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# Investigating Technology Integration Practices and Competencies of School Librarians: A Case Study in Kentucky, USA

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*The 21st century school has demanded the increasing use of technology integration. This study investigates technology practices and competencies of school librarians. An online survey targeting current school librarians working in Kentucky, USA was conducted through the email listserv for Kentucky Library Media Specialists (KYLMS). The survey data were analyzed and interpreted on the basis of, and in relation to, a cross-mapping of the following two criteria via the seven technology areas by the National Center for Education Statistics: (1) 2010 ALA/AASL Standards for Initial Preparation of School Librarians, and (2) knowledge and skills specifications for school media librarians in the Praxis II Library Media Specialist test. The combined context can serve as a framework for comparative or evaluative analyses on the school librarians' practices and competencies of technology integration. Implications of the results are discussed, including as a reference for school library program curriculum development and implementation.*

## Introduction

The use of educational technology in K-12 classrooms has been gaining tremendous momentum across the country since the 1990s (Delgado, Wardlow, McKnight, & O'Malley, 2015): the rise of the digital revolution and the need for incorporating technological tools to assist in facilitating the Common Core State Standards. Since then, federal and state governments and agencies have promoted and supported the integration of technology to enhance K-12 education. As an example, building on the work of leading educators and researchers at the state and federal levels, The National Education Technology Plan (U.S. Department of Education, 2017) delineates a national vision and plan for technology-based learning and teaching. In the state of Kentucky, the 2018-2024 Kentucky Education Technology System (KETS) Master Plan (KDE, 2018) was issued to represent a five-year vision for the technology strategy that supports the school districts' education plans and digital readiness, as well as ensuring alignment to the Kentucky Board of Education's (KBE) vision and educational goals.

The ever-changing technological environment of 21st century schools has significantly affected and redefined the position of the school librarian, adding various responsibilities in integrating technology. The task of technology integration has been delineated in the professional standards and guidelines that school librarians frequently consult (e.g., AASL 2017; ALA & AASL, 2010; ISTE, 2017), but these documents do not specifically articulate technology competencies. The duties utilizing specific technology competencies are often assigned to school librarians because they have pedagogical knowledge paired with technology expertise (Johnston, 2012). Despite the growing demands of technology tasks, little work has explored technology competencies of school librarians, and no empirical research has been conducted regarding identifying technology-integration competencies for school librarians (Asselin 2005; Tilley & Callison 2001; Everhart, Mardis, & Johnston 2010; Shannon 2008; Vansickle 2000).

## **Research Goal and Research Questions**

To better educate and prepare pre-service school librarians for their technology integration duties, learning about the competencies of school librarians regarding technology integration is needed. In this study, we aimed to assess current technology integration practices of school librarians in order to identify competencies, such as the knowledge, skills and abilities desirable to perform a broad range of technology integration tasks. Therefore, the result of this study can contribute to providing an empirical ground in the curricula design and development of technology for pre-service school librarian education programs. For the research goal, this study addresses the following research questions:

- RQ1. What are the technology integration practices of school librarians?
- RQ2. What are the technology competencies of school librarians?

## **Literature Review**

Educational technologies providing efficient and effective instruction and learning are moving at a rapid pace. Therefore, educators must combine the need for information and communication technologies (ICT) in and out of the K-12 classroom, emphasizing this inclusion as integral to the teaching and learning process (Hinostroza, Ibieta, Claro, & Labbé, 2016; Tondeur, Pareja Roblin, van Braak, Voogt, & Prestridge, 2017; Tondeur, VanBraak, & Valcke, 2007). The review of the literature focuses on the roles technology plays with educational professionals and the school librarian.

## **Education Professionals and Technology**

Educational systems that better understand and utilize technology skills and competencies will be best suited to influence the minds of today's learners (Tondeur et al, 2017). In the 21st century school, technology has become a common tool supporting nearly all aspects of the school library profession and an integral component for its various stake holders.

For the school librarian, their positions require taking an active role in technology (Maceli, 2015), necessitating school librarians to acquire skills and competencies in educational technologies. Proposing and implementing curriculum for information and computer technologies (ICT) can be central to the role of school librarians, allowing them to carve out a niche as subject matter experts in educational technology (Hew & Brush, 2007). For classroom teacher, utilizing various technologies in their classrooms to help students strengthen critical and creative thinking skills necessary for the 21st century, allowing students to learn both in and outside of a brick and mortar classroom (Delgado et al., 2015). For library science educators, a variety of subjects and courses related to information technology have been extensively integrated and implemented in library science curriculum over the past decade. Some technology topics have consistently dominated curriculum in library science (Singh & Mehra, 2013), and other technology competencies required by employers in the library science domain were also incorporated (Mathews & Purdue, 2009). With the recent emerging technology demands and needs, library science educators seek to meet as well as anticipate up-to-date technology skills and competencies for library professionals.

An effective school system relies upon colleagues that will form professional partnerships where rapid advances in information technology interconnect to the work (Bratta, 2011). Based upon a shared vision of library professionals' needs (Tosaka & Park, 2017), continuing education in technology (e.g., ISTE) and professional competencies (e.g., ALA/AASL Standards for Initial Preparation of School Librarians) must collaboratively evolve, for there is a continuing need for learners to be offered technical skills and competencies (Shannon, 2002). Through developed levels

of integration of all partnering agents, educators across all platforms must engage learners in technology.

### ***School Librarians and Technology***

The modern school library “is a laboratory of creation” (Dando, Folk & Levitov, 2017, p. 8), a cultivation of skills that enables school librarians to foster the unique interests and individual needs of learners across all spectrums. Leadership in technology, for the purposes of learning, is paramount (Federer, 2018; Johnston, 2012). The challenges faced by school librarians of this digital era requires a deeper understanding of what today’s learners require to thrive. School librarians play the role of faculty tasked with understanding, designing, and implementing successful learning environments to engage learners. They must navigate the spectrum of available resources online and within the library system in order to showcase exemplary learning practices and principles (Turner & Lucas, 2018). Research has noted librarians having a desire for greater educational support on topics related to current/emerging technologies (Tosaka & Park, 2018). Though some educators may shy away from incorporating technology in the classroom (Kim, Kim, Lee, Spector, DeMeester, 2012), school librarians are tasked with bringing a bold perspective and a wealth of experience and knowledge to the traditional delivery of instruction, modifying education by embracing technology as the vehicle for enhanced learning (Turner & Lucas, 2018).

An issue that school librarians have often confronted is that they are ill-equipped to implement the use of technology to its full potential in the classroom. In addition, the lack of technology integration in a wide variety of school librarian roles may be out of the librarians’ control, although underlying beliefs and attitudes toward technology and its use for teaching and/or learning can be a factor (Hughes-Hassell & Hansan-Baldauf, 2008); it has been found that the role of the school’s integration into technology is dependent upon the active role of the school librarian (Shannon, 2002). Given the issues, the existence of two roles within some school systems also has an effect on the abilities and support offered to school librarians, as often there will be a separate role for the librarian vs. a technology specialist who works directly with teachers (Everhart et al., 2010).

## **Research Method**

### ***Data Collection***

To examine the practices and competencies, we prepared and executed an online survey targeted for current school librarians. School librarians subscribing to the school librarian listserv in Kentucky (KYLMS) with 1,415 subscribers, voluntarily participated in this survey. The survey was posted on the listserv at the end of June 2017 for two weeks. During the period, a total of 41 current school librarians responded to the survey, and the schools of the 41 respondents were dispersed in 29 different counties in Kentucky (refer to Fig. 3 below). Kentucky is one of forty-two states adopting the Common Core State Standards, a 2010 educational initiative that specifies the competencies to be achieved in English language arts and mathematics by K–12 students at the end of each school grade (CCSSO & NGA, 2010). The survey participants relatively well represent all regions in the state (as shown by the coverage in Figure 3), including seven counties belonging to the Appalachian region (52 of 120 counties in KY). The state of Kentucky is one of 13 states in the Appalachian region in the United States. Appalachian Kentucky is a region with a long history of systemic poverty and educational inequality (Elam, 2002).

The survey was composed of three question sets containing: (1) contextual data; (2) technology practices; and (3) technology competencies; the full survey is featured in Appendix A. The question set for the contextual data was to inquire on background information of online survey

participants, such as location and grade level of schools, experience as school librarians, etc. The second question set investigated school librarians' typical or representative practices of technology integration for each of the five ALA/AASL Standards for Initial Preparation of School Librarians (2010), national standards of acceptable practice by the accrediting associations for school librarians, in order to align the technology practices with the recognized standards. The third question set examined the technology competencies of participants by identifying specific technologies being used along with the level of expertise. To do this, we employ a definition of technology from National Center for Education Statistics under U.S. Department of Education, covering a broad range of elements for the infrastructure of the operation of instructional and school management applications (NCES, 2002). Given the definition of technology consisting of seven specific categories in technology (i.e., computers and peripherals; servers and routers; telephone-based technology; audio/video equipment; instructional display equipment; networking; software applications), survey participants were asked to identify the technologies being used and their competency levels for each technology category.

To investigate the technology competency of school librarians in the second part of this survey, a definition of technology is employed in which technology is defined as a combination of 7 different elements (i.e., T1 through T7). To cover the 7 elements, the second survey consists of 7 questions (C1 through C7), and each question deals with a separate technology element. In each survey question, participants are asked to identify three technologies related to a technology element. Please refer to the survey questions and technology definition at Appendix A.

## **Data Analysis**

To analyze the reported technology-integration practices, we adopted the responsibility specifications for school librarians noted in the Library Media Specialist Praxis (<https://www.ets.org/s/praxis/pdf/5311.pdf>), prepared and authorized by Educational Testing Service (ETS), an educational testing and assessment organization, as a de facto standard. The reason for the adoption is that the Praxis test is prepared to assess the knowledge and skills related to the specifications, and passing the Praxis test is a requirement for school librarians. The knowledge and skills specifications follow (refer to Appendix C for more details on the knowledge and skills):

Topic 1: Program Administration

Topic 2: Collection Development

Topic 3: Information Access and Delivery

Topic 4: Learning and Teaching

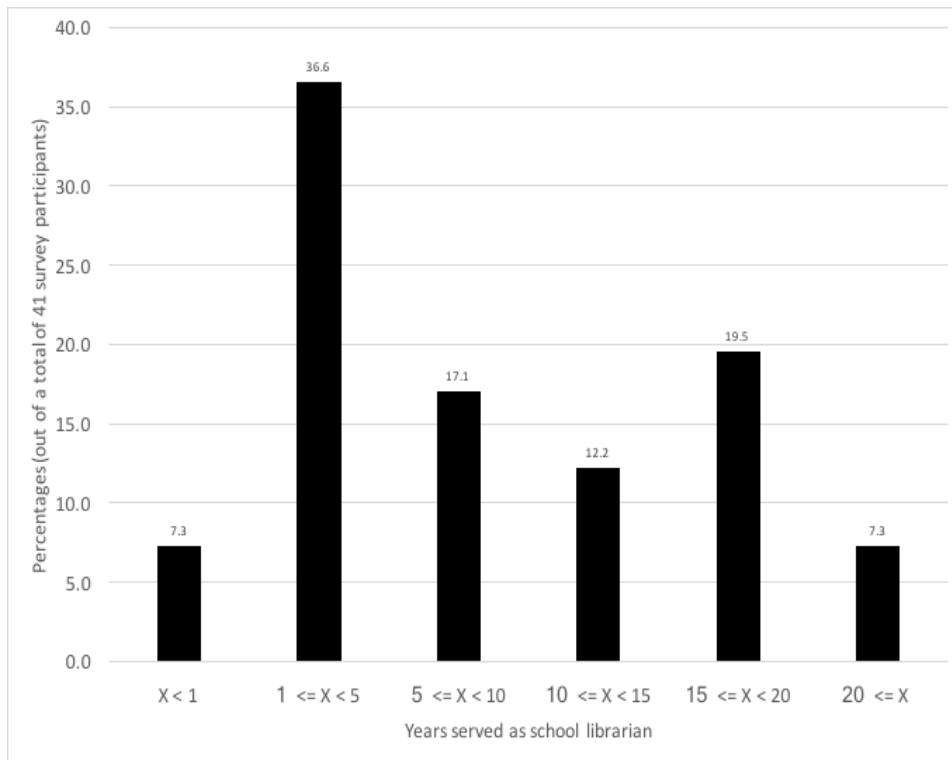
Topic 5: Professional Development, Leadership, and Advocacy

Each topic exhibits a number of specific elements. We mapped out the reported technology-integration practices into the elements of the topics through using inter-rater reliability. Two of the authors were involved in the inter-rater reliability process. After becoming familiar with the coding scheme, they analyzed 10% of the sampled data and discussed the results until reaching full agreement. Then, all the remaining data samples were divided and coded. The coded data set was collected and analyzed through the frequency analysis and charted out based on the frequency percentage.

## **Results**

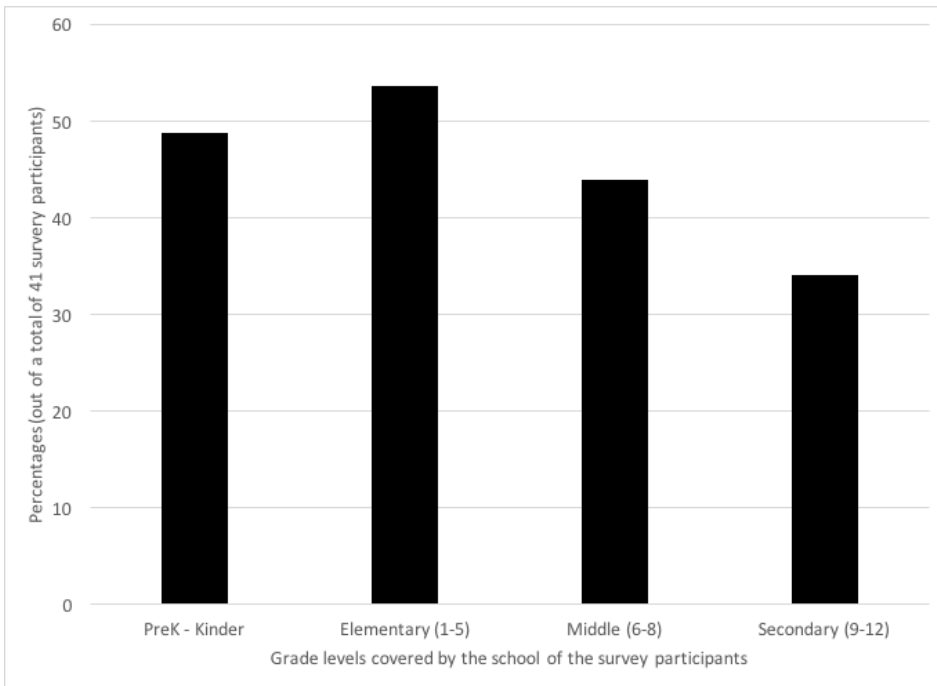
The following section describes the outcomes obtained from the survey data. Figures 1-3 refer to the demographics of the research participants (e.g., experience levels, school grade levels and school locations within the state of Ky.). The results of the first and second research questions are shown

through Figures 4-6 and 7-13, respectively. While figures 4-6 exhibit technology integration practices of the school librarians surveyed, figures 7-13 are associated with their technology usage and competency.



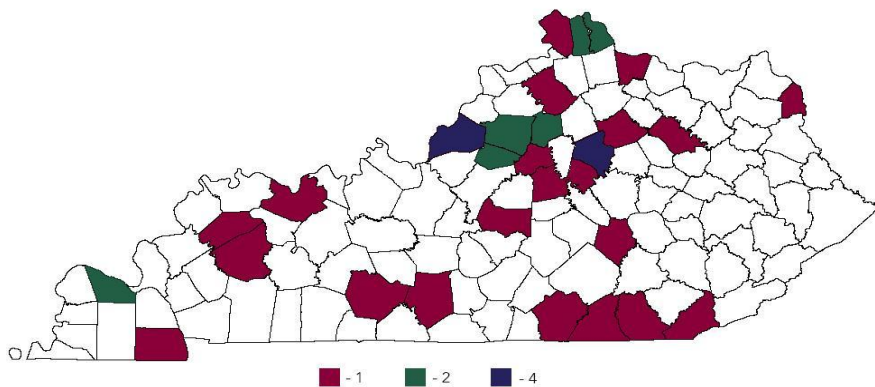
**Figure 1. Experiences at the position of school librarian in years**

Figure 1 shows the distribution of the participants into six different ranges in years of service. The range of the participants as school librarian are from less than one to more than 20 years. The average years of service is 8.5. It is clearly shown that the years of service of the participants are not evenly well-distributed. Nevertheless, the data exhibit that all ranges of experience are reasonably represented, with the majority (i.e., about 85%) falling within the middle levels (between equal to or greater than 1 year and less than 20 years) and a relatively small number of participants (i.e., about 14.6%) at the least or most experienced levels.



**Figure 2. Distribution of grade levels of the schools**

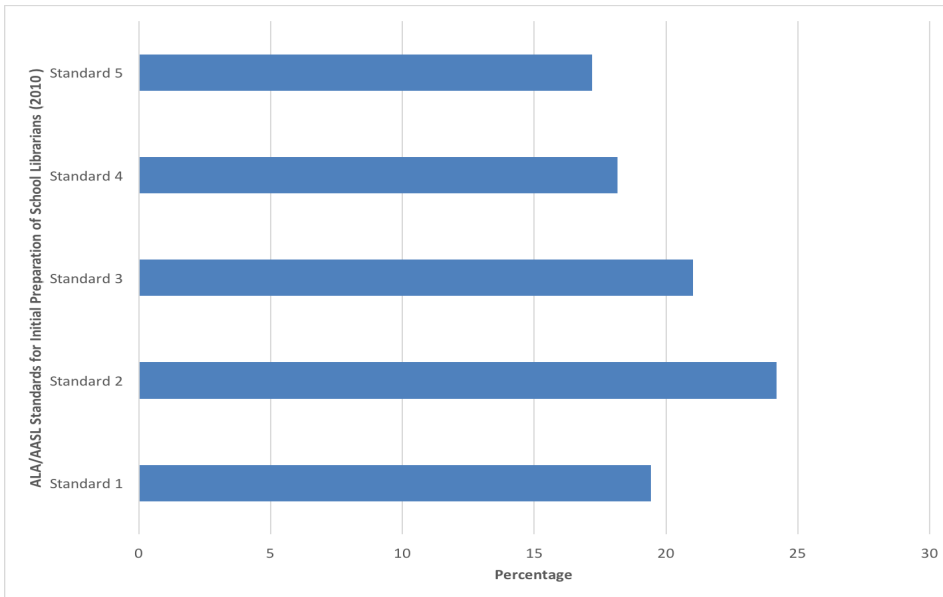
Figure 2 illustrates the distribution of the school librarian participants into four grade ranges. As shown, the percentage of participants in each grade range is well above 30 percent so that all the ranges are adequately represented by the survey participants. Note that the sum of the percentages for all ranges exceeds 100 percent due to the fact that in many cases survey participants’ schools encompass multiple grade ranges fully or partially.



**Figure 3. Distribution of the schools of the participants in Kentucky county map**

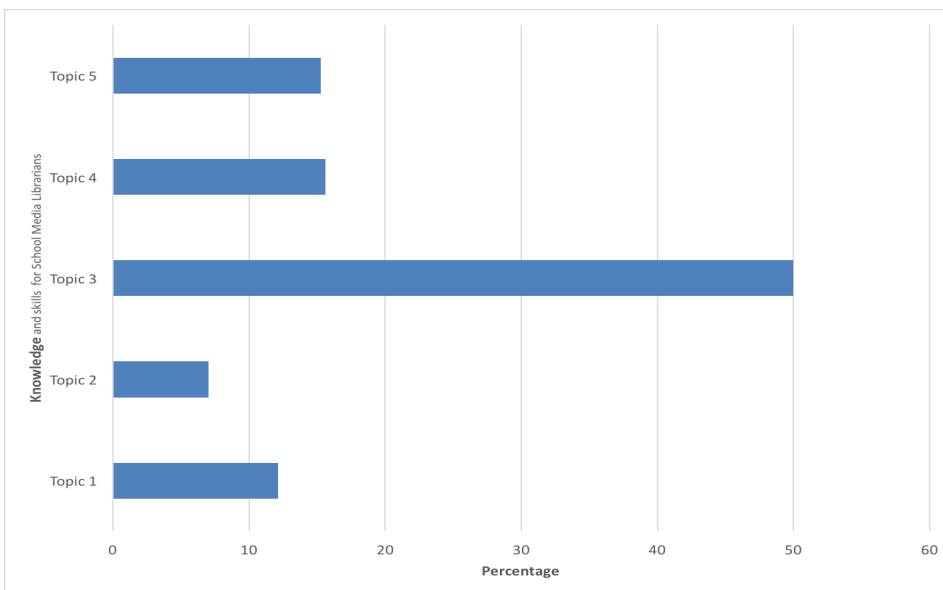
Figure 3 illustrates the distribution of the Kentucky counties where the participants’ schools are located. Among 29, there are two counties (shown in dark blue at the map; Fayette county and Jefferson county - the two most populated counties), each of which is represented by 4 schools; there are 6 counties (shown in green at the map), each of which is represented by 2 schools; and the

remaining 21 counties (shown in maroon at the map), each of which is represented by 1 school. A total of 41 survey participants' schools are dispersed over 29 different counties. The distribution shows good coverage considering the sample size and number/size of counties (refer to Appendix B for the full list of county names and the number of corresponding participants).



**Figure 4. Distribution of the most typical technology-integration practices over the AASL/ALA Initial Preparation of School Librarians Standards**

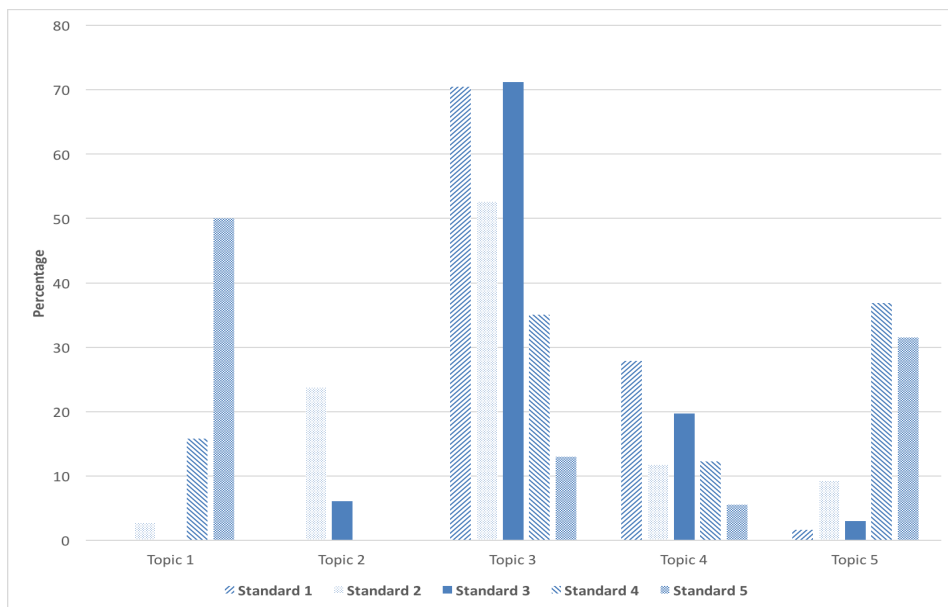
Figure 4 exhibits that the greatest volume of technology-integration practices have occurred in Standard 2, Literacy and Reading, followed by Standard 3, Information and Knowledge, Standard 1, Teaching for Learning, Standard 4, Advocacy and Leadership, and Standard 5, Program Management and Administration. A noteworthy finding is that technology integration has been employed and implemented across all standards relatively evenly.



**Figure 5. Distribution of the most typical technology-integration practices over the topics of school media librarians' knowledge and skills**

Figure 5 exhibits the distribution of the most typical technology integration practices over the topics of school media librarians' knowledge and skills.

The mapping result reveals that the most amount of the technology integration practices occurred in the area of Information Access and Delivery (IAD), out of the five topics. The IAD contains 9 elements such as 'knowledge of current and emerging technologies,' 'knowledge of information retrieval processes,' 'information resource sharing,' and 'legal and ethical issues related to information use.'



**Figure 6. Distribution of most typical technology-integration practices covering both the AASL/ALA Standards and the Topics from Library Media Specialist Praxis' specifications**

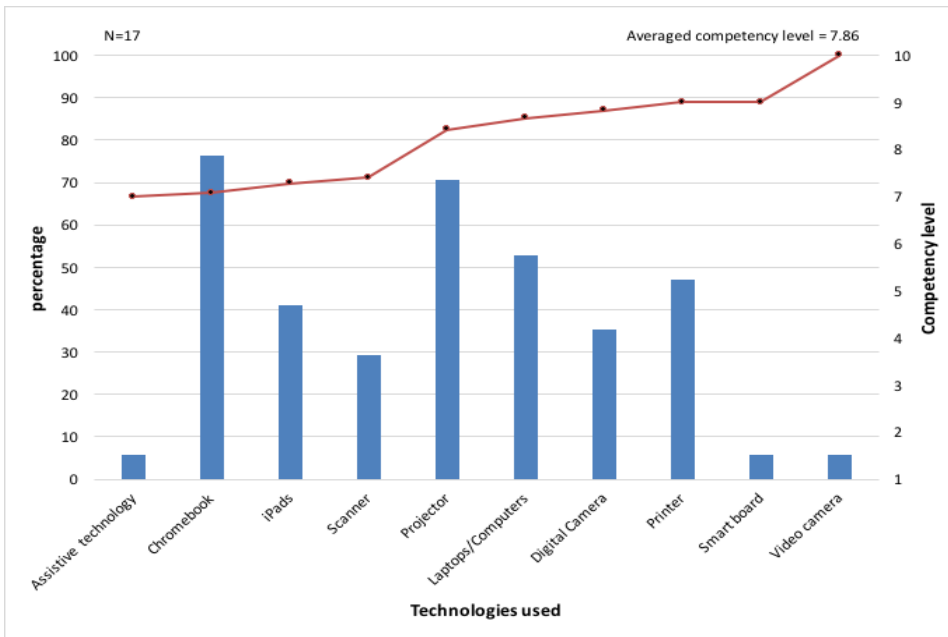
Figure 6 exhibits the frequencies of technology-integration practices according to both the AASL/ALA Initial Preparation of School Librarians Standards and the Topics of school librarians' knowledge and skills from Library Media Specialist Praxis' specifications.

The most occurring tech-related practices in Topic 1 (Program Administration) are mapped across AASL/ALA Standard 5 (Program Management and Administration), and the most occurring practices in Topic 5 (Professional Development, Leadership, and Advocacy) fall under AASL/ALA Standard 4 (Advocacy and Leadership). The mappings are expected as the Topics and Standards are very close in content specifications.

An interesting result can be found under Topic 2. That is, the practices related to AASL/ALA Standards 2 (Literacy and Reading) and 3 (Information Access and Delivery) only occur under ETS's Topic 2 (Collection Development); no practices related to the other standards were made for the topic. The 'Collection Development' topic includes practices related to Standards 2 and 3, such as 'Selection and maintaining resources,' 'Developing and maintaining a professional collection,' 'Descriptive and subject cataloging,' etc.

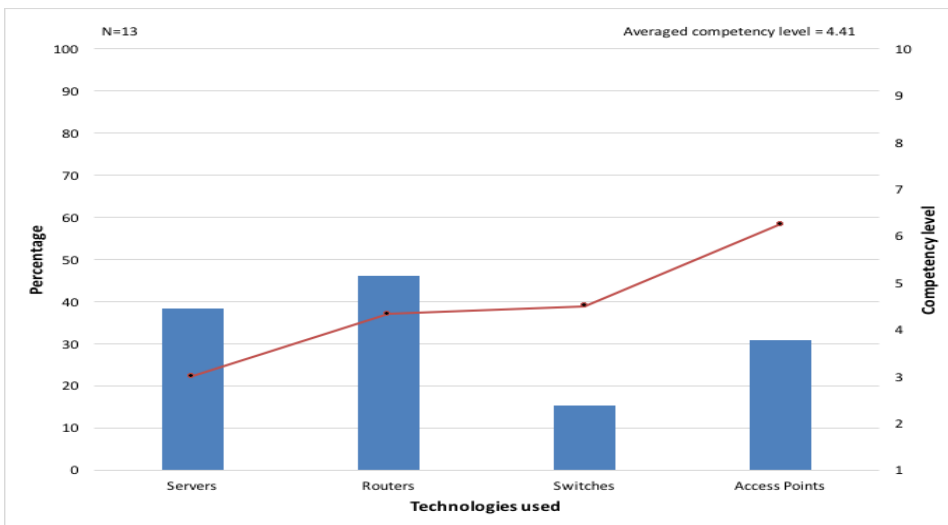
Another noteworthy finding is that ETS's Topic 3 (Information Access and Delivery) appears to be the most popular, indicating that the majority of the technology practices conducted in K-12 school libraries are regarding the access and distribution of information.





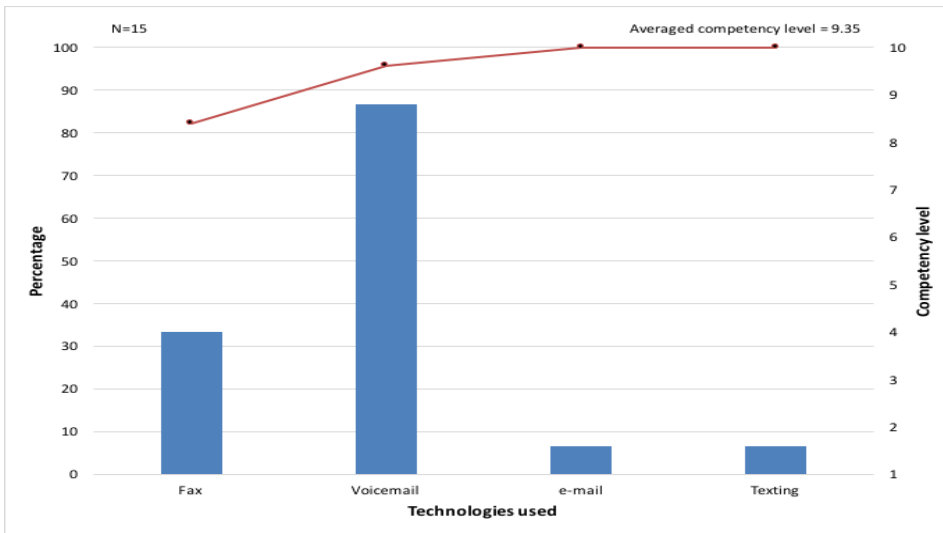
**Figure 7. Usage and competency of technologies in the category of T1-Computers and Computer-driven Equipment**

Figure 7 exhibits the usage and competency level of technologies related to the T1 element. The three most popular technologies were Chromebooks, projectors and laptops/computers. The average competency range was high, i.e., high 5 to high 7.



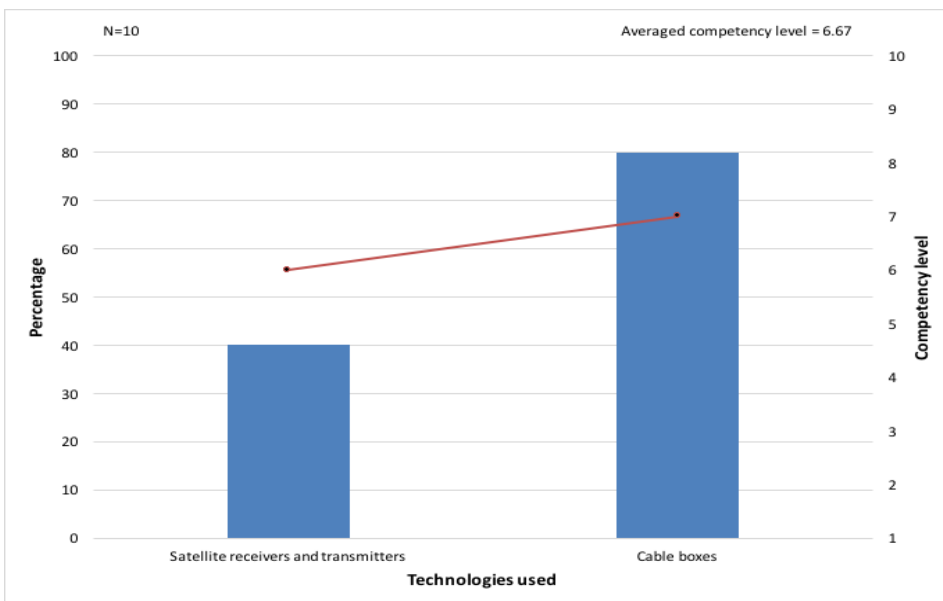
**Figure 8. Usage and competency of technologies in the category of T2-Communication Equipment**

Figure 8 exhibits the usage and competency level of technologies related to the T2 element. There were only four technologies reported in Communication Equipment, T2. The average competency range was in the middle, i.e., low 3 to low 6.



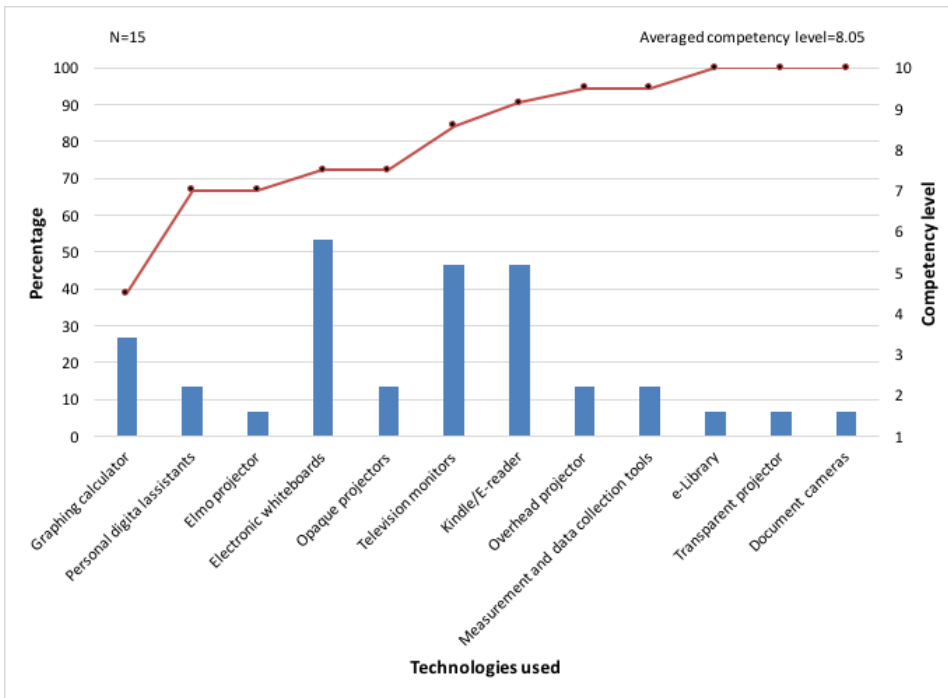
**Figure 9. Usage and competency of telephone-based technologies in the category of T3**

Figure 9 exhibits the usage and competency level of telephone-based technologies related to the T3 element. There were only four technologies reported with an average competency range being from a middle 8 to a high of 10. The technologies that were reported as being the least used, i.e, e-mail and texting, had the highest levels of competency.



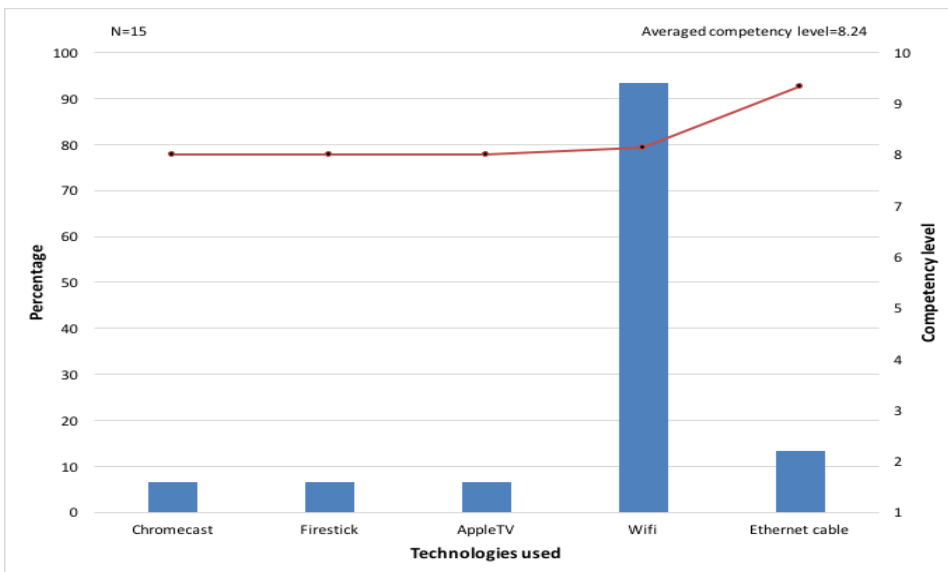
**Figure 10. Usage and competency of audio and video equipment in the category of T4**

Figure 10 exhibits the usage and competency level of audio and video equipment technologies related to the T4 element. There were only two technologies reported, with average competency levels being between 6 and 7.



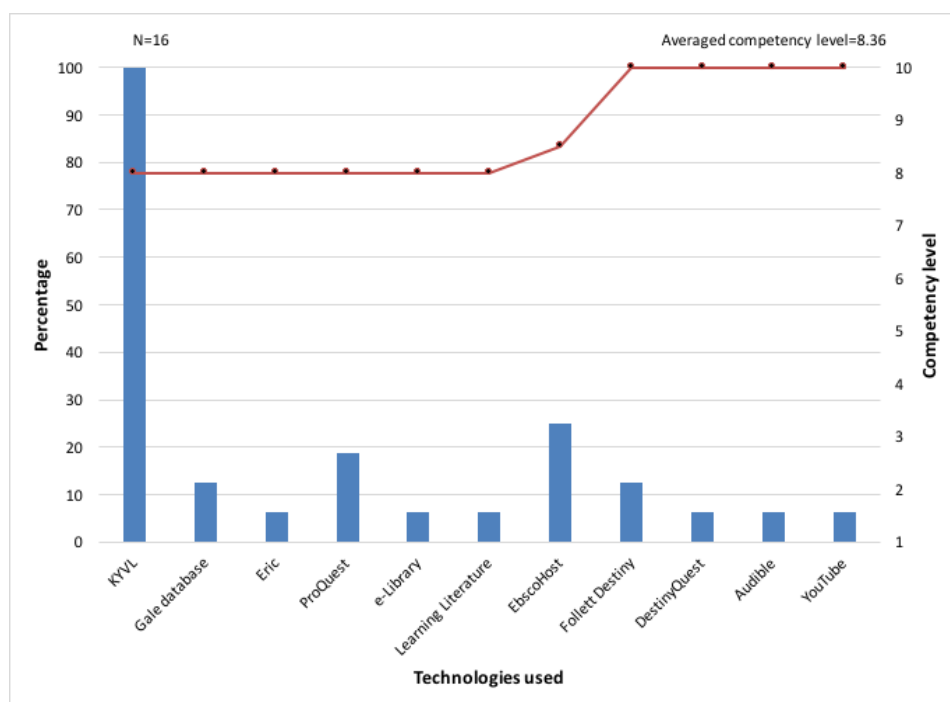
**Figure 11. Usage and competency of display equipment technologies in the category of T5**

Figure 11 exhibits the usage and competency level of technologies related to the T5 element. The three most dominant technologies in use were electronic whiteboards, television monitors and Kindle/E-readers. The average competency range was high, i.e., low 7s to 10.



**Figure 12. Usage and competency of Connectivity technologies in the category of T6**

Figure 12 exhibits the usage and competency level of technologies related to the T6 element. The most dominant technology in use was Wifi. The average competency levels of all the reported technologies in T6 was at least as high as 8.



**Figure 13. Usage and competency of software applications and program technologies in the category of T7**

Figure 13 exhibits the usage and competency level of technologies related to the T7 element. The most dominant technology cited was KYVL. The average competency levels of all reported technologies in T7 was at least as high as 8.

**Table 1. Technology elements and competency levels**

Technology elements	T1	T2	T3	T4	T5	T6	T7
Reported technologies (n)	10	4	4	2	12	5	11
Average competency level	7.86	4.41	9.35	6.67	8.05	8.24	8.36

Table 1 is a summary of the result of RQ2, which is the averaged competency levels from all 7 technology elements. First, in the survey, we discovered that school librarians appeared to have more available technologies in the areas/elements of computer and computer-driven equipment (T1), display equipment (T5), and software applications and program technologies (T7). Second, school librarians exhibited the greatest competency level in telephone-based technologies (T3), followed by software applications and program technologies (T7), and display equipment technologies (T5). Third, the survey also revealed that the average competency levels are relatively high in most areas/elements; the two areas/elements with the lowest levels are communication equipment (T2) and audio/video equipment (T4).

## Discussion and Conclusion

Regardless of the highly increasing tasks and demands of school librarians in technology integration (Ejikeme & Okpala, 2017; Wine, 2016), little research has been done in examining technology competency for school librarians. To the best of our knowledge, this research is a frontier study on the investigation of measuring technology competency.

***RQ1: What are the technology integration practices of school librarians?***

In terms of RQ1, first, the most frequent practices in technology-integration have occurred in activities related to ALA/AASL Standard 2, Literacy and Reading, even though its practices occur relatively evenly across all Standards. The results of this study can be utilized in School Library program curriculum design and assessment. Through knowing which technologies are most readily being utilized by school librarians in the field, program faculty can better design, develop and evaluate courses representative of the roles school librarians are playing on the job.

Second, among the five responsibilities of school librarians noted in the Library Media Specialist Praxis, topic 3, Information Access and Delivery, is the dominant topic being utilized for technology-integration. It exhibits that school librarians in Kentucky are more frequently utilizing technologies in conducting their responsibilities/activities toward topic 3 over the other topics. The outcome appears to reflect their primary roles & responsibilities as locating, identifying, evaluating, and making resources available. Our data also reveal that technologies have been utilized and applied across the remaining topics rather evenly. It might lead us to the implication that further or continued emphasis toward the use of technology must be considered in the current or new school librarian curriculum. Moreover, we recommend it to be integrated or embedded across the curriculum, rather than having one technology-focused course.

Third, the technology-practice mapping between the ALA/AASL standards and the Praxis topics shows that technology-integration practices for all five AASL/ALA standards are linked to the primary roles and responsibilities of school librarians (topic 3, Information Access and Delivery). In more details, technology practices related to standards 1 (Teaching for Learning), 2 (Literacy & Reading), and 3 (Information & Knowledge) are more dominantly presented in topic 3, whereas those related to standards 4 (Advocacy & Leadership) and 5 (Program Management & Administration) are much less associated with topic 3. Through the manual mapping between the AASL/ALA standards and the Praxis topics, this study has discovered where technology practices of school librarians have occurred in the maps of the major standards of the field of school librarianship and the pre-set Praxis topics. Employing the map might be potentially beneficial to the various applications in school library program planning, such as curriculum design, development, and program evaluation. For example, the maps can be utilized to aid program/curriculum developers to better align technologies more integrally with both AASL/ALA standards and Praxis targets/expectations.

***RQ2: What are the technology competencies of school librarians?***

Here are the implications toward RQ2. First, the technology elements being considered in this study can be employed for reviewing/evaluating/comparing/revising school librarian program curricula. This research can be directly contributed to the development and assessment of school librarian program curriculum that is to be commensurate with technology integration. Second, school librarians serve a leadership role in technology integration at the K-12 level, in addition to their instructional role in collaboration with classroom teachers. Many studies have reported that beginning teachers are not confident in preparing for the effective use of technology in their classrooms (Dawson, 2008; Kirschner & Selinger, 2003; Sang, Valcke, van Braak, & Tondeur, 2010; Tearle & Golder, 2008), and also pre-service technology education and practice have a crucial effect on teacher's capability of adapting technology (Agyei & Voogt, 2011; Drent & Meelissen, 2008). Given that, the significance of this study lies in that it provides a better understanding of the practical knowledge of school librarians in technology integration and adaptation, so as to (1) provide practical input/data as a reference for developing program curriculum for school librarians

and then (2), eventually, better prepare school librarians to collaborate with teachers who generally possess a lack of technology knowledge.

Given the limitation of being conducted in a single state in the United States, this study has reported new findings on the recent technology practices by school librarians in Kentucky. In addition to the reported outcome, this study also provides a framework for comparative or evaluative analyses or studies on the practices of technology integration and roles of school librarians.

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## Appendix A. Survey Questions

### **Theme: Context**

- B1. For how many years have you held a position as a school media specialist?
- B2. What are your subject specialties as a classroom teacher prior to being a school media specialist, if any (e.g., language art)?
- B3. What is the name and address of your school?
- B4. What are the grade levels covered by the school for which you are currently working as a school media specialist?
- B5. Who is (are) the primary responsible for technology in your school? If he/she is not a school media specialist, what's the job title of the personnel (e.g., technology coordinator) and his/her role in technology integration?
- B6. In what county is your school located?
- B7. To which school district does your school belong?

### **Theme: Technology Integration Practices**

**Technology integration** is the incorporation of technology resources and technology-based practices into the daily routines, work, and management of schools. Technology resources are computers and specialized software, network-based communication systems, and other equipment and infrastructure. Practices include collaborative work and communication, Internet-based research, remote access to instrumentation, network-based transmission and retrieval of data, and other methods.

### ***ALA/AASL Standards for Initial Preparation of School Librarians (2010)***

#### **Standard 1: Teaching for Learning**

Candidates are effective teachers who demonstrate knowledge of learners and learning and who model and promote collaborative planning, instruction in multiple literacies, and inquiry-based learning, enabling members of the learning community to become effective users and creators of ideas and information. Candidates design and implement instruction that engages students' interests and develops their ability to inquire, think critically, gain and share knowledge.

#### **Standard 2: Literacy and Reading**

Candidates promote reading for learning, personal growth, and enjoyment. Candidates are aware of major trends in children's and young adult literature and select reading materials in multiple formats to support reading for information, reading for pleasure, and reading for lifelong learning. Candidates use a variety of strategies to reinforce classroom reading instruction to address the diverse needs and interests of all readers.

#### **Standard 3: Information and Knowledge**

Candidates model and promote ethical, equitable access to and use of physical, digital, and virtual collections of resources. Candidates demonstrate knowledge of a variety of information sources and services that support the needs of the diverse learning community. Candidates demonstrate the use of a variety of research strategies to generate knowledge to improve practice.

#### **Standard 4: Advocacy and Leadership**

Candidates advocate for dynamic school library programs and positive learning environments that focus on student learning and achievement by collaborating and connecting with teachers, administrators, librarians, and the community. Candidates are committed to continuous learning and professional growth and lead professional development activities for other educators. Candidates provide leadership by articulating ways in which school libraries contribute to student



achievement.

**Standard 5: Program Management and Administration**

Candidates plan, develop, implement, and evaluate school library programs, resources, and services in support of the mission of the library program within the school according to the ethics and principles of library science, education, management, and administration.

T1. Report your three (3) most typical or representative practices of technology integration related to ALA/AASL Standard 1.

Answer #1:

Answer #2:

Answer #3:

T2. Report your three most typical or representative practices of technology integration related to ALA/AASL Standard 2.

Answer #1:

Answer #2:

Answer #3:

T3. Report your three most typical or representative practices of technology integration related to ALA/AASL Standard 3.

Answer #1:

Answer #2:

Answer #3:

T4. Report your three most typical or representative practices of technology integration related to ALA/AASL Standard 4.

Answer #1:

Answer #2:

Answer #3:

T5. Report your three most typical or representative practices of technology integration related to ALA/AASL Standard 5.

Answer #1:

Answer #2:

Answer #3:

**Theme: Technology Competencies****List of Technologies:**

T1: Computers and computer-driven equipment, as well as the peripherals that are attached to computers (such as printers, scanners, digital cameras, projectors, Chrome books, iPad, etc.).

- T2: Servers, routers, switches, transceivers, and other equipment that support wired and wireless communication between computers, providing access to other computers, local- and wide-area networks, and the global Internet;
- T3: Support for state-of-the-art telephone-based technology, including voicemail and fax technologies, that can improve instructional and administrative capabilities and support parent-school communication;
- T4: Audio and video equipment (including satellite receivers and transmitters, cable boxes, and other items) used in distance education;
- T5: Display equipment used in classrooms, including television monitors, kindle, e-reader, opaque and transparent projectors, and electronic whiteboards; specialized calculators and computers, including personal digital assistants, graphing calculators, and measuring/data collection tools for such purposes as chemical or biological assay or weather measurements;
- T6: The infrastructure of wires and cables (and, more and more, the wireless systems) that support computer-based networking and video access, such as Wifi, Ethernet cable, AppleTV, etc.;
- T7: The software applications and programs that are pertinent to the education system such as KYVL. These include programs that are used to support instruction or control management processes.

**Given the list of technologies, please answer the following questions.**

- C1. Make a list of hardware and software in T1 (refer to the List of Technology) you have used for the practices in technology integration as a school media specialist. Also, indicate your competency level with each hardware and software at the scale of 1 (the least competency) to 10 (the most competency).

Answer:

- C2. Make a list of hardware and software in T2 (refer to the List of Technology) you have used for the practices in technology integration as a school media specialist. Also, indicate your competency level with each hardware and software at the scale of 1 (the least competency) to 10 (the most competency).

Answer:

- C3. Make a list of hardware and software in T3 (refer to the List of Technology) you have used for the practices in technology integration as a school media specialist. Also, indicate your competency level with each hardware and software at the scale of 1 (the least competency) to 10 (the most competency).

Answer:

- C4. Make a list of hardware and software in T4 (refer to the List of Technology) you have used for the practices in technology integration as a school media specialist. Also, indicate your competency level with each hardware and software at the scale of 1 (the least competency) to 10 (the most competency).

Answer:

C5. Make a list of hardware and software in T5 (refer to the List of Technology) you have used for the practices in technology integration as a school media specialist. Also, indicate your competency level with each hardware and software at the scale of 1 (the least competency) to 10 (the most competency).

Answer:

C6. Make a list of hardware and software in T6 (refer to the List of Technology) you have used for the practices in technology integration as a school media specialist. Also, indicate your competency level with each hardware and software at the scale of 1 (the least competency) to 10 (the most competency).

Answer:

C7. Make a list of hardware and software in T7 (refer to the List of Technology) you have used for the practices in technology integration as a school media specialist. Also, indicate your competency level with each hardware and software at the scale of 1 (the least competency) to 10 (the most competency).

Answer:

## Appendix B. Names of the Participants' Kentucky Counties

County	Participants (n)	County	Participants (n)	County	Participants (n)
Anderson	1	Daviess	1	Mercer	1
Barren	1	Fayette	4	Owen	1
Bath	1	Franklin	2	Rockcastle	1
Bell	1	Hopkins	1	Shelby	2
Boone	1	Jefferson	4	Spencer	2
Bourbon	1	Jessamine	1	Warren	1
Boyd	1	Kenton	2	Wayne	1
Bracken	1	Marion	1	Webster	1
Calloway	1	McCracken	2	Whitley	1
Campbell	2	McCreary	1		

## **Appendix C. Classification of the Knowledge and Skills for Library Media Specialists<sup>1</sup>**

### **Program Administration**

- A. Organization, administration, and evaluation of the library media center
- B. Shared decision making, mission and philosophy statements, goals and objectives for services and programs, short- and long-range planning
- C. Methods for assessing needs, evidence-based assessment modes
- D. Promoting library services, resources, and programs
- E. Managing the library media center: budgeting, alternate means of funding, managing the library media center staff and volunteers
- F. Rationale for library media center policies: developing and revising policies, legal and ethical issues relating to policies

### **Collection Development**

- G. Function, structure, and components of the selection policy
- H. Selecting and maintaining resources: relationship between school curriculum and collection development; guidelines for deselection; using standard collection development, review, and bibliographic tools
- I. Developing and maintaining a professional collection
- J. Selection criteria for all resources, including equipment and services, materials acquisition sources, ordering and budgeting procedures
- K. Descriptive and subject cataloging, related tools, and digital cataloging data
- L. Purpose and format of MARC records
- M. Physical arrangement of resources
- N. Loan, renewal, and reserve procedures
- O. Promoting resources

### **Information Access and Delivery**

- P. Knowledge of print, nonprint, and digital resources and their uses
- Q. Knowledge of current and emerging technologies: jargon, equipment, the digital community
- R. Knowledge of information retrieval processes, search strategies, and evaluative criteria
- S. Information resource sharing: interlibrary loan, networks, school/public library cooperation
- T. Equal access to resources, programs, and services for all learners
- U. Scheduling
- V. Library media center environment
- W. Legal and ethical issues related to information use: copyright, plagiarism, intellectual property, confidentiality, acceptable use
- X. Bibliographic citation

### **Learning and Teaching**

- Y. Knowledge of children's and young adult literature: print and media awards, works of prominent authors and illustrators, literary genres
- Z. Knowledge of trends, issues, and research related to reading and information literacy
- II.AA. Knowledge of information literacy models and principles

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<sup>1</sup> Source: <https://www.ets.org/s/praxis/pdf/5311.pdf>

- A. Alignment of library media center program with information literacy standards; alignment of programs with school curriculum
- B. Collaborative teaching and planning
- C. Instructional design: characteristics of learners, predominant learning theories, elements of lesson planning, meeting the needs of diverse learners, assessment methods and tools
- D. Theory and practice of classroom management

### III.

#### **Professional Development, Leadership, and Advocacy**

- A. Role and function of professional organizations related to school library media
- B. Purposes and examples of professional development activities, role of reflective practice
- C. Initiating and facilitating collaborative opportunities: action plans, building consensus, characteristics of the adult learner
- D. Implications and provisions of major legislation and court cases affecting libraries and education
- E. Codes of ethics
- F. Advocacy