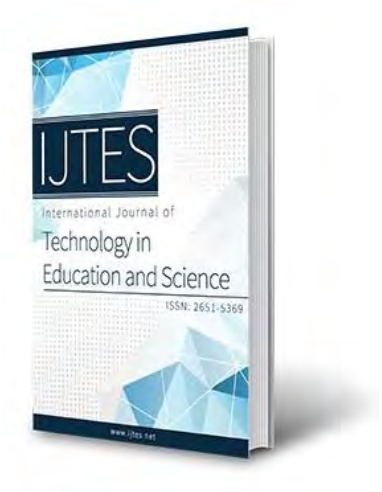

www.ijtes.net

Digital Literacy Skills Instruction and Increased Skills Proficiency

Kelli Erwin
Walden University, USA

Shereeza Mohammed
Walden University, USA

To cite this article:

Erwin, K., & Mohammed, S. (2022). Digital literacy skills instruction and increased skills proficiency. *International Journal of Technology in Education and Science (IJTES), 6*(2), 323-332. https://doi.org/10.46328/ijtes.364

IJTES International Journal of Technology in Education and Science
2022, Vol. 6, No. 2, 323-332 https://doi.org/10.46328/ijtes.364

Digital Literacy Skills Instruction and Increased Skills Proficiency

Kelli Erwin, Shereeza Mohammed

Article Info

Article History

Received:
23 December 2021
Accepted:
28 March 2022

Keywords

Digital literacy
Research
Information literacy
Digital citizenship
Instructional strategies

Abstract

Though today's students are considered digital natives, they lack the digital literacy skills needed to be competent and productive members of a digital society. Students may have experience with using technology, but they need to develop specific skills that align with consuming and producing with technology. While there may be agreement that students need digital literacy skills and established state, national and international standards to be met, there are a variety of concepts that are considered part of digital literacy and there is a lack of equitable instruction and expectations for ensuring students have these necessary skills. There is a problem in PK-12th grade education that includes a lack of evidence about the effectiveness of using content knowledge instruction, practice, and application experiences to develop students' digital literacy skills. However, by creating a path for enduring understandings for students and providing professional learning experiences for teachers, the effectiveness of student digital literacy skills can create positive social change as students would be better prepared to safely and efficiently live and interact in a digitally based society.

Introduction

Digital literacy contains a broad range of skills related to the use of technology that are defined in different ways by a variety of entities. Until a more universal understanding exists and agreement for how to define digital literacy skills has been determined, professional learning opportunities for teachers that translate into positive classroom experiences for students will continue to bring equity issues to PK-12th grade education. Following are the results from a direct search for the field of education's defined meaning of *digital literacy skills*, *digital citizenship* and *research and information fluency*. Digital citizenship and research and information literacy are only part of the concepts that align for digital literacy and are the focused concepts for this research. While evaluating resources for each topic, it became more evident that digital literacy skills are defined differently based on the entity providing the definition. In previous research studies and articles that were reviewed, there was a broadening of the research to include legislation and laws affecting each concept along with organizations that create, and support standards related to digital literacy competencies. Based on this information, I expanded the research to include the *value and importance of digital literacy skills instruction,* the *science of learning, Marzano's instructional framework*, suggestions for *digital literacy skills development*, *research and information fluency*, *digital citizenship* and various *strategic instructional strategies for teaching and learning*. By evaluating articles and previous research, I hope to better establish what digital literacy is so that professional learning experiences for teachers may be created in a way that will bring them more equitable learning experiences that can translate

to the classroom. Thus, helping students to become empowered learners and competent and productive members of a digital society.

Importance of Digital Literacy Skills Instruction

As education moves more towards using technology in the classroom and preparing all students for success beyond the classroom, it has become more important to evaluate the how, why, and when of ensuring students have digital literacy skills. Fidalgo, Santos, and Hill (2016) established that proficiency in the use of digital technologies was a critical skill in the 21st century and was necessary to prepare students for work beyond the classroom. Gerben (2017) investigated the perceptions of teachers on the importance of digital literacy skills instruction and determined that ethical use of the Internet and developing questions for research were necessary skills but were not skills that were directly taught. Williams (2015) examined the perceptions of students and employers and found that soft skills and technical skills are complementary and should be considered job readiness skills.

Ascione (2015) noted that digital literacy helps students know where to find information and how to use it and that not having these skills puts children at risk when it comes to choosing trusted websites. Students who do not understand how to identify an author or evaluate their credentials run the risk of not understanding the bias that may appear in what they read online (Ascione, 2015). In addition to evaluating online information for bias, students need to be able to evaluate to ensure the information they are reading is accurate (Ascione). As students rely more on the Internet to find information that effects their lives, they need to have critical digital literacies that help them ensure the information they are accessing was written by a credible source. St. Jean, Greene Taylor, Kodama, and Subramaniam (2017) found that students are increasingly using the Internet to search for information related to health issues, and they need digital literacy skills to find and evaluate relevant and credible online health information.

Not only has research shown that digital literacy skills are important, and that specific instruction should be provided to ensure students have a solid foundation of understanding, research has also shown that students need the ability to transfer their knowledge and skills in digital literacy to any applicable experience (Mattson & Lindsey, 2021). Education standards such as the International Society for Technology in Education (ISTE) standards for students, Computer Science Teachers Association (CSTA) standards and the Common Core State Standards along with many state specific standards such as the Technology Applications Texas Essential Knowledge and Skills (TA-TEKS), North Carolina Department of Public Instruction (NC DPI) digital literacy standards, New Jersey Student Learning Standards (NJSLS), all address the need for students to learn digital literacy skills throughout their PK-12th education. Not only are standards being set, but certifications are being designed to ensure that students have the relevant knowledge and skills for school and careers, and to become productive members of society. Whether it is from a state, national or international entity, digital literacy skills have become a requirement for students. The standards used to teach digital literacy skills to students establish guidance and expectations for what a student should know and be able to do using technology.

While this research focuses on research and information literacy and digital citizenship, the broader scope of digital literacy skills, as defined by ISTE (2016), includes seven standards: empowered learner, digital citizen, knowledge constructor, innovative designer, computational thinker, creative communicator, and global collaborator. These standards empower students to become lifelong learners who can evolve their digital literacy knowledge and skills as technology and the digital society evolves. By empowering PK-12th grade students for digital life now and digital life as it evolves, students can be consumers and producers in a digital society beyond the classroom.

Theoretical Foundation

"Education needs to be informed by the science of learning" (Kim et al., 2017) so that teachers can differentiate learning experiences and ensure students have the knowledge and skills they need. The science of learning is defined as an approach to learning that recognizes the value and importance of understanding and using different methods and techniques related to how learning occurs, with a goal of optimizing learning for all (Johns Hopkins University, 2018). While many learning frameworks exist and are widely adopted, for the purpose of this review, the focus was on Robert Marzano's art and science of teaching framework.

Marzano's (2017) art and science of teaching framework focuses on the use of direct instruction, practice, and deepening learning opportunities followed by application experiences to ensure students not only gain content knowledge but are able to apply what they have learned. The art and science of teaching framework provides teachers with a model that guides the student learning and teacher evaluation process. Marzano's framework directly relates to the learning method for how to teach digital citizenship and research and information fluency skills for student knowledge and application growth. Marzano's (2017) art and science of teaching instructional model was designed as an enhancement from the original Marzano nine effective instructional strategies:

1. Identifying similarities and differences;
2. Summarizing and note taking;
3. Reinforcing effort and providing recognition;
4. Homework and practice;
5. Nonlinguistic representations;
6. Cooperative learning;
7. Seeing objectives and providing feedback;
8. Cues, question, and advance organizers; and
9. Generating and testing hypotheses (Francis, 2012).

These instructional strategies offered an initial path for teachers to follow for engaging students in the learning process. Francis (2012) determined that by using the Marzano nine effective instructional strategies as a scaffold for organizing and implementing curriculum and instruction, technology could be used effectively to engage and instruct students in their learning process. Because the art and science of teaching framework was built from the original Marzano 9 effective instructional strategies, the aspect of using technology for direct instruction, practice and deepening learning opportunities followed by application experiences, based on Francis's work, ties to

technology being an engaging way to enhance the student learning experience. Thomas and Green (2015) conducted a study to evaluate how the use of Marzano's instructional strategies affected academic achievement in students and determined that teachers were situational in how they implemented the strategies but was not conclusive on the effect the strategies had on student achievement. Thomas and Green found that there was still a missing piece where student needs must be taken into consideration during the instructional process. Using data to drive or enhance decisions with the instruction provided to students can account for student needs.

By incorporating both the science of learning framework and Marzano's art and science of teaching into digital literacy skills instruction, teachers would be using established best practices in pedagogy and research to meet the needs of a variety of learners. To help teachers be prepared to use these frameworks for digital literacy skills instruction, professional learning experiences could be provided that address the frameworks and digital literacy skills. Helping teachers to experience the frameworks while gaining a deeper understanding of the digital literacy related standards, could be a way to help teachers prepare to integrate technology in the classroom.

Review of Broader Problem

Regardless of instructional frameworks used, standards to be covered and subject areas of instruction, teachers may receive curriculum materials for instructional purposes. Unfortunately, teachers do not always receive the training and support needed for implementing the curriculum materials with their student population. Pratolo and Solikhati (2021) suggest a need for teachers to develop technical and pedagogical skills as part of being able to successful teach digital literacy skills to students. When curriculum materials are not provided by the school system, teachers must find resources and materials to use for instruction or may not provide the instruction. Gerben (2017) confirmed that though educators have a collective responsibility to teach students how to be responsible in a digital world, they need guidance on how to directly teach the related skills. Mattson and Lindsey (2021) determined that teachers have confusion about what digital citizenship entails and that there are limited high quality materials available to help prepare teachers to teach these concepts at all grade levels. By providing teachers with curriculum materials that engage students in the learning process and support teachers' needs for implementation, digital literacy skills are more likely to be included in the classroom learning experience.

Saxby (2018) identified that teaching digital literacy skills in the context of the subject area that the student is working in is an important aspect to help students understand why these skills are valuable. Students of all abilities will be expected to interact with technology on some level as both students and productive members of society. The findings of Gerben and Saxby support those of Cihak, Wright, Smith, McMahon, and Kraiss (2015) in confirming the importance of teaching digital literacy skills to students in that all students can acquire and maintain functional digital literacy skills regardless of their intellectual abilities. Providing teachers with high quality, standards aligned curriculum materials that address digital literacy skills, is a way to further ensure equity in instruction for all students. With digital literacy skills being considered not only 21st century skills, but learning and life skills (Pratolo and Solikhati, 2021), teachers and students must develop these skills to consume and produce in a digital society.

Digital Literacy Skills Development

Students today are considered digital natives because they have grown up with technology around them in their everyday lives. Though students have access to technology and are familiar with a variety of devices, they do not necessarily have the skills needed to productively use the technology. Yamila and El-Khayat (2016) determined that tech savviness does not ensure that students have the skills they need to be successful at school and work in the future. Raish and Rimland (2016) concluded that technology skills will help prepare students for the workforce because employers expect these skills. Though Yamila and El-Khayat and Raish and Rimland have established the need for the skills, Bali (2016) explained that a focus on digital literacy should not only be about the technology skills but also about the use of those skills. Walters, Gee, and Mohammed (2019) ties digital literacy skills to not only understanding the function of technology, but the application of knowledge and skills using technology in a variety of situations. By helping students apply what they learn, teachers are preparing students to be able to transfer their knowledge and skills to future digital literacy experiences.

When students know how to use the technology and then can use digital literacy skills to create, evaluate, and share, they can become productive members of the digital society they live in and evolve as the technology does. Students need to develop and apply their digital literacy skills during school curricula so that they are prepared for the next level because digital literacy skills must be learned early and applied in a real-world type setting while still in an observed area for evaluation of need and further instruction (Saux & Cevasco, 2019). Iordache et al. (2017) recognized that developing digital skills, literacies, and competencies has become increasingly important worldwide because stakeholders use various models as the basis for their policies.

By identifying a specific set of essential digital literacy skills that could be adopted worldwide as a foundation for the education community to build on, consistent educational resources could be identified to meet the needs of learners and teachers. Though consistent educational resources for providing digital literacy skills instruction are valuable, Chetty et al. (2017) additionally concluded that digital literacy skills must evolve over time and in alignment with technological innovations. Digital literacy skills development is the overarching term related to any skills students gain that are related to the use of technology (Heitin, 2016). As a reminder, this review of literature focuses on only two of the skill sets that appear as part of digital literacy: research and information fluency and digital citizenship.

Research and Information Literacy

Students can conduct searches through a Web browser and find more information than they may expect but conducting research and understanding the results of what they find requires research and information fluency skills. D'Couto and Rosenhan (2015) concluded that students are influenced by academic and nonacademic factors as they conduct Internet-based research, which reinforces the need for teaching the skills and not allowing students to rely on what they think is the best way to conduct research. Schmidt Hanbidge, Sanderson, and Tin (2016) determined that information literacy skills were valuable, but the skills were not integrated into the classroom curriculum, which limited the opportunities to teach the skills. Information literacy should be considered part of

the core curriculum content because it is crucial for students to understand how to conduct research and evaluate the information they find. Junisbai, Lowe, and Tagge (2016) found that students need instruction on research skills and need to have hands-on learning sessions but did not evaluate a connection to digital versus human interaction as a way for students to learn and apply information literacy. Saxby (2018) concluded that for students to have structure to build on when conducting research, they needed direct instruction and inquiry-based options when learning how to search, scan, find, and evaluate information.

Research and information fluency are literacy skills that cross the boundary between print and digital. The skills are foundational to understanding how to find and analyze information along with being able to problem-solve and think logically related to the presented information (Walters, et al, 2019) independently and efficiently. Research and information fluency skills include a variety of concepts that are addressed in state, national, and international standards for learning. For example, the ISTE standards for students (2016) include aspects of information literacy as part of the knowledge constructor standard and the Texas Essential Knowledge and Skills standards (2011b) include aspects of research and information fluency skills in Language Arts, Social Studies, Science, and Technology Applications to list a few. Walters, et al (2019 referenced a concern that digital literacy and innovative thinking have not been sufficiently included in teacher preparation curriculum which negatively impacts student instruction in these areas. Research and information fluency skills are not inherently known but ones that must be taught, practiced, and applied in a variety of experiences in order to be successfully transferred to future experiences.

Digital Citizenship

Digital citizenship includes a set of skills that students must learn and exhibit as part of a digital society. Digital citizenship is a tool that helps students integrate knowledge, skills, attitudes, and values and must stay in line with living in the digital age (Dedebali & Dasdemir, 2019). To further define digital citizenship, Walters, et al (2019) include the importance of appropriate behavior while using the Internet and technology as part of participating in an online society. Mattson and Lindsey (2021) discuss a variety of concepts that should be included when teaching digital citizenship, such as digital safety, media and information literacy, digital well-being, and social responsibility.

It is important for students to gain digital citizenship skills while they are in school because students are likely to develop inappropriate skills otherwise (Ata & Yildirim, 2019). While the need for digital citizenship skills is apparent and legislation is often passed to support the need, Phillips, and Lee (2019) found that the enactment of legislation to require that digital citizenship instruction was to be offered did not guarantee that who should teach it or when it should be taught would be determined. Godfrey (2016) suggested that educators have a collective responsibility to teach what it means to be responsible in the virtual world as a digital citizen through the family and through consumer science courses because these focus on the interactions of people and their environment. Based on the findings of Dedebali and Dasdemir, Ata and Yildirim, and Godfrey, the understanding that digital citizenship is an important skill exists; however, teachers' support for, confidence level in teaching, and means to teach those skills are of concern.

Digital citizenship is a foundational skill in digital literacy because students need the knowledge and skills to be positive citizens in a digital environment. Mattson and Lindsey (2021) further explain that digital citizenship skill development helps students to develop into "safe, well-rounded, literate and participatory" citizens. Isman and Canan Gungoren found that though citizenship is taught to students, the digital aspect of being a good citizen varies in the environment where the skills must be applied (2014). By teaching students to be a good citizen in a face-to-face environment, the foundation is being set for them to transition to a digital environment (Isman & Canan Gungoren, 2014). Students must be taught, be able to practice and apply digital citizenship skills as part of their learning process in order to be productive members of the current and future society.

Strategic Instructional Strategies

Ensuring that students have the necessary digital literacy skills requires both cognitive and technical aspects (Becker, 2018). Though the importance and the need exist for teaching digital literacy skills, teachers still find it difficult to teach the knowledge and skills that form digital literacy. Opeyemi et al. (2019) studied the barriers to integrating technology into the classroom and found that a lack of adequate and well-trained personnel caused instruction to not be equitable for all students. Teachers must effectively use technology tools in the teaching and learning environment to help solidify learning for all students (Aslan, 2021). There are a variety of teaching models, based on research, which have been implemented throughout the education system for teaching core subject areas, but not for teaching digital literacy skills. Sondergeld (2014) concluded that data is important in the instructional process as is the need for teachers to have the skills to develop and use quality materials, for curriculum and assessment, to prepare students for college and future workforce needs.

Strategic instructional strategies provide educators with a standard of teaching that allows for meeting the needs of the variety of learners that they may encounter in the classroom, whether brick and mortar or in a digital environment. In support of meeting students' needs, Aslan (2021) refers to the importance of teachers connecting with students in a way that incorporates technology because of the significant importance that technology plays in a student's life outside of school. By evaluating the effectiveness of content knowledge and application experiences in the teaching and learning of digital literacy skills, a better understanding of how to help prepare teachers to meet the needs of students using digital as a tool for learning or producing could evolve.

The major findings from the review include a reaffirmation of the need for digital literacy skills instruction and specifically digital citizenship and research and information fluency as identified in the local problem. Walters, et al (2021) referenced the uncertainty felt by teachers who lacked proper training on how and when to implement using technology to enhance the student learning experience. The need to evaluate best practices for delivering digital literacy instruction and the value that instruction has for students supports the need to determine the apparent effectiveness of content knowledge instruction and application experiences as an approach to students developing increased skill proficiencies in digital citizenship and research and information fluency. When teachers know what technology tools to use to support a specific learning outcome, they experience a higher digital literacy self-efficacy which translates into more effective learning experiences for their students (Aslan, 2021) and an enhanced level of digital literacy self-efficacy for students.

Implications

The implications of the literature review establish that digital literacy skills are necessary for preparing students to be productive members of a digital society, but teachers and administrators do not have the resources and confidence to teach these skills. The digital literacy concepts are included in established standards for student learning but are not seen as critical skills as the accountability aspect is not evident. Further investigation is needed to identify both a method for establishing accountability measures and a method of teaching and learning that engages students in gaining digital literacy skills in a way that prepares them to apply these skills in any situation. In establishing accountability measures, it will be important to include curriculum materials and professional learning opportunities to ensure that teachers have the tools necessary to meet the needs of their students. The tools and materials for teaching and learning should include professional development and ongoing support for the implementation of these tools and materials.

Conclusions

There are many organizations that have identified what the essential digital literacy skills are that students must have to be productive members of a digital society. All related organizations and legislative measures include guidelines for how students should be able to interact with technology and in some cases curriculum materials have been either approved or provided. Students must be taught the skills they need to be digital citizens, to conduct research, and to become information fluent in order to be successful in both school and future work environments. Using established strategic instructional methods for students to learn, practice and apply what they have learned can ensure that students are prepared for the digital environment in which they live, now and in the future.

References

Ascione, L. (2015). Kids can tweet, but many lack digital literacy skills. *ESchool News.* Retrieved from http://www.eschoolnews.com/2015/07/30/digitalliteracyskills792/

Aslan, S. (2021). Analysis of digital literacy self-efficacy levels of pre-service teachers. *International Journal of Technology in Education (IJTE)*, *4*(1), 57-67. https://doi.org/10.46328/ijte.47

Bali, M. (2016). Digital skills and digital literacy: Knowing the difference and teaching both. *Literacy Today*, 24-25. Retrieved from https://www.literacyworldwide.org/get-resources/em-literacy-today-em-magazine

Becker, B. W. (2018). Information literacy in the digital age: Myths and principles of digital literacy. *School of Information Student Research Journal,* *7*(2). Retrieved from http://scholarworks.sjsu.edu/slissrj/vol7/iss2/2

Chetty, K., Qigui, L., Gcora, N., Josie, J., Wenwei, L., & Fang, C. (2017). *Bridging the digital divide: Measuring digital literacy.* Economics Discussion Papers, No 2017-69, Kiel Institute for the World Economy. http://www.economics-ejournal.org/economics/discussionpapers/2017-69

Cihak, D., Wright, R., Smith, C., McMahon, D., & Kraiss, K. (2015). Incorporating functional digital literacy

skills as part of the curriculum for high school students with intellectual disability. *Education & Training in Autism & Developmental Disabilities*, *50*(2), 155-171.

D'Couto, M., & Rosenhan, S. H. (2015). How students research: Implications for the library and faculty. *Journal of Library Administration*, *55*(7), 562-576. http://doi.org/10.1080/01930826.2015.1076312

Dedebali, N. C., & Dasdemir, I. (2019). Social studies teacher candidates' perception of digital citizenship. *International Journal of Educational Methodology*, 5(3), 465–477. https://doi.org/10.12973/ijem.5.3.465

Fidalgo, P., Santos, I., & Hill, A. (2016). Exploring student's performance within a digital literacy course. *2016 IEEE Global Engineering Education Conference (EDUCON), 2016 IEEE*, 780–784. https://doi.org/10.1109/EDUCON.2016.7474641

Francis, R. (2012). Enhancing teaching and learning through the integration of blended learning instructional strategies (BLIS) in the classroom. *Journal of Applied Learning Technology*, *2*(2), 6–12. Retrieved from https://journals.sfu.ca/jalt/index.php/jalt

Gerben, P. (2017). *Teacher perceptions of digital literacies skills instruction: A case study* (Order No. 10285707). Retrieved from ProQuest Dissertations & Theses Global. (UMI No. 1927647007)

Godfrey, R. R. (2016). Digital citizenship: Paving the way for family and consumer Sciences. *Journal of Family & Consumer Sciences*, *108*(2), 18-22. https://doi.org/10.14307/JFCS108.2.18

Heitin, L. (2016). *What is digital literacy?* Retrieved from https://www.edweek.org/ew/articles/2016/11/09/what-is-digital-literacy.html

International Society for Technology in Education. (2016). ISTE national educational technology standards (NETS). Eugene, OR: International Society for Technology in Education. Retrieved from https://www.iste.org/standards/standards/forstudents

Iordache, C., Mariën, I., & Baelden, D. (2017). Developing digital skills and competences: A quickscan analysis of 13 digital literacy models. *Italian Journal of Sociology of Education*, *9*(1), 6–30. https://doi.org/10.14658/pupj-ijse-2017-1-2

Isman, A., & Canan Gungoren, O. (2014). Digital citizenship. *Turkish Online Journal of Educational Technology - TOJET*, *13*(1), 73-77. Retrieved from https://files.eric.ed.gov/fulltext/EJ1018088.pdf

Johns Hopkins University. (2018). What is the science of learning?: Science of Learning. Retrieved January 22, 2022, from http://scienceoflearning.jhu.edu/science-to-practice/resources/what-is-the-science-of-learning

Junisbai, B., Lowe, M., & Tagge, N. (2016). A pragmatic and flexible approach to information literacy: Findings from a three-year study of faculty-librarian collaboration. *Journal of Academic Librarianship*, *42*(5), 604–611. https://doi.org/10.1016/j.acalib.2016.07.001

Kim, H., McGivney, E., & Care, E. (2017, March 28). Science of learning: Why do we care? Brookings. Retrieved December 11, 2021, from https://www.brookings.edu/blog/education-plus-development/2017/03/28/science-of-learning-why-do-we-care/

Marzano, R. J. (2017). *The new art and science of teaching*. Bloomington, IN: Solution Tree Press.

Mattson, K., & Lindsey, L. A. (2021). Teach dig cit. TEACH DIG CIT. Retrieved October 2021, from https://www.teachdigcit.com/

Opeyemi, D. A., Ayodele, V., Alufa, O., Anderson, E., Strachan, R., & Emembolu, I. (2019). Barriers and identified solutions to the integration of digital technologies in the classroom: A case study of teachers in Nigeria. *2019 IEEE Global Engineering Education Conference (EDUCON),* Dubai, United Arab Emirates, 953–958. https://doi.org/10.1109/EDUCON.2019.8725160

Phillips, A. L., & Lee, V. R. (2019). Whose responsibility is it? A statewide survey of school librarians on responsibilities and resources for teaching digital citizenship. *School Library Research*, *22*. Retrieved from http://www.ala.org/aasl/slmr

Pratolo, B., & Solikhati, H. (2021). Investigating Teachers' Attitudes toward Digital Literacy in EFL Classroom. *Journal of Education and Learning (EduLearn)*, v15n1, 97-103.

Raish, V., & Rimland, E. (2016). Employer perceptions of critical information literacy skills and digital badges. *College & Research Libraries, 77*(1), 87–113. https://doi.org/10.5860/crl.77.1.87

Saux, G., & Cevasco, J. (2019, July/August). Decoding digital literacy: Developing 21st-century skills for today's learners. *Literacy Today,* 10-11. http://doi.org/10.13140/RG.2.2.34638.41287

Saxby, D. (2018). Introducing digital skills by collaboration: A new strategy to develop vital digital literacy skills. *School Librarian, 66*(1), 9-11.

Schmidt Hanbidge, A., Sanderson, N., & Tin, T. (2016). Information literacy on the go! Adding mobile to an age-old Challenge. *International Association for Development of the Information Society, 12,* 103-107.

Sondergeld, T. A. (2014). Closing the gap between STEM teacher classroom assessment expectations and skills. *School Science & Mathematics, 114*(4), 151-153. https://doi.org/10.1111/ssm.12069.

Texas Education Agency. (2011b). Technology standards for students, teachers, and librarians. Retrieved from https://tea.texas.gov/academics/learning-support-andprograms/technology-resources/technology-standards-for-students-teachers-andlibrarians

Thomas, I. A., & Green, R. L. (2015). Using instructional strategies to enhance student achievement. *National Forum of Teacher Education Journal*, *25*(3), 1-18.

Walters, M.G., Gee, D., & Mohammed, S. (2019). A literature review: Digital citizenship and the elementary educator. *International Journal of Technology in Education (IJTE)*, *2*(1), 1-21.

Williams, A. (2015). *Soft skills perceived by students and employers as relevant employability skills* (Order No. 3721695). Retrieved from ProQuest Dissertations & Theses Global. (UMI No. 1719263606).

Yamila, M., & El-Khayat, M. (2016). Librarians help high school students improve research skills. *Journal of the Medical Library Association*, *104*(3). https://doi.org/10.5195/jmla.2016.17

Author Information

Kelli Erwin

https://orcid.org/0000-0001-5457-020X

Walden University

100 S. Washington Ave., Ste. 1210

Minneapolis, MN 55401

USA

Contact e-mail: *kgerwin5@yahoo.com*

Shereeza Mohammed

https://orcid.org/0000-0003-0921-784X

Walden University

100 S. Washington Ave., Ste. 1210

Minneapolis, MN 55401

USA