Professional Learning Facilitators in 1:1 Program Implementation: Technology Coaches or School Librarians?

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A rationale for and history of 1:1 program implementation is provided in this literature review, which highlights the positive impacts, negative implications, and factors of successful implementation. The provision of a high level of ongoing professional support in both technical support and instructional design was noted as a key factor in successful implementation, which suggests that school leaders should seek to include technology facilitators as part of their instructional leadership team. Research is needed to examine how technology coaches and school librarians are selected to serve as technology facilitators in the implementation of 1:1 programs, how the roles of these positions differ in practice, and how each specifically impacts professional learning.

Introduction

School In 2012, the State Educational Technology Directors Association (SEDTA), an association of state and national leaders working to improve education through technology, published a report entitled *Out of Print: Reimagining the K-12 Textbook in a Digital Age*. In this report, they recommended that districts transition from the use of print to digital materials by the 2017-2018 school year. According to SEDTA, digital content is superior to traditional print materials because it can be easily updated, made available and accessible at any time, and personalized. Digital content can also be more engaging for students as it incorporates graphics, video, and interactive elements (Fletcher, Schaffhauser, & Levin, 2012). U.S. Secretary Arne Duncan reinforced SEDTA's recommendation in remarks delivered to the National Press Club in 2012, referencing South Korea's high performing schools as an example of how U.S. schools should emulate their plan to become paper-free (Lawrence, 2012). These recommendations are driven in part by the recent implementation of the English Language Arts Common Core State Standards (Common Core State Standards Initiative, 2015) that require students to use a variety of digital tools and resources within the curriculum to develop 21st century skills (P21, n.d.). As such, districts are now scrambling to provide their students with devices through which they can access these tools and resources, leading to the implementation of 1:1 programs in which every student is provided an Internet-enabled mobile device.

Unfortunately, the implementation of 1:1 programs has not been easy. In recent years, several barriers have been identified that prohibit successful implementation. These include a lack of vision and effective leadership, unsupportive cultures, high costs, management of inappropriate

student behavior, and inadequate teacher preparation and professional development (Kervin, Verenikina, Jones, & Beath, 2013; Lee, Messom, & Yau, 2013; Stanhope & Corn, 2014; Tomlinson, 2015). Though the desire to transition to a fully digital learning environment is motivated by its potential to transform the teaching and learning process, increase student engagement and achievement, and prepare future-ready students (Stanhope & Corn, 2014; Tomlinson, 2015), it is important for school leaders to understand that a fully digital curricular environment may not be possible or appropriate if teachers are not provided with appropriate and adequate support during implementation. Strong technology leadership is needed, and most principals lack the background knowledge, training, and technical expertise to provide the high level of support needed by a faculty and staff (Sugar & Holloman, 2009). Administrators must identify other leaders, such as technology facilitators, to whom they can distribute this responsibility (Neumerski, 2013; Spillane, 2006). School librarians are uniquely trained to serve as technology facilitators who provide access to digital resources and offer collaborative instruction and leadership regarding the integration of these resources into the curriculum (American Association of School Librarians, 2010; Dotson & Dotson-Blake, 2015; Johnston, 2015). However, many administrators have elected to hire technology coaches instead of school librarians to provide leadership in the implementation of 1:1 programs. A review of the literature and professional standards indicates that the instructional and leadership roles of a coach and school librarian are similar in nature (American Association of School Librarians, 2010; Cooper, 2015; Dotson & Dotson-Blake, 2015; ISTE, 2011; Kretlow & Bartholomew, 2010; Neumerski, 2013). Since school administrators are often provided latitude in how to distribute funding for personnel, research is needed to investigate why they choose to employ technology coaches instead of teacher librarians as technology facilitators, how the roles of these positions differ in practice, and how they impact the implementation of 1:1 programs.

Rationale for 1:1 Program Implementation

Defining Two reasons are frequently cited when justifying the need to implement 1:1 programs in K-12 schools: futurism and a desire to customize education for a tech-savvy generation of students.

Futurism

In 1970, Alvin Toffler's *Future Shock* introduced a new perspective on educational theory - futurism. Toffler claimed that schools were educating students with an outdated set of practices and assumptions based upon the industrial era; this produced an educational system that faced backward rather than forward toward a new super-industrial society. Consequently, students were not being adequately prepared to function in the society that existed once they completed their education. He contended that schools needed to change in order to equip students to respond to societal changes and make intelligent choices as they moved forward into an unknown future. The emerging information technologies of today provide a way for schools to redesign their delivery systems, providing a high-choice, diverse system through which students might be better prepared for a preferable future.

This futuristic perspective has been echoed in multiple sources in recent years, resulting in a commonly held belief that a fully digital learning environment is now both necessary and beneficial for today's students. The U.S. Department of Education's National Education Technology Plan (2010), entitled *Transforming American Education: Learning Powered by Technology*, states that technology should be used to create learning experiences that mirror the reality of students' futures. It also recommends that every student and educator have at least one Internet-enabled device with appropriate resources so that they may be able to successfully engage in

research, digital content creation, and communication and collaboration both in and outside of school.

In keeping with the futuristic theme, the *NMC Horizon Report*, an annual report assembled by an international body of experts, describes the trends, challenges, and developments in educational technology that are likely to become mainstream in K-12 education in the next five years. Each year, a panel of experts is assembled to systematically review the literature that discusses emerging technologies. Carefully designed research questions are utilized to guide the panel members in selecting and ranking technology trends. The final selected trends are then categorized in the annual report by their short-term, mid-term, and long-term impact forecasts. A short-term trend identified in the 2015 report that is projected to significantly impact K-12 education within one year is that of "Bring Your Own Device" (BYOD) programs in which students are allowed or expected to bring their personal mobile devices for use within the curricular program. Another short-term trend, expected to influence K-12 education within one to two years, involves the increasing use of blended or hybrid learning where online work is combined with traditional face-to-face instruction, necessitating that students be provided with devices through which they can access online content (Johnson, Adams Becker, Estrada, & Freeman, 2015).

Project Tomorrow, a national education nonprofit organization that administers annual surveys to solicit educator, students, and parent input on these trends and synthesizes them into an annual report that is shared with state and national policy leaders, also identifies digital learning trends. The 2015 compilation of 2014 survey results, entitled *Trends in Digital Learning: Empowering Innovative Classroom Models for Learning* (2015), reports that today's education leaders possess a sense of urgency to both close the student achievement gap and prepare students to compete and contribute to a global economy. More than nine out of ten administrators surveyed communicated that the integration of technology into instruction is important for achieving these goals and recognized the use of digital tools as a key to improving student achievement.

Student Engagement

An increase in student engagement is often cited as a reason for implementing 1:1 programs in K-12 education. In the early days of the 21st century, Marc Prensky (2001) coined the term "digital natives" to describe the generation of students who have grown up using new technologies such as computers, video games, and smart phones and spend large volumes of time interacting with them. As a result of this, he posited that students think and process information in ways that differ from previous generations, the "digital immigrants" who are not as quick to adapt to new technologies. This change demands that schools adapt their instructional methods to incorporate the digital environments that students currently inhabit.

History of 1:1 Programs

Given that mobile computing devices have not been readily available or affordable until the past decade, little research has been conducted specifically on the implementation of 1:1 programs (Grant et al., 2015). The existing small body of research focuses upon the use of mobile devices in a variety of situations, including BYOD, mobile labs, and 1:1 programs.

Positive Impacts

A small number of studies have confirmed that the integration of mobile devices into curricular program results in increased student engagement and achievement. Nine comparative studies have demonstrated that students who participated in mobile learning exhibited increased achievement over those who had no mobile access and received traditional instruction. Several non-comparative studies have also revealed that mobile learning has resulted in increased and improved communication and collaboration among educational stakeholders, extended learning opportunities outside of the classroom and into real-world, authentic contexts (Liu et al., 2014). One particular study that examined how a 1:1 laptop program affected student learning in a Midwestern high school demonstrated an increase in student engagement and motivation and an improvement in learning experiences for traditional, at-risk, and high-achieving students (Keengwe, Schnellert, & Mills, 2012).

Challenges

Studies that focus solely upon the negative implications of 1:1 programs are limited (Swallow, 2015). However, several studies have noted specific challenges experienced when attempting to integrate mobile devices into the curriculum, including technical and pedagogical challenges. A case study that examined the course of a 1:1 laptop initiative over three years found that though year one demonstrated positive results, technical challenges arose in year two as students became frustrated with the extended time needed to boot up their computers and connect them to the Internet. These delays occasionally caused teachers to abandon their initial lesson plans. In addition, teacher pedagogical practices were not transformed by the use of the devices as expected; instead, emphasis shifted to more teacher-centered control (Swallow, 2015). A study that examined the use of mobile computer labs (MCL) in 3rd and 4th grade classrooms in 1,591 state schools in Chile found that the MCLs were used only sporadically. This was attributed to a lack of teacher planning time, project overload, and insufficient technical and pedagogical support; it was found that teachers required clearer and more organized guidance in using the new technology resources. Researchers concluded that the absence of teacher training and development of digital resources severely limited the potential benefit of using technology in the curricular program (Claro, Nussbaum, López, & Díaz, 2013). A study that investigated potential issues within the implementation of an e-textbook program revealed that technical factors regularly inhibited the learning process in elementary classrooms. These factors included the inability to log in, spontaneous closing, and failure of an application to respond. Switching between software programs resulted in frequent delays in instructional time as teachers waited for students to complete the change. The researchers learned that teachers would have been more satisfied with the use of e-textbooks if they possessed stronger skills in operating devices and corresponding software, more experience with instructional design, and adequate time to prepare lessons (Gong, Chen, Cheng, Yang, & Huang, 2013).

Factors of Successful Implementation

To maximize student learning outcomes of 1:1 programs, it is imperative to identify the factors that positively affect implementation (Stanhope & Corn, 2014). A research synthesis of 34 studies conducted between 2001 and 2011 to examine the impact of 1:1 laptop programs on teaching learning indicated that factors such as professional development, technical support, teachers' beliefs about technology, instructional design, and the learning environment were important in contributing to the success of implementation (Zheng & Warschauer, 2013). A multiple case study

that examined 1:1 programs in five different school districts demonstrated that those that provided teachers with substitute teachers to enable them to engage in professional development during the school day with ongoing support throughout the year saw a positive impact in how teachers integrated technology into the content areas. This explicit focus on teacher learning provided teachers the time and opportunity to learn how to deal with complex technology issues (Topper & Lancaster, 2013).

A cross-case analysis of eight technology award-winning U.S. schools and districts described specific support elements present in successful programs. These included technical support staff on site at each school as well as technology facilitators who were available to provide professional development and work directly with teachers. Quick-response teams and student help-desks were considered helpful in the absence of technology support personnel and technology facilitators (Levin & Schrum, 2013). Adequate technical support and relevant professional development were also cited as significant themes in the effective integration of mobile devices into the curriculum in a 2011 case study (Grant et al., 2015). Classroom observations revealed that having support personnel available both before and during class was essential to implementing an effective activity with a mobile computer lab in a study conducted in Chilean elementary classrooms (Claro et al., 2013). Finally, a mixed-methods study conducted to specifically examine the extent to which a technology facilitator impacted teacher commitment to the implementation of a 1:1 initiative found that affective commitment was higher with the presence of a full-time technology facilitator. Teacher attitudes toward the teaching and learning of technology and the school's infrastructure were significantly higher in schools that employed a full-time technology facilitator over those that had reduced or eliminated the position (Stanhope & Corn, 2014).

Professional Learning

Reflections and Application

Professional learning is vital to successful implementation of any new educational initiative. "Effective change initiatives require stakeholder commitment, and teachers are key stakeholders in the academic implementation of academic innovation" (Stanhope & Corn, 2014, p. 254). Essential components of teacher commitment to technology initiatives such as 1:1 programs include the availability of professional development, adequate infrastructure and technical assistance, and strategic support. Project Tomorrow's compilation of the 2014 national Speak Up survey results, *Trends in Digital Learning: Empowering Innovative Classroom Models for Learning* (2015), identified the implementation of digital learning as one of administrators' top challenges. Forty-seven percent of principals were concerned about how to evaluate the quality of digital content and one-third of school principals reported "that the lack of teacher training on how to use digital content in particular within instruction is holding back their plans for more innovative classroom model implementations" (p. 8). This indicates that many teachers don't yet fully understand the role of digital tools and content within the instructional program and supports the literature that demonstrates that a high level of ongoing support for teachers is essential for success during the implementation of a mobile learning program.

In 2009 the National Staff Development Council and The School Redesign Network at Stanford University released a report on the first phase of a multi-year study conducted to examine professional learning in the United States and abroad. Darling-Hammond, Wei, Andree, Richardson, and Orphanos (2009) found that ongoing and intensive professional development

positively impacted student acievement when it connected to practice and school initiatives, focused on the instruction and learning of specific academic content, and incorporated a collaborative approach. Since most principals lack the background knowledge, training, and technical expertise to provide this type of professional development and the National Educational Technology Plan (2010) recommended a team-driven approach for professional learning, administrators must identify other leaders, such as technology facilitators, to whom they can distribute this responsibility in the implementation of 1:1 programs (Beglau et al., 2011; Neumerski, 2013; Spillane, Halverson, & Diamond, 2001; Sugar & Holloman, 2009).

Technology Facilitators

A technology facilitator is described as "a professional who provides leadership, guidance, and opportunities for professional development (PD)" (Stanhope & Corn, 2014, p. 254).   Technology facilitators are expected to stay current with best practices in educational technology and the planning and implementation of digital learning environments. They are responsible for increasing teacher self-efficacy by demonstrating and modeling technology integration. They provide ongoing technical support, assistance in developing technology-integrated lessons, and professional development. Technology facilitators may be assigned professional titles such as technology specialist, technology integration specialist, technology support specialist, technology coach, instructional technology coach, digital learning coach, technology coordinator, media specialist, library media specialist, school librarian, or teacher librarian (Bray & Hollandsworth, 2011; Johnston, 2015; Sugar & Holloman, 2009).

Professional Standards

There are two sets of professional standards that serve to direct individuals in effectively functioning as technology facilitators in their schools. The International Society for Technology in Education (ISTE) has designed the *ISTE Standards for Coaches* which concentrate upon the skills and knowledge needed by technology coaches to guide and support teachers in a technologically-connected and global society. *The American Association of School Librarians (AASL) Standards for Initial Preparation of School Librarians* (2010) are designed to "prepare candidates to develop and manage library and information services in a PreK-12 setting, regardless of degree name or professional title" (p. 1) and heavily emphasize the use of digital resources and emerging technologies and development of 21st century skills within the curricular program. Both sets of standards have been approved by the Council for the Accreditation of Educator Preparation (CAEP) for use in advanced programs in colleges of education ("CAEP Accreditation Organization Approves ISTE Standards," 2013; Church, Dickinson, Everhart, & Howard, 2012).

Coaches

Many school districts have elected to employ coaches in an effort to provide continuous professional development to teachers (Beglau et al., 2011; Neumerski, 2013; Udesky, 2015). These coaches are typically identified by administrators as veteran educators holding a positive reputation with peers who are assigned to provide assistance to teachers in the improvement of instruction (Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009). Depending upon the direction of the school or district, coaches may or may not be required to complete an advanced course of study beyond their basic teaching credential. In addition, there is no standard model for instructional coaching, leaving schools and districts to design and implement their own models (Neumerski, 2013).

Believing that "convergence of technology, coaching, and community (social learning) is essential to model learning and teaching effectively in a connected, global society," (ISTE, 2011, p. 3) ISTE developed its *Standards for Coaches* to provide a model that outlines benchmarks for the knowledge and skills that technology coaches should possess in order to effectively assist teachers in designing technology-rich learning environments (Beglau et al., 2011). The standards indicate that coaches should:

- Inspire and participate in the development and implementation of a shared vision for the comprehensive integration of technology to promote excellence and support transformational change throughout the instructional environment
- Assist teachers in using technology effectively for assessing student learning, differentiating instruction, and providing rigorous, relevant, and engaging learning experiences for all students
- Create and support effective digital age learning environments to maximize the learning of all students.
- Conduct needs assessments, develop technology-related professional learning programs, and evaluate the impact on instructional practice and student learning
- Model and promote digital citizenship
- Demonstrate professional knowledge, skills, and dispositions in content, pedagogical, and technological areas as well as adult learning and leadership and are continuously deepening their knowledge and expertise (ISTE, 2011, pp. 1-2)

School Librarians

A review of the literature indicates that the instructional roles of a coach and school librarian are similar in nature (Church, 2011; Knight, 2011; Kretlow & Bartholomew, 2010; Neumerski, 2013) and a close examination of the ISTE *Standards for Coaches* and the *AASL Standards for Initial Preparation of School Librarians* reveals a high degree of overlap between the instructional roles of both positions as school librarians are uniquely trained to provide access to digital resources and collaborative instruction and leadership (Dotson & Dotson-Blake, 2015). This training is outlined in the *AASL Standards of Initial Preparation of School Librarians* (2010), which require that preservice school librarians be prepared to do the following:

- Base twenty-first century skills instruction on student interests and learning needs and link it to the assessment of student achievement
- Make use of a variety of instructional strategies and assessment tools to design and develop digital-age learning experiences and assessments in partnership with classroom teachers and other educators
- Employ strategies to integrate multiple literacies with content curriculum
- Integrate the use of emerging technologies as a means for effective and creative teaching and to support P-12 students' conceptual understanding, critical thinking and creative processes
- Model multiple strategies for students, other teachers, and administrators to locate, evaluate, and ethically use information for specific purposes
- Collaborate with students, other teachers, and administrators to efficiently access, interpret, and communicate information
- Evaluate, select, manage a quality collection of print, non-print, and digital resources; facilitate access to information in print, non-print, and digital formats

- Model and facilitate the effective use of current and emerging digital tools to locate, analyze, evaluate, and use information resources to support research, learning, creating, and communicating in a digital society
- Promote and model digital citizenship and responsibility; educate the school community on the ethical use of information and ideas
- Lead professional development activities for other educators
- Acknowledge the importance of participating in curriculum development, of engaging in school improvement processes, and of offering professional development to other educators as it relates to library and information use (AASL, 2010, pp. 1 – 17)

Support for Coaches and School Librarians

Though a few studies have provided promising data regarding the effectiveness of the coaching model in improving instruction, overall there is little research to support it (Darling-Hammond et al., 2009; Kretlow & Bartholomew, 2010; Neumerski, 2013b). Conversely, a 2016 compendium of research findings collected from large-scale studies conducted in 25 states demonstrates that professional certified school librarians positively impact student achievement when they organize and maintain a collection of print and electronic resources, regularly collaborate with teachers to integrate resources and activities into the curriculum, facilitate physical and intellectual access to print and digital information, and provide leadership in achieving a school's mission and learning objectives (*School libraries Work! A Compendium of Research Supporting the Effectiveness of School Libraries*, 2016). Additionally, a key finding of Project Tomorrow's 2014 national Speak Up survey results states, "Librarians and media specialists are providing first responder support to students and teachers to support their use of digital tools and resources in blended, flipped and virtual classrooms" (*Trends in Digital Learning*, 2015, p. 3).

Many school leaders throughout the nation are unaware of this research and have little to no knowledge of the instructional role or technology expertise of the school librarian, existing school library standards, and resources to develop effective school library programs in conjunction with 1:1 initiatives (Church, 2008, 2010; Hartzell, 2002; Levitov, 2013; Shannon, 2012). Though instructional technology specialists are often viewed as essential technology leaders in schools and are included as part of the administrative team, school leaders do not view school librarians through the same lens (Johnston, 2015). Consequently, school librarians are not considered when adding technology facilitator positions to a school's faculty.

Clarification of Roles

This lack of clarity about the school librarian's role has resulted in uncertainty in how school librarians can successfully enact an instructional technology role in practice. In 2010, ISTE's Media Specialists Special Interest Group (SIGMS) released an advocacy statement entitled *The Role of School Librarians in Promoting the Use of Educational Technologies* in an attempt to provide clarification for both school librarians and the school's stakeholders. This document states that because of their unique training and experience, school librarians are positioned to play a critical role as educational technology leaders in their schools. As such, they should either serve in the role of instructional technology specialist in a school when the position of a formal technology coordinator is not present or work closely with the school's technology coordinator to provide guidance in technology integration to both students and staff.

Data collected from Johnston's (2012) study conducted to investigate the enablers and barriers that allowed National Board Certified school librarians to thrive in this role as technology integration leaders in their schools provides valuable information to assist in better preparing

school librarians to successfully fulfill this role. Enablers included a high level of support provided by the principal and district administration, opportunities to serve on leadership teams and technology and curriculum committees and provide professional development, collegial relationships with teachers, and involvement with professional organizations. Barriers included uncollaborative and unsupportive teachers, a competitive relationship with a building-level instructional technologist, exclusion from leadership, and deficiencies of resources including a lack of time, a fixed library schedule, and lack of clerical assistance. An overarching theme of this study's findings was that of administrative support. Without it school librarians were not able to effectively engage in the essential aspects of technology leadership.

Given that technology facilitators are needed to provide support in the implementation of 1:1 programs, the overlap and ambiguity between the professional standards of the school librarian and technology coach, and the disparities in research to support each role, additional research is needed to examine how these roles are enacted in practice and their impact upon both professional learning and student achievement in digital learning environments. Topics to investigate include administrative decisions regarding the hiring of technology coaches or school librarians, the level and nature of preservice preparation or training completed by each individual, how the roles in practice align to the established professional standards, and how the coach or librarian specifically contributes to instructional leadership in regards to technology integration throughout the school's curricular program. Results of this research would serve to inform preservice programs, professional development, and advocacy efforts for administrators, classroom teachers, technology coaches, and school librarians.

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