and on a larger scale.

As the school-based professional possessing the training and expertise outlined by AASL roles as instructional partner, teacher, and information specialist, the school librarian is positioned to carry out the leadership role in a manner that serves the technological needs of 21st century

learners and teachers (AASL, 2009). With this in mind, I focused on the following research questions during the course of this study:

RQ. To what extent do school librarians perceive they are prepared to lead digital learning resource integration?

RQa. What do they perceive as their areas of strength?

RQb. In which areas do they perceive they need improvement?

Literature Review

Digital Learning Resources

In March 2012, the Leading Education by Advancing Digital (LEAD) Commission was sanctioned and advised by the United States Department of Education (U.S. DOE) and the Federal Communications Commission (FCC) to "research the state of technology in American schools" in an effort to determine why technology adoption was happening at such a slow pace, and to determine what could be done to speed up adoption (LEAD Commission, 2013, p. 1). Meanwhile, 22 states responded to federal digital curriculum directives to switch from print to digital learning materials with fee-based and free resources (Fletcher, Schaffhauser, & Levin, 2012). On October 19, 2015, Culatta, Ison, and Weiss issued a statement through the White House blog that "the Federal government is supporting the use of open educational resources to provide equitable access to quality education" (para. Summary). To that end, the Office of Educational Technology's #GoOpen campaign encourages the use of open educational resources (OERs) for educational purposes in order to increase equity, maintain relevancy and quality, provide teachers with more control over their instructional materials, and conserve financial resources (U.S. DOE, n.d.). Open educational resources (OERs) are defined as "teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and re-purposing by others" (The William and Flora Hewlett Foundation, n.d., para. 2). To be defined as an OER, a resource must provide the ability to be reused, revised, remixed, retained, and redistributed without cost to the end user (The William and Flora Hewlett Foundation, 2013).

The shift to digital learning resources is reflected in Simba Information's annual educational publishing marketing reports. In *Publishing for the PreK-12 Market 2014-2015*, Mickey and Meaney (2014) reported that textbook sales (both print and digital) accounted for only 40% of the current K-12 school market for instructional resources compared with more than 50% just before the turn of the last century. The remainder is composed of other instructional resources such as test question banks and worksheets. Further, sales of digital supplements like CDs that were once popular with school districts had declined in favor of "free, open and teacher-created supplemental resources" (p. 2).

Finding and Vetting Digital Resources

Unfortunately, finding and vetting quality digital resources is neither straightforward nor easy. "Content is everywhere, and it is not always clear whether the work is accurate and/or where the work originated" (Ovadia, 2013, p. 61). Educators often have limited time and/or training on how to locate quality resources among the many available (Carlson & Reidy, 2004; Recker, Dorward, & Nelson, 2004; Hanson & Carlson, 2005; Perrault, 2007; Maull, Saldivar, & Sumner, 2010; Ed. schools, 2013). Teachers also cited other problems in trying to locate and integrate digital resources into their curriculum: lack of support at the district level; dissatisfaction with search results or web interfaces; incompatibility of resources with instructional needs; and lack of professional development to support integration (Hanson & Carlson, 2005; Johnson et al., 2013).

The idea of quality is subjective and contextual, especially in a school setting, depending on the purpose and the intended audience (Bethard, Wetzer, Butcher, Martin & Sumner, 2009). Couple these concerns with the fact that the technology used for access is also ever-changing, and a complex problem begins to emerge. Digital information might be "portable and compact," but its care and maintenance are no simple task (Gaur & Tripathi, 2012, p. 294). This disconnect between availability and quality is where digital curation practices, and the school librarian as technology leader, become vitally important. The school librarian is in a unique position at the intersection between pedagogy and resources. Because school librarians have had training and experience in both areas, the ability to locate and curate appropriate digital learning resources is a fundamental aspect of the job.

School Librarians as Technology Leaders

School librarians serve not only as digital literacy instructors, but also as their schools' onsite curators, sifting through and organizing digital resources for a variety of learning and teaching applications (Ballew, 2014). This dual role was confirmed by Project Tomorrow (2014a) through its Speak Up initiative, an annual national survey of K-12 educators, students, parents, and other stakeholders in the areas of "education, technology, 21st century skills, schools of the future and science instruction" (Project Tomorrow, para. 1). The 2010 survey's findings included that 78% of respondents depended on their school librarian to locate appropriate websites for classroom use, 56% to create digital collections to support the curriculum, and 47% to locate specific requested digital content. At the same time, respondents also indicated that the school librarian was instrumental in answering technology-related questions and in training faculty on how to find and evaluate digital resources independently (Project Tomorrow, 2011, p. 13).

Because of this acknowledged support position, school librarians are often familiar with a variety of digital resources that best serve the needs of teachers, students, and other stakeholders. Further, those resources must also be curated and offered in such a way as to make their integration with the existing curriculum seamless and intuitive. The curatorial role requires a unique set of technological skills, and the ability to provide technological leadership to others. But technology leadership is not just limited to familiarity with, and curation of, digital resources. School librarians also have a role to play in teaching technology skills to others.

In *Empowering Learners: Guidelines for School Library Programs*, the American Association of School Librarians (AASL) called for the school librarian to be a leader in the school. Specifically, the guidelines state: "Leadership is integral to developing a successful 21st-century school library program. As information literacy and technology skills become central to learning, the school librarian must lead the way in building 21st-century skills throughout the school environment" (AASL, 2009, p. 26). This statement suggests that, not only do school librarians need to be capable of providing leadership in the traditional area of information literacy, but also in the area of technological literacy.

The prevalence of technology in the K-12 classroom backs up this leadership directive from the AASL, as does the nationwide move toward digital learning resources as the norm for teaching and learning (Leading Education by Advancing Digital, n.d.), and for personalizing instruction (Brookings Institution, 2011; Selwyn, 2011; West, 2013).

Method

This study focused on the technology leadership roles relating to digital content performed by K-12 public school librarians in the state of Florida.

Participants

At the time of the survey, there were 5,670 certified educational media specialists in the state of Florida (Florida Department of Education, 2015). The Florida Teacher Certification Examination (FTCE) relating to school librarianship is called "Educational Media Specialist" (Peason, 2017). It is possible that not all of those certified were practicing school librarians; by any educator with a teaching certificate can take the certification examination. The anticipated response rate was 2%, or 113 participants. The actual response rate was 1.7%, or 97 participants.

The survey was completed in full by 95 females, one male, and one participant who identified as "other." Of the 97, 92 selected "white" as their ethnicity, and the remaining five selected "Hispanic or Latino." The youngest respondent was 23, and the oldest 70, with a median age of 52 (N=97).

The Qualtrics online survey application collected the respondents' Internet Protocol (IP) address as they completed the surveys. An IP location website (http://iplocation.net) was used to determine that responses were likely representative of 26 of 67 counties in the state of Florida (N=97). One caveat is that this information cannot be 100% guaranteed due to the possibility of location spoofing.) Due to restrictions in IRB approval, specific counties cannot be named. However, the geographic distribution appeared to be representative of all regions of the state.

Data Collection

An established technology leadership survey instrument (Appendix A) that was based on the *National Board for Professional Teaching Standards' (NBPTS) Library Media Standards, First Edition* (Coatney et al., 2001) was utilized. Upon receiving Institutional Review Board (IRB) approval for the research, the Technology Leadership Survey was keyed in and distributed via the Qualtrics web-based survey tool. In an effort to reach the largest possible population of Florida school librarians, the survey was publicized using major school librarian professional email lists (LM_NET and AASLForum), the Florida Association for Media in Education (FAME), and the Florida Department of Education (via the Library Media and Instructional Materials Specialist, who then distributed the survey statewide to state school district level contacts). The survey was open from November 30, 2015 to December 31, 2015, and reminders were sent every seven days.

Data Analysis

Statistical analysis was performed for questions 1-92: questions 1-20 provided demographic data, which was reported in frequencies, and results from questions 21-92 were used to calculate Technology Leadership Scores, described below,, which were then analyzed for possible associations with the demographic data, where appropriate.

Findings

Survey Section I. Participant Background

Section I of the survey captured information about participants' training and certification, experience, and work environment.

Training, Certification, and Experience. Following the three demographic questions, participants were asked about their certification, training, and experience. The majority of respondents (n=82) indicated certification as both a teacher and a librarian/media specialist, one as a teacher only, and 14 as a librarian, but not as a teacher.

Next, participants were asked to indicate the state in which they obtained certification. The majority of participants (n=86, or 88.7%) were certified solely in Florida. Two respondents were

certified in multiple states: one was certified in Arizona and Florida and one was certified in Alabama, Florida, and South Carolina. Two participants (2.1%) were certified solely in New York. Seven participants (9%) were certified in only one state: Georgia, North Carolina, New York, Pennsylvania, and Texas. One participant did not report the state in which he/she was certified.

The next set of survey questions pertained to respondents' experience in K-12 education. Participants were first asked about their level of experience as a school librarian. The number of years of experience varied from zero, or first year, to 36 years, with the median level being ten years of experience. A subset of the 97 participants (n=17, or 17.5%) were also National Board Certified Media Specialists. National Board certification is a voluntary, peer-reviewed process, and the National Board for Professional Teaching Standards, which bestows the certification, is an independent non-profit agency. The standards that must be met to achieve certification are developed by accomplished educators in each field (NBPTS, 2014).

Many respondents (n=74) had been classroom teachers prior to running the school library. For those who taught at the elementary level, the grade level at which they taught was fairly evenly distributed, with a few (3) teaching music, physical education (P.E.) and special education, as Table 1 shows.

Table 1. Elementary Grade Level Taught (N=47)

Grade	Frequency (%)
K	8 (8.2)
1	8 (8.2)
2	8 (8.2)
3	9 (9.3)
4	5 (5.2)
5	6 (6.2)
Music	1 (1)
Physical Education	1 (1)
Special Education	1 (1)
Total	47 (48.5)

For the 73 participants who taught at the secondary level, they had taught English/Language Arts (n=15), Reading (n=7), and Career Tech (n=2). One each chose Mathematics, Art, Foreign Language, and Special Education. However, the majority (n=42) chose "other" as the subject area taught. Respondents were provided a text box to indicate what subject area "other" referred to and 22 (22.7%) reported that they had taught all elementary and secondary subject areas at some point; the remaining "other" answers (n=20) ranged from one response each in a variety of other elementary subject areas.

Work Environment. The remainder of the questions in the first section of the survey pertained to the respondents' workplace. The vast majority of respondents (n=96) were full time and 89 served only one school. The rest distributed their time among multiple schools: four served three schools; two served two schools; one served nine schools; and one served 86.

Also for the majority of respondents (n=86), only one certified school librarian worked in the school. Ten participants indicated that they had two, and only one indicated that there were no certified school librarians on staff. When asked if there were any other paid staff working in the school library who were not certified school librarians, 58 participants responded "yes" and 39 responded "no." Whether those staff were full- or part-time varied: 38 indicated that they had one full-time paid staff member and five indicated that they had two; 13 indicated that they had one part-time paid staff member, one indicated that they had 22, one reported three, and one reported two.

Some participants (n=60) also had volunteer help, with the number of hours ranging widely from one to 75 per week. Less than half of respondents (n=48) also reported having full-

time instructional technology staff at their schools, while approximately one quarter (n=25) reported having part-time instructional technology staff.

In reference to library scheduling, respondents' (N=96) school libraries operated on either a fixed (n=22) or flexible (n=46) schedule, or some combination (n=28). In those school libraries, 97% (n=94) of respondents had broadband (i.e., high speed) internet access, while 3% (n=3) were unaware of what type of access they had. In response to the follow-up question "Do you feel that you have adequate speed and reliable access to the internet for instructional purposes?", 73 answered "yes" and 24 "no."

In response to whether the internet access in the library was filtered or unfiltered, results (N=97) showed that it was primarily filtered, for both students (89, or 91.8%) and teachers (61, or 62.9%), though some respondents reported access that was both filtered and unfiltered for both students (4, or 4.1%) and teachers (30, or 30.9%). Few participants indicated that only unfiltered access was offered to students (1, or 1%) and teachers (2, or 2.1%). Three participants did not know what type of access was offered to their students and four were unsure what type of access was offered to their teachers. Finally, participants were asked about the number of desktop and laptop computers located in their schools. Responses (N=97) ranged from as many as 175 (n=1) to a few as 1 (n=4); most respondents (n=39) noted having responsibility for between 8 and 21 desktop computers in their libraries. Laptops were more common with 53 or 95 respondents reporting having up to 30 laptops in their libraries, with a one respondent responsible for 570!

Respondents (N=90) were also sometimes responsible for computers outside of their libraries, with those responses ranging from 0 (n=10) to 720 (n=1); most respondents were responsible for up to 150 desktop computers outside of their libraries (n=40). Many respondents were also responsible for laptops outside of the library, with 71 of 90 respondents reporting at least one laptop outside of the school library in their control.

These findings suggest a profile of a typical respondent as a white female with prior classroom experience, working as the only school librarian at her school. The typical participant was also certified as both a teacher and a librarian/media specialist who was responsible for a number of computers and digital resources both within and beyond her library.

Survey Section II. Technology Leadership

Participants responded to a series of questions based on the *NBPTS Library Media Standards* (1st edition), the standards that drove National Board Certification of school library specialists from 2001-2011. Those questions are divided into the following ten categories derived from the NBPTS standards sections: Knowledge of Learners; Knowledge of Teaching and Learning; Integrating Instruction; Knowledge of Library and Information Studies (Resource Focus); Leading Innovation through Library Media Program; Administering the Library Media Program; Reflective Practice; Professional Growth; Ethics, Equity, and Diversity; and Leadership, Advocacy, and Community Partnerships.

Each participant's responses were scored by multiplying the Likert response (1-6) by the leadership level assigned to that question (entry: 1, adaptive: 2, transformative: 3). The scores for each category were then added together to produce the participant's overall Technology Leadership Score. The minimum and maximum possible scores were 145 and 930, respectively. (The minimum and maximum possible scores for individual categories are discussed in the corresponding sections below.)

Knowledge of Learners. The first category focused on Standard I of the NBPTS Library Media Standards (first edition): Knowledge of Learners. This standard states that "accomplished library media specialists have knowledge of learning styles and of human growth and development" (Coatney et al., 2001, p. 7). The six questions in this category focused on how school

librarians use technology to support growth and development within their schools. The minimum possible score for this category was 12 and the maximum 72. As illustrated in the histogram in Figure 1, participants' scores represented a normal distribution.

The mean of the scores was 42.04, and the standard deviation was 12.769, indicating that scores were somewhat spread out, rather than clustered tightly around the mean. However, the two scores which represented the mode (39 and 42, with seven participants each), were rather close to the mean.

Knowledge of learners scores were then divided into three categories: entry (12-32), adaptive (33-53), and transformative (54-72). As Figure 1 illustrates, 21 participants fell into the entry level category; 58 participants into the adaptive category, and 18 into the transformative category.

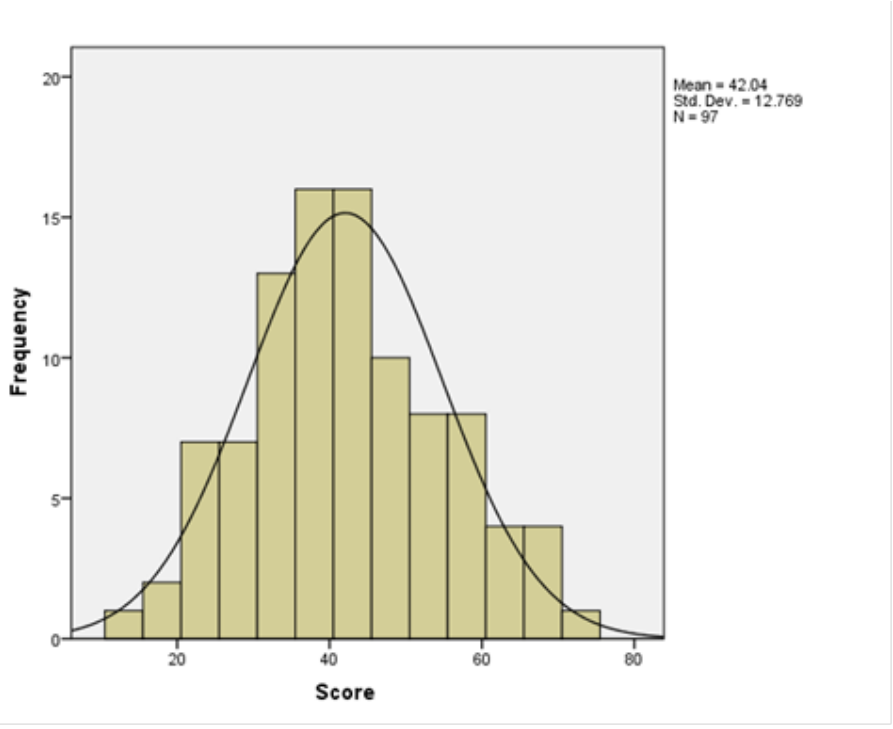

Figure 1. Knowledge of learners category scores (N=97).

Knowledge of Teaching and Learning. The next category focused on Standard II of the NBPTS Library Media Standards (first edition): Knowledge of Teaching and Learning. This standard states that "accomplished library media specialists know the principles of teaching and learning that contribute to an active learning environment" (Coatney et al., 2001, p. 11). The 10 questions in this category focused on how school librarians use technology to support teaching and learning within their schools. The minimum possible score for this category was 20 and the maximum 120.

As illustrated in Figure 2, participants' scores represented a distribution skewed slightly to the left, with one outlier who scored the minimum possible score of 20. The mean of the scores was 96.89, and the standard deviation was 17.732, indicating again that scores were somewhat spread out, rather than clustered tightly around the mean. In this case, however, scores were spread out around the upper end of the score range. In fact, the mode for this category was 120, the maximum score possible.

The Knowledge of Teaching and Learning category scores were then divided into three categories: entry (20-53), adaptive (54-87), and transformative (88-120). As Figure 2 illustrates,

only one participant fell into the entry level category; 23 participants into the adaptive category, and the overwhelming majority (73) into the transformative category.

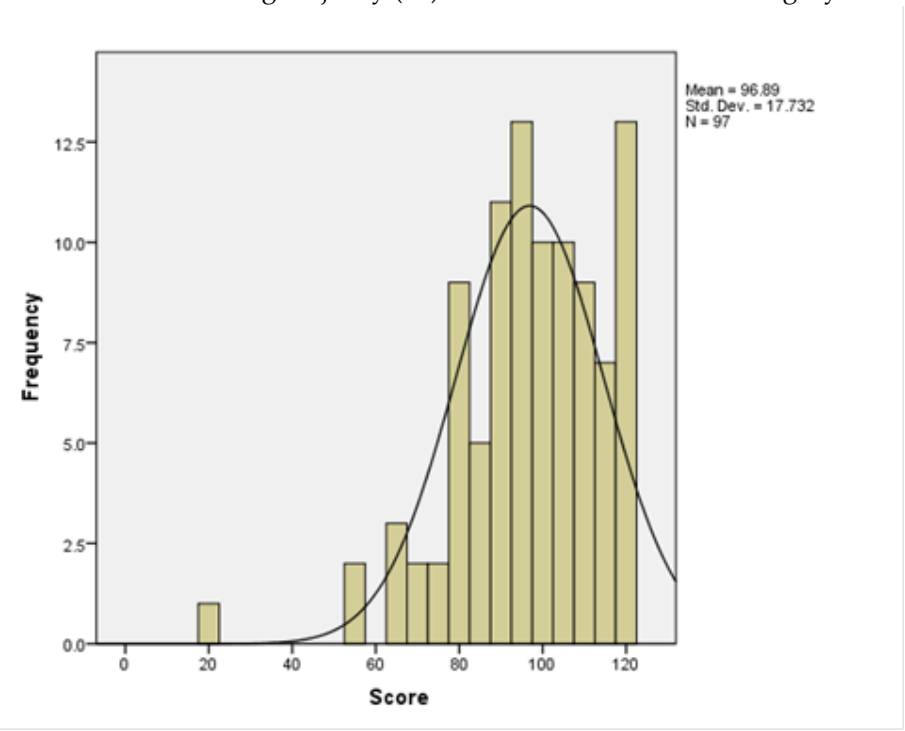

Figure 2. Knowledge of teaching and learning scores (N=97)

Integrating Instruction. The next category focused on Standard IV of the NBPTS Library Media Standards (first edition): Integrating Instruction. This standard states that "accomplished library media specialists integrate information literacy through collaboration, planning, implementation, and assessment of learning" (Coatney et al., 2001, p. 19). The nine questions in this category focused on how school librarians support the integration of technology into the classroom and the school. The minimum possible score for this category was 19 and the maximum 114. As illustrated in Figure 3, participants' scores represented a normal distribution. The mean of the scores was 80.9, and the standard deviation was 21.397, once again indicating that scores were somewhat spread out, rather than clustered tightly around the mean.

Integrating Instruction scores were divided into three categories: entry (19-50), adaptive (51-82), and transformative (83-114). As Figure 3 illustrates, nine participants fell into the entry level category; 42 participants into the adaptive category, and 46 into the transformative category.

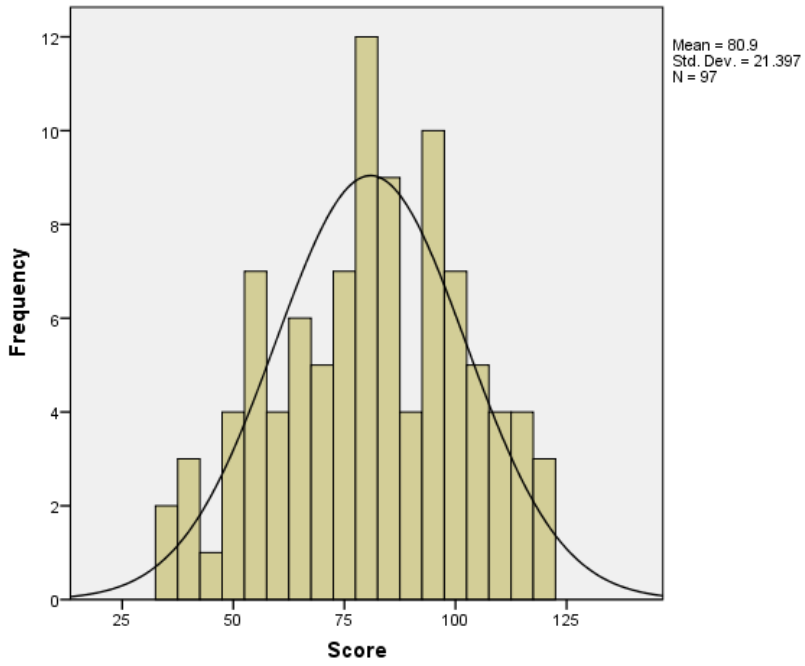

Figure 3. Integrating instruction category scores (N=97)

Knowledge of Library and Information Studies. The next category focused on Standard III of the NBPTS Library Media Standards (first edition): Knowledge of Library and Information Studies. This standard states that "accomplished library media specialists know the principles of library and information studies needed to create effective, integrated library media programs" (Coatney et al., 2001, p. 15). The seven questions in this category focused on how school librarians create and maintain their collections, specifically through the acquisition and curation of digital resources. The minimum possible score for this category was 13 and the maximum 78. As illustrated in the histogram in Figure 4, participants' scores represented a distribution skewed very slightly to the left.

The mean of the scores was 57.57, and the standard deviation was 13.202, indicating that scores were somewhat spread out, rather than clustered tightly around the mean. Knowledge of library and information studies scores were divided into three categories: entry (13-34), adaptive (35-56), and transformative (57-78). As Figure 4 illustrates, only five participants fell into the entry level category; 37 participants into the adaptive category, and 55 into the transformative category.

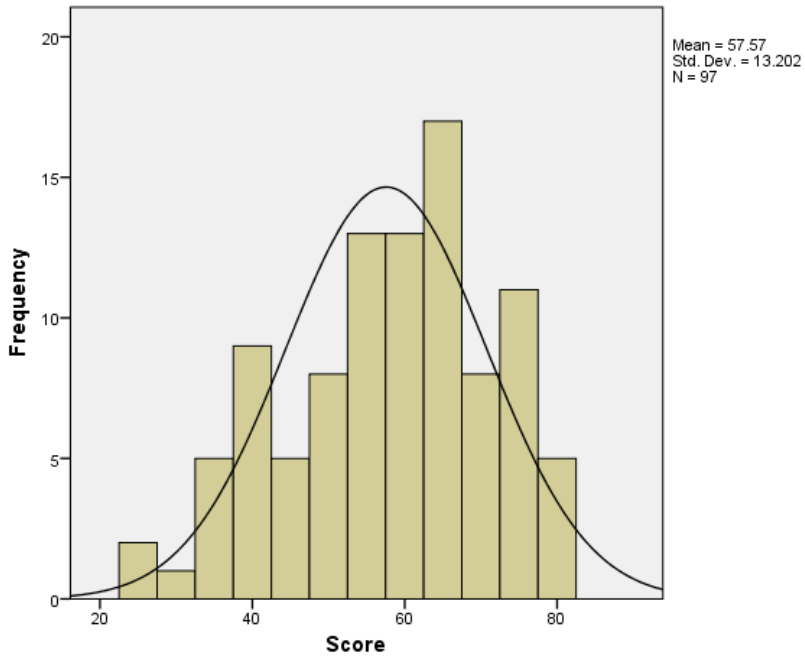

Figure 4. Knowledge of library and information studies (resource focus) scores (N=97)

Leading Innovation through Library Media Program. The next category focused on Standard V of the NBPTS Library Media Standards (first edition): Leading Innovation through Library Media Program. This standard states that "accomplished library media specialists lead in providing equitable access to and effective use of technologies and innovations" (Coatney et al., 2001, p. 23). The 12 questions in this category focused on school librarians' role in providing access to, and training about, technology. The minimum possible score for this category was 21 and the maximum 186. As illustrated in the histogram in Figure 5, participants' scores represented another distribution skewed very slightly to the left.

The mean of the scores was 123.68, and the standard deviation was 33.78, indicating that scores were even more spread out for this category than in previous ones. Leading Innovation through Library Media Program scores were divided into three categories: entry (21-76), adaptive (77-131), and transformative (132-186). As Figure 5 illustrates, 11 participants fell into the entry level category; 49 participants into the adaptive category, and 37 into the transformative category.

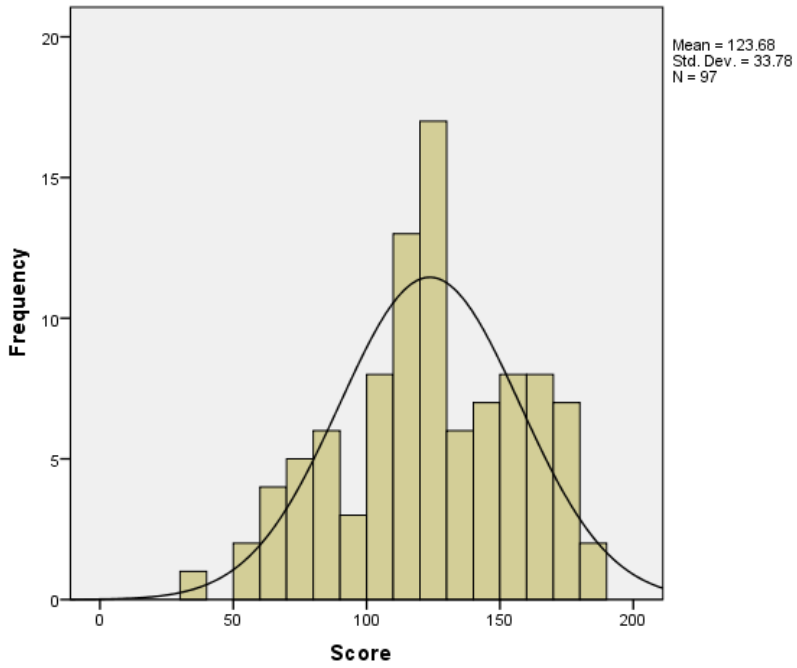

Figure 5. Leading innovation through library media program scores.

This category was the only one to contain an item that explicitly questioned respondents about their perceptions of themselves as technology leaders. They were asked to rate themselves from one to six on this statement: "I possess the knowledge, confidence and courage to act as a technology leader," with a response of one signifying "not my job" and a response of six signifying "fully involved (completely, entirely)." Their responses are listed in Table 2.

Table 2. Self-Reported Perceptions of Technology Leadership Ability (N=97)

Response	Frequency	Percent
Not my job	1	1.0
Not Involved (never involved)	3	3.1
Rarely Involved (infrequently, hardly ever, not often, seldom)	5	5.2
Partially involved (somewhat, moderately, sometimes)	19	19.6
Substantially Involved (frequently, often, most of the time, significantly)	37	38.1
Fully Involved (completely, entirely)	32	33.0
Total	97	100.0

Administering the Library Media Program. The next category focused on Standard VI of the NBPTS Library Media Standards (first edition): Administering the Library Media Program. This standard states that "accomplished library media specialists plan, develop, implement, manage, and evaluate library media programs to ensure that students and staff use ideas and information effectively" (Coatney et al., 2001, p. 27). The five questions in this category focused on how school librarians use technology in their administration and management of the school library program. The minimum possible score for this category was 9 and the maximum 54. As illustrated in Figure 6, participants' scores represented the fifth distribution skewed to the left.

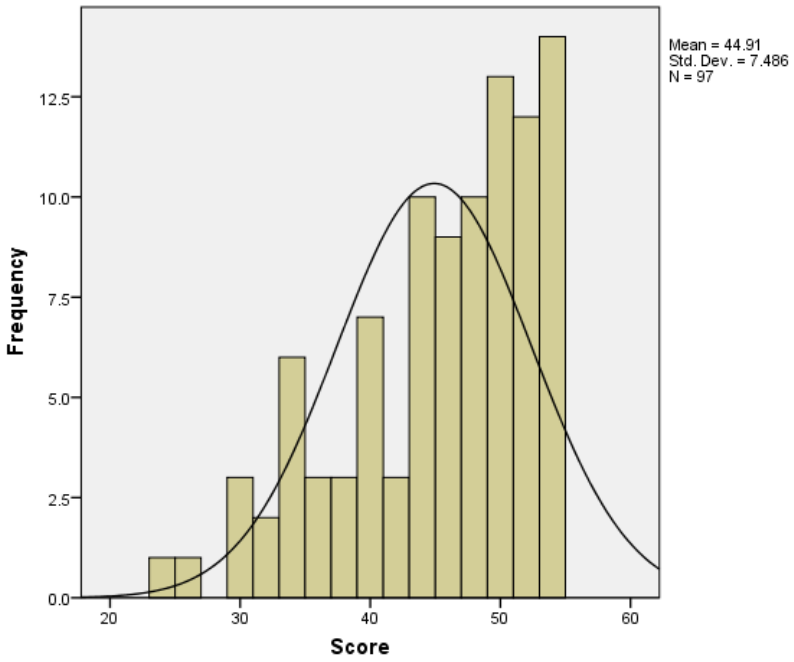

Figure 6. Administering the library media program scores (N=97).

The mean of the scores was 44.91, and the standard deviation was 7.486, indicating that, in this case, scores were clustered more tightly about the mean. This tighter clustering illustrates that participant scores in this category were not as spread out as in previous categories. In fact, when the three leadership levels are considered, a clearer picture emerges.

For Administering the Library Media Program scores, entry level = 9-23, adaptive = 24-38, and transformative = 39-54. As Figure 6 illustrates, no participants fell into the entry level category; 19 participants into the adaptive category, and the large majority (78) into the transformative category.

Reflective Practice. The next category focused on Standard VII of the NBPTS Library Media Standards (first edition): Reflective Practice. This standard states that "accomplished library media specialists engage in reflective practice to increase their effectiveness" (Coatney et al., 2001, p. 31). The four questions in this category focused on how school librarians use reflective practice and feedback from stakeholders to monitor and evaluate the effectiveness of technology in their schools. The minimum possible score for this category was 12 and the maximum 72. As illustrated in Figure 7, participants' scores represented another distribution skewed slightly to the left.

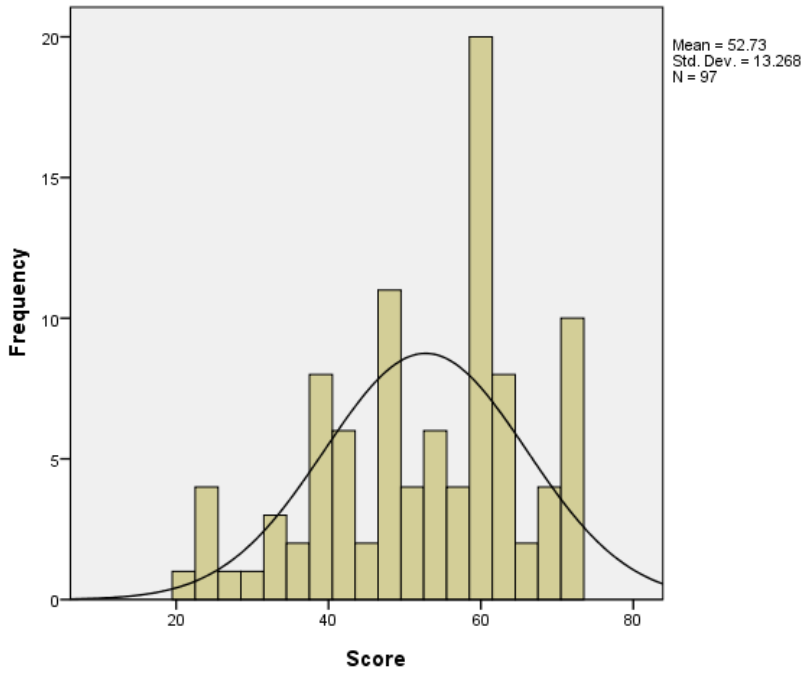

Figure 7. Reflective practice scores.

The mean of the scores was 52.73, and the standard deviation was 13.268, indicating that scores were again somewhat spread out, rather than clustered tightly around the mean. Reflective Practice scores were divided into three categories: entry (12-32), adaptive (33-53), and transformative (54-72). As Figure 7 illustrates, seven participants fell into the entry level category; 36 participants into the adaptive category, and 54 into the transformative category.

Professional Growth. The next category focused on Standard VIII of the NBPTS Library Media Standards (first edition): Professional Growth. This standard states that "accomplished library media specialists model a strong commitment to lifelong learning and to their profession" (Coatney et al., 2001, p. 35). The five questions in this category focused on how school librarians stay up-to-date on the latest technology developments by maintaining involvement with their peers and actively seeking professional development opportunities. The minimum possible score for this category was 10 and the maximum 60. As illustrated in the histogram in Figure 8, participants' scores represented a normal distribution with two outliers.

The mean of the scores was 40.53, and the standard deviation was 10.915, indicating that scores were somewhat more clustered around the mean, though still relatively spread out. Professional Growth scores were divided into three categories: entry (12-32), adaptive (33-53), and transformative (54-72). As Figure 8 illustrates, 11 participants fell into the entry level category; 48 participants into the adaptive category, and 38 into the transformative category.

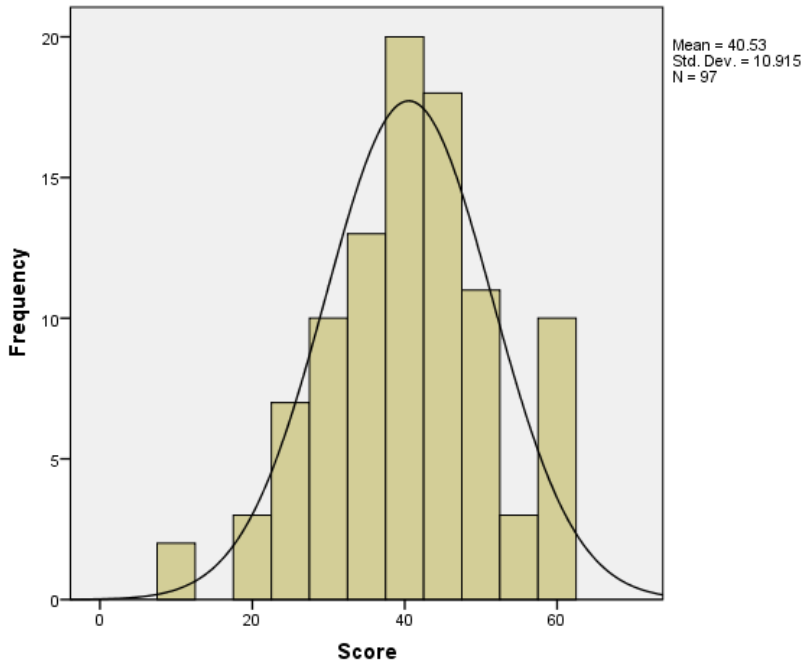

Figure 8. Professional growth scores.

Ethics, Equity, and Diversity. The next category focused on Standard IX of the NBPTS Library Media Standards (first edition): Ethics, Equity, and Diversity. This standard states that "accomplished library media specialists uphold professional ethics and promote equity and diversity" (Coatney et al., 2001, p. 39). The nine questions in this category focused on how school librarians use technology to promote equity and diversity, and how their understanding of technology policies affects that use. The minimum possible score for this category was 18 and the maximum 108. As illustrated in Figure 9, participants' scores represented another distribution skewed to the left.

The mean of the scores was 84.35, and the standard deviation was 17.366, indicating that scores were more spread out, rather than tightly clustered about the mean. Ethics, Equity, and Diversity scores were divided into three categories: entry (18-47), adaptive (48-77), and transformative (78-108). As Figure 9 illustrates, only four participants fell into the entry level category; 24 participants into the adaptive category, and the overwhelming majority (69) into the transformative category.

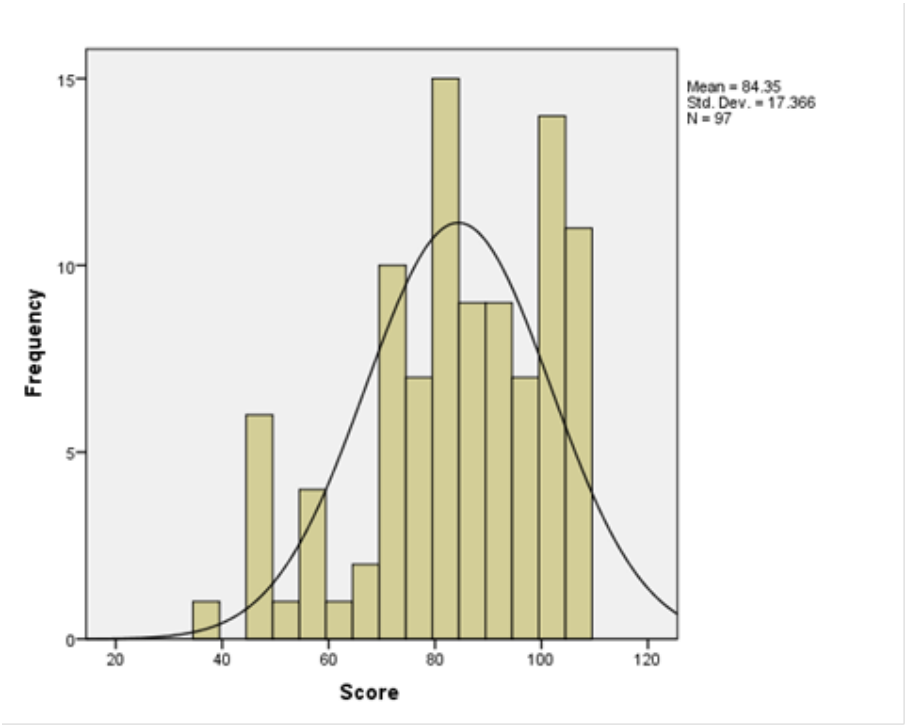

Figure 9. Ethics, equity, and diversity scores.

Leadership, Advocacy, and Community Partnerships. The next category focused on Standard X of the NBPTS Library Media Standards (first edition): Leadership, Advocacy, and Community Partnerships. This standard states that "accomplished library media specialists advocate for the library media program, involving the greater community" (Coatney et al., 2001, p. 43). The five questions in this category focused on how school librarians disseminate information about technology to their schools and to their communities. The minimum possible score for this category was 11 and the maximum 66. As illustrated in Figure 10, participants' scores represented a fairly normal distribution, with perhaps a slight skew to the left.

The mean of the scores was 42.68, and the standard deviation was 12.956, indicating that scores were somewhat spread out, rather than tightly clustered about the mean. Leadership, Advocacy, and Community Partnership scores were divided into three categories: entry (11-28), adaptive (29-47), and transformative (48-66). As Figure 10 illustrates, 13 participants fell into the entry level category; 47 participants into the adaptive category, and 37 into the transformative category.

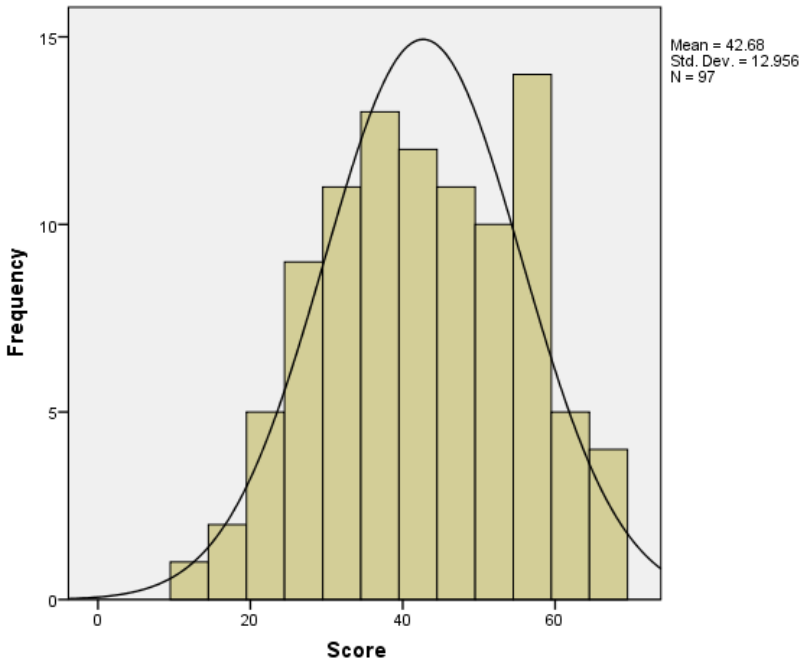

Figure 10. Leadership, advocacy, and community partnerships scores.

Technology Leadership Scores. Each participant's responses to the survey questions were recorded numerically; for each participant, then, a technology leadership score was calculated for each survey category (discussed in the preceding sections) as well as an overall technology leadership score. The minimum possible overall technology leadership score was 145 and the maximum 930. Figure 11 depicts a fairly normal distribution, with a slight skew to the left, as might be expected considering the results from each sub-category above, the majority of which also reflected a slightly leftward skew.

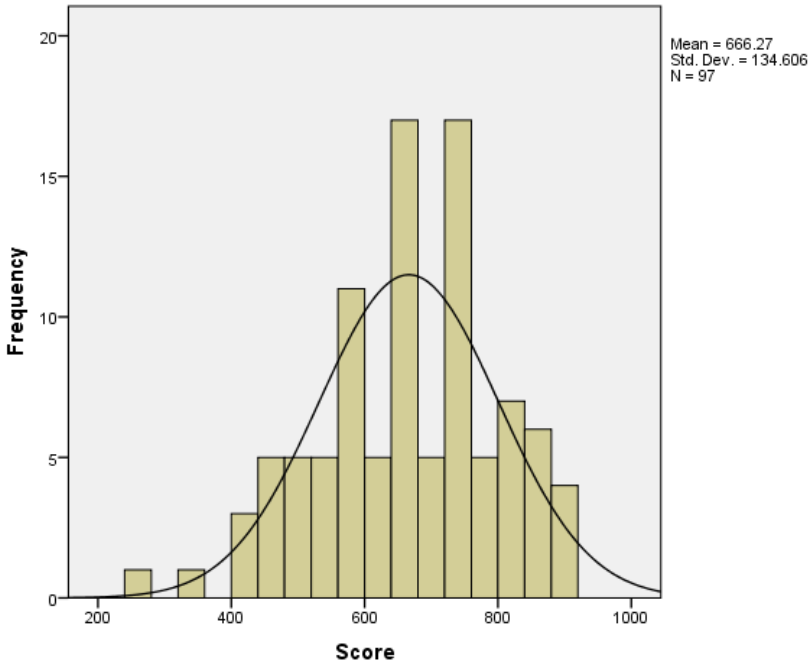

Figure 11. Overall technology leadership scores.

The mean of the scores was 666.27, and the standard deviation was 134.606, indicating that scores were spread out, rather than tightly clustered about the mean. Overall technology leadership scores were divided into three categories: entry (145-407), adaptive (408-669), and transformative (670-930). As Figure 11 illustrates, only three (3.1%) participants fell into the entry level category. There were 43 (44.3%) participants in the adaptive category, and the majority (51, or 52.6%) fell into the transformative category.

Due to the distribution of gender and race described earlier in this chapter (dominantly female and white), the relationship of those variables to the technology leadership score was not examined. The relationship between age and technology leadership score, however, was examined, as well as that between years of experience and technology leadership score. A Pearson Chi-Square test showed no association between a participant's age and his or her technology leadership score [$\chi 2(3306) = 3425.178$, $p = .073$]. The scatter plot in Figure 12 better illustrates the lack of association.

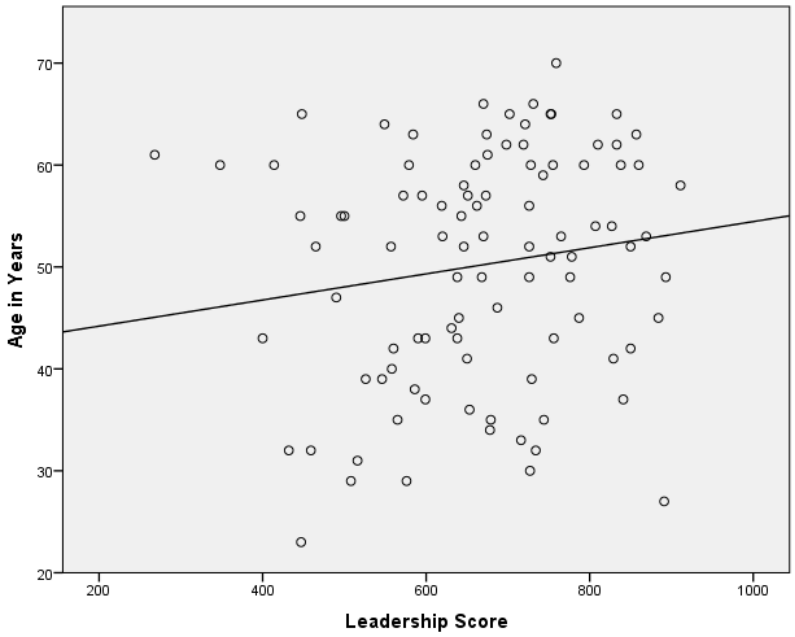

Figure 12. Association between age and leadership score. (N=97)

A Pearson Chi-Square test also showed no association between the number of years a participant had been a school librarian and his or her leadership score [$\chi 2(2610) = 2695.388$, $p = .119$]. This lack of association is also better illustrated by the scatter plot in Figure 13.

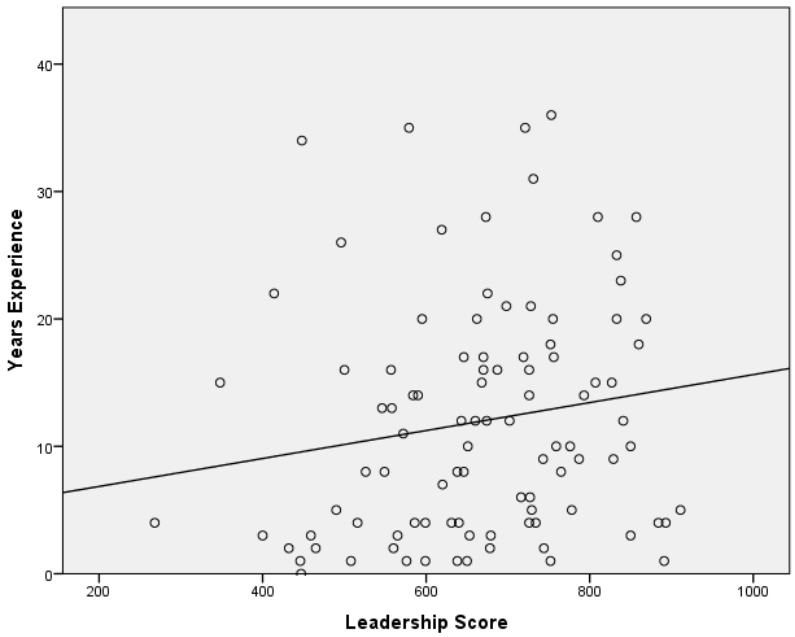

Figure 13. Association between years of experience and leadership score. (N=97)

For each of the ten NBPTS categories, the majority of respondents fell into the adaptive or transformative range of scores. In three categories, the number of participants who fell into the transformative range was particularly high: Knowledge of Teaching and Learning (73, or 75%); Administering the Library Media Program (78, or 80%); and Ethics, Equity and Diversity (69, or 71%). For these same categories, the number of participants who fell into the entry level range was less than five. Also of possible interest is the Knowledge of Learners category, which had the most normal distribution and the highest number of participants in the entry level range (21, or 22%), as well as the lowest number of participants in the transformative range (18, or 19%).

Discussion

The research question for this study asked about the extent to which school librarians felt that they were prepared to lead digital learning resource integration, and about areas that were perceived as strengths or areas for improvement.

Technology Leadership

In 2006, AASL Vision Summit participants added "leader" to the list of roles for school librarians, which already included program administrator, instructional partner, teacher, and information specialist (AASL, 2009). Leadership at the school librarian level includes being an "early adopter of changes in current educational and technology trends" and creating "an environment that is conducive to active and participatory learning, resource-based learning, and collaboration with teaching staff" (AASL, 2009, p. 77-78). The *ALA/AASL Standards for Initial Preparation of School Librarians* reiterate the importance of the leadership role, as well as the ability to "integrate current and emerging technologies into instruction" (AASL, 2010, p. 11). This technologically integrative leadership role was reflected in the NBPTS *Library Media Standards, First Edition,* which formed the basis of the Technology Leadership Survey utilized in this research (Coatney et al., 2001).

The majority of participants in the survey self-reported that they were prepared to act as technology leaders within their schools. When asked to rate their participation in response to the statement, "I possess the knowledge, confidence and courage to act as a technology leader," 71.1%

of respondents indicated that they were substantially or fully involved. The overall technology scores of participants supported this response, where 96.9% scored in the adaptive or transformative range. The adaptive level signifies that the librarian is acting as a technology facilitator, which indicates enough familiarity with technology to not only use it (as with entry level), but to understand and be able to explain it to others. The transformative level signifies a more innovative use of technology where "higher order learning activities" are occurring (Florida Center for Instructional Technology, 2015). In both cases, an integration of technology beyond its use simply as an instructional aide is implied. This self-reported ability to act as a technology leader suggests that, in cases where the school librarian is not fully involved in technological integration, factors beyond their own preparedness are at play. Embedded within this general readiness to act as technology leaders, however, there were distinct areas of strength, as well as room for improvement.

Areas of Strength

A substantial portion of participants' self-reported survey responses fell into the transformative range in three of the nine NBPTS categories: Administering the Library Media Program (n=78, or 80%), Knowledge of Teaching and Learning (73, or 75%); and Ethics, Equity and Diversity (69, or 71%). Additionally, the number of participants who fell into the entry level range in these three categories was less than five. These categories are reflective of the four traditional roles of the school librarian: program administrator, information specialist, instructional partner, and teacher (AASL, 2009). The AASL defines the role of program administrator as follows:

> As program administrator, the school librarian ensures that all members of the learning community have access to resources that meet a variety of needs and interests. The implementation of a successful school library program requires the collaborative development of the program mission, strategic plan, and policies, as well as the effective management of staff, the program budget, and the physical and virtual spaces. To augment information resources available to the learning community, the school librarian works actively to form partnerships with stakeholders and sister organizations at local and global levels. The school librarian also addresses broader educational issues with other educators in the building, at the district level, and at the professional association level. (AASL, 2009, p. 31)

As program administrator, a school librarian is expected to understand the administration of the school library program and to do so with an eye toward ethics, equity, and diversity, as indicated by the directive to provide access to a variety of resources that meet diverse needs. Program management and administration is also listed as Standard 5 of the *ALA/AASL Standards for Initial Preparation of School Librarians*, which calls for school librarians to possess skills in collection development, strategic planning, and business management, and to enact those skills in a professionally ethical manner (AASL, 2010). The survey results indicate that participants have internalized the program administrator role and feel comfortable leading in that role.

School librarians must also employ ethics, equity, and diversity skills in their role as information specialist, where they must possess "expertise in the ethical use of information" and teach that ethical use to the school community as they introduce and model "emerging technologies, as well as strategies for finding, assessing, and using information" (AASL, 2009, p. 29). Further, the *ALA/AASL Standards for Initial Preparation of School Librarians* list "efficient and ethical information-seeking behavior" in Standard 3.1, indicating that school librarians should help school stakeholders "to locate, evaluate, and ethically use information for specific purposes" (AASL, 2010, p. 10). Again, participants seem ready and able to lead as information specialists.

As an instructional partner, "the school librarian works with members of the school community to develop the policies, practices, and curricula to guide student learning" (AASL, 2009, p. 27). The ability to enact the instructional partner role involves a level of knowledge of teaching and learning such that collaboration with the classroom teacher can become an established and ongoing practice. In the closely related role of teacher, a school librarian "empowers students to become critical thinkers, enthusiastic readers, skillful researchers, and ethical users of information" (AASL, 2009, p. 29). The ability to effectively carry out this role also suggests knowledge of teaching and learning, which, as survey results indicate, participants felt that they possessed. This knowledge of teaching and learning is necessary in order to facilitate the integration of "technology directly with curriculum" (AASL, 2009, p. 25). This includes the integration of digital learning resources, and survey results indicate, once again, that this is an area where participants feel comfortable leading.

Area for Improvement

The ability to act as an effective teacher is also assisted by knowledge of the individual learner. Questions in the Knowledge of Learners category were based on the NBPTS (first edition) standard, which stated that school librarians should "have knowledge of learning styles and of human growth and development" (Coatney et al., 2001, p. 7). The *ALA/AASL Standards for Initial Preparation of School Librarians* also list "knowledge of learners and learning" as the first element in Standard 1 (AASL, 2010, p. 1). Standard 1.1 calls for the following skillset:

> Candidates are knowledgeable of learning styles, stages of human growth and development, and cultural influences on learning. Candidates assess learner needs and design instruction that reflects educational best practice. Candidates support the learning of all students and other members of the learning community, including those with diverse learning styles, physical and intellectual abilities and needs. Candidates base twenty-first century skills instruction on student interests and learning needs and link it to the assessment of student achievement. (AASL, 2010, p. 1)

Despite the importance placed on knowledge of learning and learning styles by both the NBPTS and AASL, responses in the Knowledge of Learners category reflected the highest number of participants in the entry level range (21, or 22%), and the lowest number of participants in the transformative range (18, or 19%). This finding indicates that participants are less comfortable with their knowledge of learners than in any other category of the survey.

There are a few possible explanations for this result. Certified school librarians do not necessarily have a degree in teacher education, as the school library degree is offered at the Master's level and admission requirements do not include an undergraduate degree in teacher education. Additionally, school librarians may or may not spend time in the classroom before moving into the library, and not all school librarians teach regularly when they do secure a position in the library. Unfortunately, the survey instrument did not ask for participants' areas of degree specialization. Information regarding whether or not the participant had been a classroom teacher was collected, and 74 (76%) respondents indicated that they had spent time in the classroom. However, the amount of time spent in the classroom before moving to the library might also be a factor in the number of participants who fell into the entry level range in the Knowledge of Learners category, and the survey instrument did not capture that information either.

The remaining six technology leadership survey categories fell somewhere in the middle, with the large majority of scores distributed more evenly between the adaptive and transformative levels. This trend suggests that there may be additional factors at play that hinder the participants'

ability to move away from the adaptive level and into a more transformative role in technology leadership in their schools.

Limitations. This research was exploratory in nature and cannot be generalized to either the national or international population of school librarians. Participants in this study resided and worked as school librarians in the state of Florida only. The study also relied on participant self-reporting. As such, some measure of bias is to be expected, whether that bias is under- or over-reporting their skill levels. Rather than offering generalizations about the school librarian population at large, this research provides applications for preservice education, and directions for future research.

Conclusion

In this study I set out to explore the extent to which school librarians perceived themselves as leaders in digital learning. Using an established survey instrument and scoring mechanism, I examined the technology leadership skills of a sampling of Florida K-12 school librarians. Survey participants' technology leadership scores presented as a normal distribution, with a few outliers causing a slight skew to the left, indicating that a few participants were less comfortable with their ability to act in a technology leadership role. A Pearson Chi-Square test showed no association between respondents' technology leadership scores and their age, or between the score and their years of experience in the school library.

Directions for Future Research.

One application for preservice training would be the issue that emerged from the survey data regarding the Knowledge of Learners category. The NBPTS Library Media Standards and the ALA/AASL Standards for Initial Preparation of School Librarians both call for school librarians to develop and exhibit some level of mastery in this area (Coatney et al., 2001; AASL, 2010). A larger focus on the components of learners and learning in preservice school library programs might result in a shift toward more school librarians self-reporting at the transformative level. This shift might also be evident to other stakeholders within the school, particularly teachers, and might encourage collaboration, which could lead to the opportunity to more fully enact the technology leadership role.

Professional standards for school librarians call for them to act as technology leaders (AASL, 2009), and the quantitative data from the survey indicates that they are prepared to do so. The question remains as to whether or not they are given the opportunity to enact those leadership skills. Only the quantitative results from Section II of the Technology Leadership Survey were reported here. Future papers will report the qualitative results from Section III of the survey, as well as results from follow-up interviews that were conducted as part of the larger study, both of which explore the factors that enable and inhibit school librarian's ability to act as technology leaders.

Future directions for research include a larger national and/or international study regarding the enactment of technology leadership skills of school librarians across the U.S. and possibly the world. Other areas to explore include the school librarian's curatorial role in digital resource integration and implementation, and the comprehensiveness of school library pre-service programs as compared to the AASL's standards.

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Author Note

Jennifer R. Luetkemeyer is an Assistant Professor of Library Science at Appalachian State University in Boone, NC. Her research interests include school libraries, digital integration, digital learning resources, educational technology, and school culture. This work was adapted from her dissertation entitled *The Information Worlds of School Librarians as Digital Learning Leaders.*

Appendix A. Technology Leadership Survey

Section I

1. Your gender [radio button] Male Female Other
2. Your ethnicity: Hispanic or Latino American Indian or Alaska Native Asian Native Hawaiian or Other Pacific Islander White More than one race [radio button]
3. Your age in years: [text box]
4. Certification/Position: Teacher-Librarian (state certified as both teacher and librarian/media specialist); Teacher (state certified as a teacher, but not as a librarian/media specialist); Librarian (State certified librarian/media specialist, or with a master's degree in library and information science, but not certified as a teacher); Other (certified as neither a teacher nor a librarian/media specialist, without a masters degree in library and information science) [radio button]
5. State where you were certified: [drop down]
6. Years experience as a school library media specialist [text box]
7. A. Are you a National Board Certified Media Specialist? Y/N [radio button]
7. B. If so, what year did you obtain certification? [text box]
8. A. Do you have experience as a classroom teacher? Y/N [radio button]
8. B. If so, at what level did you teach for the longest period? Elementary, Middle, High [radio button]
8. C. If yes, at what grade level did you teach? K, 1, 2, 3, 4, 5, art, music, physical education, foreign language, special education [checkbox]
8. C. If yes, what subject area did you teach? language arts/English; science; mathematics; history; art; journalism; guidance; career tech; physical education; foreign language; special education; reading; other [checkbox]
9. How many schools do you serve? [text box]
10. What is your work status? Full time; part time [radio button]
11. How many certified full-time school library media specialists work in your school? Please include yourself in the count if you are full-time. [text box]
12. A. Are there other paid staff working in your library who are not a certified school library media specialists (e.g., clerk, aide, paraprofessional)? Y/N [radio button]

13. B. If yes, how many are full-time? [text box]
13. C. If yes, how many are part-time? [text box]

13. How many hours a week do you have library volunteer help? (Total hours=number of volunteers x number of hours each week. Example: 6 volunteers working 15 hours each per week is 90 hours of volunteer help) [text box]
14. Do you have any full-time instructional technology staff in your school? Y/N [radio button]
15. Do you have any part-time instructional technology staff in your school? Y/N [radio button]
16. On what type of schedule does your media center operate: fixed flexible combination of fixed and flexible block [radio button]
17. What type of Internet access exists in your library? None Dialup Broadband Don't know [radio button]
18. Do you feel that you have adequate speed and reliable access to the Internet for instructional purposes? Y/N [radio button]
19. A. If there is Internet access in your library, does it have filtered or unfiltered access for students?: filtered only, unfiltered only, both filtered and unfiltered, Don't know [radio button]

19. B. If there is Internet access in your library, does it have filtered or unfiltered access for Professional staff (e.g., school library media specialist, classroom teachers)? filtered only, unfiltered only, both filtered and unfiltered, Don't know [radio button]

20. Please provide the number of computers in the library media center: Desktops located in or under supervision of the school library media center: _____; Desktops located elsewhere in the school, not under the library media center (LMC) control, but connected to LMC resources_____; Laptops located in or under supervision of the school library media center: _____; Laptops located elsewhere in the school, not under the library media center (LMC) control, but connected to LMC resources _____; [text boxes]

Section II

DIRECTIONS: Directions:

Scale:

1. Not my job
2. Not involved (never involved)
3. Rarely involved (infrequently, hardly ever, not often, seldom)
4. Partially involved (somewhat, moderately, sometimes)
5. Substantially involved (frequently, often, most of the time, significantly)
6. Fully involved (completely, entirely)

[all radio buttons]

I. Knowledge of Learners	Level of Statement	Scale
21. I provide learners with technological tools to meet their needs.	Entry	
22. I instruct learners in using the most appropriate technology to meet their needs.	Adaptive	
23. I impact school-wide decision-making concerning technology and learning.	Transformative	
24. I provide assistive and adaptive technologies for learners.	Entry	
25. I ensure that the content in district's learning management system (e.g., Moodle, Blackboard) meets student needs.	Adaptive	
26. I develop content for the school's learning management system (e.g., Moodle, Blackboard).	Transformative	

Knowledge of Teaching and Learning	Level of Statement	Scale
27. I use technology to differentiate my instruction.	Adaptative	
28. I understand that appropriate use of technology can pique learners' interest.	Entry	
29. My instruction integrates technology that is aligned to local, state and/or national professional and technology standards.	Transformative	
30. In my instruction I model use of emerging technologies.	Adaptive	
31. I teach learners how to identify the appropriate technology for their needs.	Adaptive	
32. I use AASL *Standards for the 21st Century Learner* to guide the development of my instruction.	Adaptive	
33. I am confident supporting science and mathematics teachers and learners with technology.	Adaptive	
34. I am confident supporting mathematics teachers and learners with technology.	Adaptive	
35. I am confident supporting English/Language Arts teachers and learners with technology.	Adaptive	
36. I am confident supporting social studies teachers and learners with technology.	Adaptive	

Integrating Instruction	Level of Statement	Scale
37. I collaborate with teachers to plan for using technology in their instruction.	Adaptive	
38. I provide teachers with access to technology that enhances their instruction.	Entry	
39. I provide teachers with a range of technological alternatives for assessing students learning.	Adaptive	
40. I advocate for the use of technology for alternative demonstrations of student learning.	Transformative	
41. I am involved in the initial process of setting learning objectives and promoting the integration of technology in classroom instruction.	Transformative	
42. I promote learning activities that connect the use of technology to content standards.	Transformative	
43. I help learners create their products using various types of technology.	Entry	
44. I facilitate learners' use of technology to create products that express new ideas.	Adaptive	
45. I participate in instructional materials selection decisions, including digital textbook resources.	Transformative	

Knowledge of Library and information Studies (Resource Focus)	Level of Statement	Scale
46. I apply evaluative criteria to select digital resources for acquisition.	Entry	
47. I collaborate with the school learning community to assess curricular needs for digital resources and incorporate this information when considering immediate and long-range budgets.	Adaptive	
48. I foster an information rich environment where learners can explore their personal interests.	Transformative	
49. I follow a consistent procedure to assess the effectiveness of digital resources.	Adaptive	
50. I ensure connections to a wide variety of digital resources within and beyond the school walls.	Entry	
51. I employ effective management skills in collecting, organizing, disseminating, and maintaining digital resources in order to enhance access.	Adaptive	
52. I include digital resources in my online catalog.	Adaptive	

Leading Innovation through Library Media Program	Level of Statement	Scale
53. I possess the knowledge, confidence and courage to act as a technology leader.	Transformative	
54. I maximize access to technology equipment for all members of the learning community.	Adaptive	
55. I manage a school library website.	Adaptive	
56. I take the lead in the delivery of information beyond the school walls.	Transformative	
57. I seek grants and funding opportunities to provide technology and/or digital resources to the school community.	Transformative	
58. I strive to reduce barriers to constructive use of digital	Transformative	

resources.		
59. The technology training I provide to teachers is an integral part of my school's professional development plan.	Transformative	
60. I actively contribute to school committees or teams to make the learning community aware of the availability of technologies and how best to use them.	Transformative	
61. I participate in the educational technology decision-making process in my district.	Transformative	
62. I make partnerships throughout the community to increase digital resources and technologies offered to learners.	Adaptive	
63. I advocate for the supply and utilization of broadband for appropriate for instructional uses.	Transformative	
64. I have or will have a role in my school's current or future use of digital textbooks.	Entry	

Administering the Library Media Program	Level of Statement	Scale
65. I choose technology tools appropriate for administrative tasks.	Entry	
66. I use the reporting options of library management systems (e.g., circulation systems, reading programs, collection analysis).	Transformative	
67. I ensure that the school library media center's mission continues to evolve as technology changes.	Adaptive	
68. I organize special programs and events related to technology.	Adaptive	
69. I maintain technology equipment.	Entry	

Reflective Practice	Level of Statement	Scale
70. I solicit feedback from teachers about technology.	Transformative	
71. I solicit feedback from students about technology.	Transformative	
72. I reflect on and learn from student assessments and modify instruction as necessary.	Transformative	
73. I actively employ strategies to evaluate the effectiveness of technology in my school library program.	Transformative	

Professional Growth	Level of Statement	Scale
74. I stay abreast of innovations in technology through reading professional materials in both print and online.	Entry	
75. I belong to professional organizations that promote the use of technology in education.	Adaptive	
76. I present technology related professional development activities at conferences.	Transformative	
77. I present technology related professional development activities to the learning community.	Adaptive	
78. I engage in face-to-face and/or online professional interactions with peers and experts.	Adaptive	

Ethics, Equity, and Diversity	Level of Statement	Scale

79. I am aware of policies on the use of technology and digital resources.	Entry	
80. I provide input on policies on the use of technology and digital resources.	Adaptive	
81. I provide instruction for teachers on the ethical and legal policies and practices relating to technology and digital resources.	Adaptive	
82. I provide instruction for students on the ethical and legal policies and practices relating to technology and digital resources.	Adaptive	
83. I model the ethical and legal policies and practices relating to technology and digital resources.	Adaptive	
84. I ensure that digital resources reflect the diversity of cultural expression.	Adaptive	
85. I use technology to enable and empower learners with diverse backgrounds.	Adaptive	
86. I understand the new developments in Fair Use and Creative Commons and share that knowledge with learners using and producing media	Adaptive	
87. I examine web-based and free or open-source software alternatives to promote equity.	Transformative	

Leadership, Advocacy, and Community Partnerships	Level of Statement	Scale
88. I disseminate information about the use of technology and digital resources within the school to the community at large.	Adaptive	
89. I disseminate information about advances in educational technology and digital resources to the community at large.	Adaptive	
90. I advocate on local, state and/or national levels for the implementation of technology in education.	Transformative	
91. I develop strategies and use technology to inspire students to make a contribution to the community at large.	Transformative	
92. I am aware of information about advances in technology and digital resources.	Entry	

Section III

Open Ended Questions:

93. Think back about the activities in the preceding statements, specifically those in which you are fully involved. What enables you to be involved at that level?
94. Again, think about those activities addressed earlier. Are there any activities in which you'd like to be more involved than you are right now? If so, please tell us about the barriers that hinder your involvement.
95. Do you have anything else you would like to add?