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The Impact of 1:1 Technology Initiatives on New Literacy in the Secondary ELAR Classroom: A Metasynthesis

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THE SECONDARY ELAR CLASSROOM: A METASYNTHESIS

by

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ABSTRACT

Guided by socio-cultural learning theories of Vygotsky's (1979) social-constructivism and cultural-historical activity theory (Engeström, 2014), the researcher of this study formed three research questions regarding the emergent research trends on 1:1 technology initiatives in the secondary ELAR classroom and new literacy. In response, a meta-synthesis of relevant studies was conducted. To provide an initial framework for the synthesis, the researcher provided conceptual definitions and backgrounds of 1:1 technology initiatives, socio-cultural learning theories, and *new literacy*, supported by the history of literacy movements that led to this new model of literacy. Utilizing narrowed inclusion and exclusion criteria, the research yielded six journal articles and dissertations that served as participants for this study. In a second phase of data analysis, the researcher established the emergent themes across all studies included topics on the impact of 1:1 on new literacy acquisition, the changing role of the teacher in 1:1 settings, the deictic nature of literacy, and common challenges that impede technology integration. In a third and final phase of this meta-synthesis, the researcher utilized the original theoretical framework and research question as a lens to provide additional interpretations. The findings from this process related to a lack of unified terminology regarding the emergent form of literacy, as well as conditions for student engagement and acquisition of new literacy skills.

DEDICATION

To my parents, who taught me by example to love what I do and to be loving toward others.

To Alex, for all of the busy weekends, unwavering support, and foot rubs that you put into this endeavor.

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First, I would like to acknowledge and thank my husband Alex and my parents, who always believed that I could reach my goals, which were only made possible with their constant support, assistance, and patience.

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TABLE OF CONTENTS

LIST OF FIGURES

<center>**CHAPTER I**</center>

<center>**Introduction to the Study**</center>

Introduction

Across global economic markets, technology impacts nearly every facet of life, and its use increases every year. In education, technology's rapid progression has had a dramatic impact on educators who strive to improve student learning through the effective and consistent use of technology. Technological innovations in the classroom have created experiential opportunities otherwise not available to many students, from enabling communication across remote geographical locations, to introducing other tools that enhance the learning experience (Hew & Brush, 2007, p. 224). Technology's impact on K-12 students cannot be understated, and research suggests that its successful integration into classrooms is essential for maintaining the nation's economic stability. In his book, *Education Transformation*, Ron Packard (2013) claimed,

> The next generation of entrepreneurs impacting our world will be created by our current education system, and we need a system that equips them with the knowledge, talents, skills, values, drive, and vision to be entrepreneurs – or anything they want to be. Nations that fail to do this will not remain globally competitive. (p. 7)

<center>1</center>

The national response to this call for change varies at the federal, state, and local

levels (Horn & Staker, 2015; Packard, 2013), but state laws and local schools are largely

guided by federal policy initiatives that have been created to address the needs of

educators and students as they strive to integrate classroom technologies. The federal

report, *A Nation at Risk* (1983) acknowledged the increasing global demand for

technological knowledge and skills; furthermore, the report emphasized America's need

to not only link technology to specific content areas in the sciences and the humanities,

but also to integrate content areas for the greatest breadth of educational coverage:

> Knowledge of the humanities, they maintain, must be harnessed to science and
>
> technology if the latter are to remain creative and humane, just as the humanities
>
> need to be informed by science and technology if they are to remain relevant to
>
> the human condition. (National Commission on Educational Excellence, 1983,
>
> para. 15)

Almost two decades after the release of *A Nation at Risk*, the No Child Left Behind Act

(NCLB) of 2001, specifically the Enhancing Education Through Technology Act of

2001, demanded improvement in student achievement through the use of technology in

K-12. Even more recently, the U.S. Department of Education released a new National

Education Technology Plan (2016), which outlines a national commitment to (1) redesign

teacher preparation for the inclusion of "thoughtful use of technology" in the curriculum,

(2) increase equitable student access to technologies, and (3) implement design principles

that emphasize overall student achievement through technology integration.

Background of the Problem

Fearful reactions to *A Nation at Risk* (1983) led to widespread implementation of educational reform (Brown, 2009), because the increased use of technology in all markets has necessitated adequate technological training for K-12 students (Reiser, 2001). The International Society for Technology in Education (ISTE) has produced technology standards for students and educators that guide federal and state education standards (ISTE, 2017a; 2017b). In response, the federal government requires technology integration in K-12 schools, and it has mandated that technology be integrated into specific content areas, rather than in isolation (U.S. Department of Education, 2012). The standards for Common Core (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2019), which has currently been adopted by 42 states for the English Language Arts and Reading (ELAR) standards, is prefaced with the expectation that in addition to achieving the content standards,

> Students employ technology thoughtfully to enhance their reading, writing, speaking, listening, and language use. They tailor their searches online to acquire useful information efficiently, and they integrate what they learn using technology with what they learn offline. They are familiar with the strengths and limitations of various technological tools and mediums and can select and use those best suited to their communication goals. (p. 7)

In other words, technology is now considered at the national level as a tool used to meet practical demands, separate from using technology for technology's sake.

Consequently, technology integration has become an integral aspect of teacher evaluation systems. Many national and state-level standards-based reforms have increased the need for monitoring teachers to ensure best practices and accountability (Hamilton, Stecher, & Yuan, 2008). For example, the Texas Education Agency (TEA) and the Texas Commissioner of Education require teacher performance to be evaluated and recommend the Texas Teacher Evaluation and Support System (T-TESS) as the medium for such evaluation (§150.1001). One notable T-TESS standard requires that teachers use technology to help students reach "mastery levels" through effective use of technology in the classroom (§149.1001). These and other state efforts to integrate technology in public schools reflect wider policy and societal changes (Reiser, 2011).

Inan and Lowther (2010) argued that technology integration " . . . can be grouped primarily into three broad categories; technology for instructional preparation, technology for instructional delivery, and technology as a learning tool . . ." (p. 138). Relatedly, Downes and Bishop (2015) recognized the need for teachers to reinterpret the impact of technology on teaching and student learning. Considering technology's increasing customization and accessibility, researchers have recognized the value of technology in the classroom to promote student-centered learning and critical thinking (McCain 2005). Researchers also identified that students should use technology in real-world ways – to research, communicate with others, work together, and solve problems (An, & Reigeluth, 2011; Ertmer et al., 2012).

Stating the Problem

The above-mentioned federal initiatives have resulted from a rapidly changing global market that increasingly demands its workforce to be prepared in new ways. Such a market, which depends on the similarly rapid development of technology's integration in the K-12 classrooms, exacerbates a notable gap between the technological skills previous generations of students needed and the ones today's students need in order to participate effectively in the modern workforce (Lombardi et al., 2017; Mann & Kirkgaard, 2006; Moss, 2012; Packard, 2013; Tribuzzi & Fisher, 2014; Warshaurer & Ware, 2008). In other words, the global economic demand for this study's focus – *new literacy*, which encompasses technological fluency – has inspire federal initiatives.

These initiatives in turn have affected state mandates and, thus, impact local schools. From there, the problem is that local schools need 1:1 initiatives and teachers who are willing and trained to implement the technology in the classroom, but many of those teachers, for a variety of reasons, have limitations regarding the implementation of technology that affect their ability to meet state mandates and fulfill federal initiatives. Therefore, students are less prepared for global economic markets. While the need for increased demand and application of technology use in the content-area classrooms is known and acknowledged, researchers and educators alike debate how to efficiently and successfully integrate technology with traditional literacy skills, especially when it comes to resolving barriers to educator implementation success.

This national problem has necessitated further research. The remainder of the current chapter provides background for schools' technology integration measures, and it

establishes the correlation between increasing technology use and the changing landscape of literacy skills. It also expresses the need for a synthesis of qualitative research on the topic of 1:1 technology initiatives and new literacy skills for secondary school students. Finally, the chapter introduces the purpose and significance of this dissertation's research and the research questions that guided the inquiry, and suggests the implications of utilizing 1:1 technology initiatives for the acquisition and teaching of new literacy skills.

Context A: 1:1 technology initiatives. Although there are varying models of technology integration, one popular initiative in K-12 schools is a "one-to-one" (1:1) program, in which there are enough internet-enabled devices on campus for each student to access educational technology. These programs can vary significantly in four areas: (1) the types of devices available (iPads, wireless Internet-enabled laptops, Chromebooks, or mobile devices), (2) the source of devices (student- or school-supplied), (3) options for students to take home devices, and (4) how the devices are integrated into curricula. Regardless of variations, however, 1:1 programs ease access to technology for educators and students alike, and they remain a popular alternative to computer labs or mobile labs separate from on-campus classrooms.

Even though it is standardized in theory, technology integration in practice is highly dependent on its implementation environment, specifically individual teachers' perspectives. While there are a number of barriers to implementing technology in the classroom, teachers' perspectives remain one of the largest contributors (An & Reigeluth, 2011; Ertmer et al., 2012; Hur, Shannon, & Wolf, 2016; Inan & Lowther, 2010; Kim et al., 2013; Vatanartiran & Karadeniz, 2015). In fact, " . . . the top three barriers -

resources (40%), knowledge and skills (23%), attitude and beliefs (13%) made up for 76% of those mentioned in current literature . . ." (Blocher et al., 2011, p. 158). A teacher's attitude about classroom technology, or even about technology in general, can influence their respective levels of willingness and resistance to implement its use for their own students (Salleh, 2016). Negative attitudes are generally related to a teacher's anxiety regarding their own skill level and/or students' negative behaviors while using technology, but attitudes are also shaped by a school's existing technological infrastructure, restrictive internet policies, and deficient professional development (Blocker et al., 2011; Vatanartiran & Karadeniz, 2015). All of these factors can be demotivating for teachers and create resistance to implementing technology in the classroom (Vatanartiran & Karadeniz, 2015).

In order to successfully implement technology, essential resources such as appropriate technological devices and basic Internet access are critical, and yet they are often lacking in K-12 classrooms despite being more affordable than ever. Advances in technological devices such as tablets and laptop devices, with operating systems largely utilizing cloud data instead of hard drive space (such as Chromebooks), have made educational technologies more cost-efficient, faster to use, and more portable in the past decade (Varier, Dumke, Abrams, Conklin, Barnes, & Hoover, 2017). The U. S. Department of Education echoed this finding in its most recent National Educational Technology Plan (2017). It noted, "The cost of digital devices has decreased dramatically, while computing power has increased, along with the availability of high-quality interactive educational tools and apps" (p. 7). In addition to federal funding

allocated for educational technologies, many corporations are providing money for schools to obtain the resources they need for technology integration. In 2014, Apple, Microsoft, AT&T, and Verizon each pledged to donate money for this purpose, totaling $750 million (Cheng, 2014). However, despite this positive trend in overcoming economic barriers to adequate resources for technology integration, Internet speed and reliability persist as relevant problems in limiting effective integration as they impede access and increase frustration, which in turn often results in the decreased use of technology (Peterson & Scharber, 2017; Varier, et al., 2017).

If teachers had sufficient and consistent technology skills, which also play a vital role in the successful integration of technology in K-12 classrooms, teacher might feel more prepared to incorporate digital tools in their lessons. However, teachers often lack the pedagogical framework with which to build practical implementation of technology in their classrooms. Not only should teachers be competent in technology at a basic level to meet their own needs, but they should be able to transfer their knowledge and skills into implementation at the student level (An & Reigeluth, 2011; Ertmer et al., 2012; Vatanartiran & Karadeniz, 2015). Ertmer and Ottenbreit-Leftwich (2010) asserted that " . . . knowing how to use the tools is only the foundation. Teaching with technology requires teachers to expand their knowledge of pedagogical practices across multiple aspects of the planning, implementation, and evaluation processes . . ." (p. 260). Research has suggested, then, that technology integration demands a wider instructional philosophy and framework to be successfully implemented by teachers.

The limits of instructional exposure to and choices about their pedagogical framework ultimately impact teachers' uses of technologies in the classroom (Kim et al., 2013). Decision-making regarding the role of technology directly relates to a teacher's instructional design (Ertmer, et al., 2012; Inan & Lowther, 2010), and recent research has demonstrated that teachers need to be well-informed about the fundamental beliefs of technology integration, in addition to its practices (Bleakley & Mangin, 2013; Ertmer et al., 2012; Kim et al., 2013) to successfully integrate technology in their classrooms. As such, integration of technology in the classroom requires the development and education of teachers in both fundamental beliefs and technological practices (Reiser, 2001). More important than the actual philosophy choice, it is vital that teachers choose a framework and work within its philosophical tenets. As noted by An and Reigeluth (2011), "It is possible that teachers who are learner-centered in philosophy are teacher-centered in actual practice . . ." (p. 60), and such a discrepancy can cause significant implementation issues.

Targeted professional development can enhance educators' skills for successful technology integration in K-12 classrooms (Blocher et al., 2011; Clausen, 2007; Hew & Bush, 2007; Scott & Mouza, 2007). With this in mind, Scott and Mouza (2007) suggested that for innovative technology integration to occur, technology-related professional development must be provided to classroom teachers. The authors (2007) claimed that " . . . the lack of innovative technology use in the classroom is partly attributed to the inadequacy of professional development available to teachers . . ." (p. 232). The "inadequacy" might be explained by the fast-paced progression of technology.

Blocher, et al. (2011) explained that the gap between what was termed "digital immigrants," or veteran teachers who were not raised with technology nor trained in teacher education programs for the appropriate use of technology in the classroom, and "digital natives," who have been immersed in technology much of their lives is at least partly responsible for the ineffectiveness of professional development involving technology integration. The researchers (2011) noted that " . . . many teachers who have been in the classroom a number of years most likely did not grow up with technology . . ." (p. 159). Teachers entering the field in recent years who have utilized technology in their everyday lives are, on the other hand, more comfortable with technology integration. This disparity between the two groups of teachers can impede the quality of implementation, as well as the quality of professional development created by educators.

Researchers also offered another factor besides professional development that impacts educators' willingness and ability to integrate technologies: educators' level of access to technical support for both hardware and software. Cuban et al. (2001) wrote, "Teachers also said that the technology itself is unreliable and they expressed deep ambivalence about powerful machines that often broke down . . ." (p. 829). When teachers feel ambivalent to technology, they are less likely to include it in their curriculum. Although some school organizations have funded personnel to aid teachers with technology integration, many technical support issues cannot be immediately addressed. Cuban et al., (2001) observed that " . . . support personnel were often overwhelmed by teacher requests, out of replacement parts, or they just could not respond swiftly or adequately . . ." (p. 829).

Context B: Associated learning theories. Successful implementation of technology integration in K-12 classrooms has significant implications for the philosophical underpinnings of pedagogy and learning. Internet access is vital to this success, as it provides an immediate social network of information and communication. Using Internet technologies, students can achieve a more student-centered, personalized education, taking advantage of the ability to connect with knowledge and people across the world (Horn & Staker, 2015). Internet-enabled technology may also be considered a tool for activity; as Engeström (2014) acknowledged, "Activities are always mediated with human-made artifacts, such as various types of tools and signs" (p. 139). Accordingly, Cultural-Historical Activity Theory (CHAT) is an essential philosophy that connects activity, learning, and development. One of the primary contributions to this theory, social-constructivism, as envisioned by Vygotsky (1979), connects activity to the individual's ability to construct new knowledge and meaning.

A key component of Vygotsky's theory of social-constructivism is the Zone of Proximal Development (1979), which he defined as " . . . the difference between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (p. 86). Lompscher (2006), examining the history of CHAT, noted that

> Vygotsky's view on psychic development as going on in integration and
> cooperation with others, in social situations of development, as transition from
> inter-psychic to intra-psychic processes, and his idea about zones of proximal

development by cooperation, support, help, and/or modeling would be impossible

without this type of historical-sociological concept of human activity. (p. 38)

Emphasizing the need for interaction with other learners and external knowledge for

development and learning, Vygotsky's (1979) theory clearly connects to the utilization of

educational technologies for the enhancement of student learning. Recognizing this

connection, Pittman and Gaines (2015) asserted, "From the sociocultural perspective,

technology provides the platform and the tools to engage via numerous media with other

individuals and groups beyond the immediate reach of the learner" (p. 540).

Bridging Vygotsky's social constructivism and CHAT with modern concepts of

technology and information networks, George Siemens (2005) established the theory of

connectivism. Connectivism imagines learning as a constructivist, active process, using

the specific features of the Internet as tools to accomplish such learning. Siemens (2005)

demonstrates this when he claims,

Learning is a process that occurs within nebulous environments of shifting core

elements – not entirely under the control of the individual. Learning (defined as

actionable knowledge) can reside outside of ourselves (within an organization or a

database), is focused on connecting specialized information sets, and the

connections that enable us to learn more are more important than our current state

of knowing. (para. 23)

Siemens's claim allows for learners to use technology as a way to increase their existing

knowledge as well as their interaction with other knowledge that exists outside of the

classroom.

These theories guide the rationale behind the increased demand for integration of technology in the classroom for the purposes of student learning and literacy, and, together, have allowed for an emerging theory to develop: *New literacy*. *New literacy* evolved from other forms of literacy such as *functional literacy* (UNESCO, 1966), *cultural literacy* (Hirsch, 1988), *emancipatory literacy* (Freire & Macedo, 1987), *critical literacy* (Giroux, 2001), *multimedia literacy* (Mayer, 2008; Mayer, 2009), and *digital literacy* (Gilster, 1997). It has been alternatively identified as 21st century skills, and in the plural as *new literacies*, indicating the idea that *new literacy* includes multiple skills and knowledges. Tribuzzie and Fisher (2014) noted that *new literacy* is an effect of:

> . . . the evolution from traditional reading, writing, listening, and speaking to using multiple types of print and digital media, online communication, and collaborative structures to enable depth in learning and knowledge for the sake of sharing ideas and communicating in a global society. (p. 28)

New literacy is therefore intrinsically social in nature and is grounded in communication skills that are required for online, textual, and face-to-face platforms. The swift development of technology integration, the prodigious volume of ever-increasing information available online, and the relatively recent identification of *new literacy* skills have led to increased research on the ways in which technology may be used to assist students in gaining the literacy skills required for modern society. As Withrow (2004) acknowledged, "With multiple literacies, the challenge is how to teach users to have confidence in the validity of the information they use" (p. 31).

The Purpose and Research Questions

This study was driven by three purposes: (1) to aggregate and interpret trends in educational research on 1:1 technology integration in secondary English Language Arts and Reading (ELAR) classrooms, (2) to further evaluate the findings in the context of student engagement with and achievement in new literacy skills, and (3) to position the topic of new literacy at the center of technology integration initiatives in the K-12 classroom. The researcher approached this study with the following questions:

1. What are the common trends within current research on 1:1 technology initiatives in secondary ELAR classrooms?

2. What does current research demonstrate about the relationship between 1:1 technology initiatives and student acquisition of new literacy skills in those initiatives?

3. What does current research demonstrate regarding the relationship between 1:1 technology initiatives and student practice of new literacy skills in those initiatives?

Definitions

The following six key terms are used throughout the following chapters, and their conceptual definitions and context must be clearly established so the reader and researcher's lens may be aligned:

1:1 technology initiatives.

1:1 technology initiatives are varieties of implementation programs on K-12 campuses that share the common goal of providing ". . . all the students in a class, grade

level, school, or district . . . computers for use throughout the school day and, in some

cases, at home . . ." (Zheng, Warschauer, Lin, & Chang, 2016, p. 1053).

Blended learning. The phrase blended learning means ". . . a formal education

program that leverages both technology-based and face-to-face instructional approaches"

(ESSA, 2015, §4102).

Educational technology.

Educational technology refers to ". . . the study and ethical practice of facilitating

learning and improving the performance of creating, using, and managing appropriate

technological processes and resources" (Carliner, Ribiero & Boyd, 2008, p. 313).

New literacy.

New literacy is considered a combination of digital literacy and traditional

(reading/writing/speaking) literacies (Larson, 2009). It is commonly understood as an

emergent type of literacy resulting from the increased multimodality of information

through technological progression. In its plural form, new literacies, it often

encompasses other types of literacy such as media literacy, global literacy, trans-literacy,

and meta-literacy (Jacobs, 2014; Mackey & Jacobson, 2011; Thomas et al., 2007).

Secondary English Language Arts and Reading (ELAR).

This categorical term refers to courses with curricula in English writing, reading,

and communication skills for students in grades 6-12 (U.S. Department of Education,

2008; TEA, 2015)

Technology integration.

Technology integration refers to the purposeful utilization of technology in the classroom for the enhancement of student learning (Becker, 1994), and its effective use is practiced to support a student-centered curriculum (Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012).

Significance of the Research

As a response to the increased utilization of technology in people's lives, and technology's potential for creating new pathways to successful participation in the global workplace, educators must closely examine the skills necessary for students to become "new literate" citizens (Johnson & Sheskey, 2014; Tribuzzi & Fisher, 2014). A new literacy is the by-product of extensive integration of technology, it is relevant to further examine how educational technology integration, particularly in the popular form of 1:1 technology initiatives, impacts students' engagement and their acquisition of new literacy skills. Warschauer and Ware (2008) observed, "Educators must look for ways to acknowledge and even appropriate for themselves the creative and complex literacy practices that youth bring into schools" (p. 234). To prepare students to be literate in modern, technological society, and to establish what research has demonstrated about effective uses of technology integration, researchers and educators must explore and interpret the results from qualitative studies examining 1:1 technology initiatives' impact on student acquisition of new literacy skills. Demonstrating such a connection between the acquisition of new literacy skills and technology integration in secondary English language arts classrooms will have significant implications for school leaders who plan to implement technology initiatives and create changes to curricula.

Meta-synthesis research design has allowed the researcher to aggregate and interpret the extensive research on 1:1 technology integration initiatives and new literacies, and it will provide a comprehensive examination of their relationship, potentially generating new findings for school leaders and education researchers. Although researchers Zheng, Warschauer, Lin, and Chang (2016) already conducted a meta-analysis and synthesis of the impact of 1:1 laptop programs on student learning, there remains a need for a narrowed examination of 1:1 initiatives through the lens of new literacy. In support of future research on this topic, Zheng, Warschauer, Lin, and Chang (2016) concluded with the need for "studies that can more systematically identify what works, what does not, for what" (p. 1076). Conducting the meta-synthesis with a narrowed focus allows for a more systematic approach to determining what is both successful and unsuccessful in implementing 1:1 technology initiatives for student acquisition of new literacy skills.

Organization of the Study

This dissertation is organized into five chapters, each with a distinct purpose. The first chapter provided a background of the problem, the purpose of the study, the questions guiding the research, and the significance of the study. It also established the theoretical and ontological framework of constructivism and connectivism for the study's focus on new literacy. Each of these ideas were explained more thoroughly in conjunction with the literature review detailed in Chapter II, which focuses on relevant literature on 1:1 technology initiatives, new literacy, and constructivism. Chapter III described the rationale of the study's methodology of meta-synthesis, and it details (1)

the researcher's criteria for included studies, (2) the data collection, and (3) data analysis.

Chapter IV delineated the findings of each participating study included in the meta-

synthesis to demonstrate the emergent themes from the individual studies and across the

collective. In the final chapter, the dissertation offered interpretations of the findings and

established their implications, to demonstrate the impact of 1:1 technology initiatives on

students achieving new literacy in the secondary English language arts classroom.

CHAPTER II

Review of Literature

Introduction

This chapter discusses the evolution of educational technology integration and its impact on instruction and learning. It offers the theoretical framework of social-constructivism to support a literature review of the history of literacy and the construction of *New Literacy*; furthermore, it reviews the impact of federal policies on technology integration, 1:1 technology initiatives, and learner-centered instruction in the American K-12 classroom.

Evolution of Literacies

To think of literacy as merely the ability to read and write is overly simplistic, yet this understanding has long dominated much of how literacy is conceived of in K-12 classrooms. In reality, a deictic understanding of literacy – or literacy having meaning based on context – has created opportunities for multipurpose and multifunctional literacies (Leu Jr., 2000). Indeed, the term "literacy" has included various modifiers that suggest the many intricacies, functions, and purposes of literacy: *functional literacy* (UNESCO, 1966), *civic literacy* (Milner, 2002), *emancipatory literacy* (Freire & Macedo, 1987), *cultural literacy* (Hirsch, 1988), *critical literacy* (Giroux, 2001),

multimedia literacy (Mayer, 2008; Mayer, 2009), and *digital literacy* (Gilster, 1997), as well as various discipline-specific literacies such as *health literacy, computer literacy, math literacy, financial literacy,* and *physical literacy.* Donald J. Leu Jr. (2000) argued, "In a broad, historical sense, literacy has always been deictic, its meaning dependent on the technologies and envisionments within many historical, religious, political, and cultural contexts" (p. 616). As Leu (2000) claimed, "continuous, rapid change regularly redefines the nature of literacy" (p. 614), and the concept of *new literacy* evolved from all previous forms of literacy, meeting the conceptual needs of our changing world. Also examining the emergence of new forms of literacy, Lankshear and Knobel (2011) noted, "This paradigmatic sense of 'new' in relation to literacy is not concerned with new literacies as such but, rather, with a new approach to thinking about literacy as a social phenomenon" (p. 27).

This new approach can be seen especially in functional literacy, cultural literacy, emancipatory literacy, and critical literacy, which all share a common idea that literacy is often based on cultural context, and that it can function as a form of social or individual resistance. In 1966, UNESCO claimed " . . . literacy programmes must impart not only reading and writing, but also professional and technical knowledge, thereby leading to a fuller participation of adults in economic and civic life" (p. 97). When it released these recommendations for literacy in the report "An Asian Model of Educational Development", UNESCO established the concept of *functional literacy* (UNESCO, 1966). *Functional literacy* has been historically popular in educational policies and practices between the 1960s and 1990s based on its use for increasing socioeconomic

mobility. Viewing literacy with this utilitarian approach, Freire and Macedo (1987)

argued that functional literacy was an attempt to meet "… the basic reading demand of an

industrialized society" (p. 147). Nevertheless, the concept was met with criticism by

some experts in the field (Freire & Macedo, 1987; Giroux, 2001, Hirsch, 1988). Giroux

(2001) claimed that its predominant weakness was that,

> In spite of its appeal to economic mobility, functional literacy reduces the concept
>
> of literacy and pedagogy in which it is suited to the pragmatic requirements of
>
> capital; consequently, the notions of critical thinking, culture, and power
>
> disappear under the imperatives of the labor process and the need for capital
>
> accumulation. (pp. 215-216)

Likewise, in their work, *Literacy: Reading the Word and the World,* Freire and Macedo

(1987) asserted, "For the notion of literacy to become meaningful it has to be situated

within a theory of cultural production and viewed as an integral part of the way in which

people produce, transform, and reproduce meaning" (p. 142). From functional literacy,

then, experts shifted away from function exclusively toward the incorporation of culture

in understanding literacy. E.D. Hirsch's (1988) concept of *cultural literacy*, or the ability

to read a culture's symbols and signs, incorporates written and spoken language in

addition to culturally important ideas, figures, and history. Although Hirsch's (1988)

prescribed list of culturally important concepts and histories has been widely contested,

the idea of reading textual context has become a vital component of other literacies. For

example, *emancipatory literacy*, coined by Freire and Macedo (1987), is " . . . tied not

only to mechanical learning of reading skills but, additionally, to a critical understanding

of the overall goals for national reconstruction . . ." and is a necessary tool for oppressed

people to use as a form of resistance (p. 157). Relatedly, *critical literacy* (Giroux, 2011)

allows students to examine contexts and texts that are silent or invisible. As Giroux

(2001) explained,

> Literacy skills . . . become the tools that enable working-class students to
>
> appropriate those dimensions of their history that have been suppressed, as well as
>
> those skills that will reveal and explode the false attractions and myths that hide
>
> the deep division and inequities of the capitalist state. (p. 231)
>
> Each of these literacies emphasizes that the concept of literacy currently holds

significant implications for social justice, and any new conception of literacy is affected

by its relationship to these implications. But literacy does not abruptly change overnight;

its critical evolution links previous forms to new ones. As Lankshear and Knobel (2011)

claimed,

> To say that 'new' literacies are ontologically new is to say that they consist of a
>
> different kind of 'stuff' from conventional literacies we have known in the past.
>
> It is the idea that changes have occurred in the character and substance of
>
> literacies that are associated with larger changes in technology, institutions, media
>
> and the economy, and with the rapid movement toward global scale in
>
> manufacture, finance, communications, and so on. (p. 28)

Though not wholly transformed, literacy's form and function are changing, largely as a

result of increased technological capability, which came with an onslaught of mass

information (Leu, 2000). New literacy embraces change, though it still includes former

concepts of itself by emphasizing skills for discerning " . . . issues of underlying power, and how new technologies might be deployed to enhance the broad educational, social, and economic opportunities of culturally and diverse learners" (Warschauer & Ware, 2008, p. 234).

New Literacy

While globalization and the worldwide increase in technology integration promote changing concepts of literacy (Leu, 2013), it is important to recognize that technology is a catalyst of change, rather than its creator. The process of literacy reform is almost cyclical: technology is a catalyst for changes in literacy, *new literacy* calls for more efficient uses of technology, and efficient uses of technology may lead to the need for additional literacy reform. With this in mind, researchers have claimed that students should use technology in real-world ways – to research, communicate, collaborate, and problem-solve (An & Reigeluth, 2011; Ertmer et al., 2012). McCain (2005) noted,

> . . . the use of technology in the classroom is not the critical issue facing education in the 21st century . . . The issue of foremost importance is to develop thinking skills in our students so that they will be able to utilize the power of technological tools to solve problems and do useful work. (p. 84)

New literacy then, as McCain (2005) referenced, should be the educational focus in preparing students for their futures. Technology may even act as an additional instructional coach for students in facilitating their acquisition of *new literacy* skills. (Dalton & Proctor, 2008). Varied by device and software capabilities, technological tools are capable of assisting students with reading supports, comprehension strategies, error

correction, meta-cognitive strategies, and goal-setting and monitoring (Dalton & Proctor, 2008), which are all critical components of engaging with current multimedia texts.

The evolving concept of "text" itself in the K-12 classroom has contributed to the need for *new literacy* and the use of technology to achieve it. For instance, digital texts are vastly different from traditional print texts in that they may be considered ". . . nonlinear, multimodal with heavy visual orientation, interactive, unbounded in time and space, with murky conveyance of authorship and authority . . ." (Dalton & Proctor, 2008, p. 297). The skills associated with these multimodal texts demand skills for ". . . presentation, problem solving, relevance, truthfulness of resources, and collaborative construction . . ." (Tribuzzi & Fisher, 2014, p. 33). Consequently, *new literacy* skills, including " . . . communication, collaboration, problem-solving, critical, and creative thinking skills . . .", are a vital response to new media (Ng, 2015, p. 6). These skills also include digital competence, involving online safety and the use of hardware and software, as well as a sure understanding of accessing, sharing, and storing digital information (Moss, 2012). They help students operate technology more effectively as a learning tool in the present, and they prepare them for further education and careers in the future.

Despite technology's uses, however, new literacy skills must also emphasize the need for advanced critical thinking, so that students develop the ability to critique information sources for credibility. As Wiley (2014) acknowledged, "It has now become vitally important for students to be critical consumers of information, to understand where information comes from, why it was created in the format it's in, and what potential issues exist for accuracy" (p. 151). Critical thinking extends to identifying what

may be considered *literacy, literature,* or even a *text*, as well as understanding

multimodal, multi-genre, and socially-constructed information and authorship (Tribuzzi

& Fisher, 2014; Warshauer & Ware, 2008). As a result, critical thinking within *new*

literacy requires an aptitude for not only adapting to rapidly changing technologies but

also interrogating new and varied sources of information (Walser, 2008).

Government Policies & Standards for Educational Technologies

Federal policies regarding classroom technology integration have significant

implications for educators and 21st-century notions of literacy, and several major policies

since 1965 have outlined plans for technology's funding and integration. The Elementary

and Secondary Education Act (ESEA, 1965), the No Child Left Behind (NCLB, 2001),

and the Every Student Succeeds Act (ESSA, 2015) all have provisions for technology

integration, and each policy allocates funding for technology resources and professional

development for technology. The Enhancing Education Through Technology program,

as part of NCLB (2001), specifically outlined two primary goals: (1) technology literacy

and (2) curriculum integration. Most recently, in Title IV of ESSA (2015), the allotment

of funds is intended ". . . to improve the academic achievement, academic growth, and

digital literacy of all students" (§4109a).

Such federal education initiatives are heavily influenced by findings from the

International Society for Technology in Education (ISTE), which not only provides

research and ISTE standards for educators and students (ISTE, 2017a; 2017b), but also

offers research-based ideas of the ". . . essential conditions. . . necessary to effectively

leveraging technology for learning . . ." (ISTE, 2019, para. 1). These conditions,

including ISTE's (2019) call for "shared vision," "consistent and adequate funding," "student-centered learning," and "engaged communities," (para. 4-7) are evident within current plans published by the Department of Education (2017). In the *2017 National Education Technology Plan Update*, the Department of Education's vision of educators as collaborators in learning with students was paired with the integration of educational technologies. Explicitly calling for the need for increased collaboration, standardization, and accountability, the vision asserted that,

> To realize fully the benefits of technology in our education system and provide authentic learning experiences, educators need to use technology effectively in their practice. Furthermore, education stakeholders should commit to working together to use technology to improve American education. These stakeholders include leaders; teachers, faculty, and other educators; researchers; policymakers; funders; technology developers; community members and organizations; and learners and their families. (U.S. Department of Education, 2017, p. 3)

The alignment of federal policy with the ISTE findings demonstrates systemwide efforts to standardize the implementation of technology for the enhancement of student learning.

Beyond federal regulations, states also have their own technology standards for education. Common Core State Standards (CCSS) for ELAR have been adopted by 42 states and are an exemplar of how educational technology is integrated within content area standards. In the case of English language arts and reading (ELAR) Common Core standards for grades 6-12, the CCSS introduction provides the following rationale for its inclusion of technology integration within this content area:

> To be ready for college, workforce training, and life in a technological society,
> students need the ability to gather, comprehend, evaluate, synthesize, and report
> on information and ideas, to conduct original research in order to answer
> questions or solve problems, and to analyze and create a high volume and
> extensive range of print and nonprint texts in media forms old and new. (NGA &
> CCSSO, 2010, p. 4)

The use of technology in ELA curricula as a problem-solving tool to cultivate college and
workplace skills demonstrates an acknowledgment of the role technology has to play in
literacy's evolution. The standards for writing and college and career readiness for all
grades in 6-12 ELA, mandate students' "strategic use" of technology (p. 41 & 63).
Reaffirming this acknowledgment, the CCSS ELA Speaking and Listening standards
even explicitly state, "Technology itself is changing quickly, creating new urgency for
students to be adaptable in response to change" (p. 48).

In Texas, even though the student standards – the Texas Essential Knowledge and
Skills (TEKS) – do not yet clearly incorporate technology within ELA, the integration of
technology is included in the required evaluation system for Texas teachers of all content
areas. Specifically, in the Texas Teacher Evaluation and Support System (T-TESS), the
Texas Education Agency (TEA) (2014) calls for teachers to incorporate technology in the
classroom in two out of four dimensions. According to the rubric for T-TESS (Teach for
Texas, 2016), to be considered *proficient* in these dimensions, the teacher must integrate
technology " . . . when applicable . . ." (p. 1) and that is " . . . aligned to instructional
purposes . . ." (p. 4). To attain the highest rating of *distinguished*, educators must

integrate technology for the purposes of " . . . actively engag[ing] students in ownership of their own learning . . ." (p. 4) and " . . . to enhance mastery of goal(s) . . ." (p. 1). With these directly-stated purposes of integration within the T-TESS rubric, rather than a specification of what the students should do with technology, TEA acknowledges that digital skills may change. Nevertheless, it puts the focus on using technology as a tool within a student-centered pedagogy and allows for flexibility to meet those changing needs.

Evidently, both federal and state education policies are directing educators to integrate technology for the benefit of student learning and mastery, and that these policies are based on beliefs instituted by research organizations like ISTE. They all concern themselves with technological skills needed for the future, the correlation between digital and language arts skills, and the need for accountability in the instruction and learning of these skills. As Culp, Honey, and Mandinach (2005) noted,

> Threaded among 20 years of research and policy work on technology's role in education is a conceptual framework for technology's use in education that offers substantial guidance for striking a balance between the demands of improving practice over time and pressing public concerns such as accountability and equity, between the cycle of change in technology and the cycle of change in schools, between the skills of tomorrow and the skills of today. (pp. 305)

The researchers' perspective demonstrates the impact of "public concerns" that guides the framing of technology integration and its connection to ELA content and skills.

1:1 Technology Integration Initiatives

With the establishment of technology integration's purpose in curricula, it is then

vital to provide a background of a currently popular, systematic method of integration

that attempts to increase technology access for all students – 1:1 technology initiatives.

These technology initiatives refer to efforts made by districts, campuses, or departments

to provide enough Internet-enabled devices for each student to have access to the Internet

while at school, though they may vary in the types of devices provided and the limitations

of those devices' capabilities and location (Bebell & O'Dwyer, 2010). While other

models of technology integration exist and enjoy varying levels of popularity, 1:1

initiatives are an important trend in education to examine for changing pedagogical

implications as well as student engagement and achievement in learning outcomes

(Zheng et al., 2016).

One-to-one initiatives fulfill three critical needs: they (1) increase students' access

to technology, they (2) expedite that access through fast Internet, and they, thus, (3) allow

for more efficient use of technology in the K-12 classroom. Increased access is a unique

feature of technology integration that "not only serve[s] a social justice purpose, but also

prepare[s] more technologically competent students for the future workforce by including

the disadvantaged student populations" (Holen, Hung, & Gourneau, 2017, p. 25). Of

course, this increased access increases efficient use of technology in the classroom, but so

too does Internet speed. According to research by the tech company CISCO, average

broadband speeds should keep increasing from the 39 megabytes per second (Mbps)

recorded in 2017, to a projected " . . . 75 Mbps worldwide in 2022 . . ." (Marvin, 2018,

para. 6). Efficiency within 1:1 initiatives has also been improved due to the development of quickly accessible cloud computing devices (such as Chromebooks) and tablets. The cost-efficiency and functionality of these devices has, in turn, increased the spread of 1:1 initiatives across U.S. schools (Molnar, 2014). Simply having the ability to access technology quickly has been demonstrated to positively affect teachers' integration of technology in instruction (Adelman et al., 2002). According to Adelman et al. (2002), teachers use technology less when they have to deal with the difficulty of scheduling time in a computer lab. When students are ensured to have their own device in the classroom, as 1:1 initiatives promote, teachers are more likely to incorporate technology into the curriculum (Adelman et al., 2002).

Barriers to Implementation

Educators' buy in to technology integration is essential; for effective integration of technology in the curriculum, teachers have been found to be the single largest influence (Heath, 2017). Because technology use has been identified as an essential component to *new literacy* (Dalton & Proctor, 2008), and educators are held responsible by state standards for ensuring that the technology is used purposefully and strategically (NGA & CCSSO, 2010), it is thereby essential to explore the barriers that commonly hinder teachers from integrating technology in their classrooms. Despite mandated standards, technology integration in practice is highly dependent on its implementation environment. Literature suggests that the most significant barriers for teachers in implementing technology integration include (1) lack of administrative support (Berrett, Murphy, & Sullivan, 2012; Ertmer et al., 2012; Machado and Chung, 2015); (2) lack of

professional development and technical support (Inan & Lowther, 2010; Hur, Shannon, & Wolf, 2016; and (3) teachers' beliefs and attitudes about technology (Ertmer et al., 2012; Hur, Shannon, & Wolf, 2016; Inan & Lowther, 2010; Kim et al., 2013; Vatanartiran & Karadeniz, 2015).

The role of administrators. As vital components impacting the effectiveness of technology integration efforts, the leadership and support of the campus administration can either promote or inhibit the integration of technology in a school (Berrett, Murphy, & Sullivan, 2012; Ertmer et al., 2012). Moreover, Berrett, Murphy, and Sullivan (2012) suggested that the success of technology integration in schools depends on an administrative " . . . understanding of what the technology can do […] a significant amount of support and understanding from administrators, and […] better use of the tools in one's own area of teaching" (Berrett, Murphy, & Sullivan, 2012, p. 216). Unfortunately, lack of administrative support is often cited by teachers as a barrier to technology integration (Ertmer et al., 2012). A principal's attitude toward technology and the shared vision of their campus can determine the success of teachers' technology integration efforts; in Peled, Kali & Dori's (2011) longitudinal study, the researchers found the principal's' attitude to be a strong predictor of teacher implementation. They found that "The principal creates the basis upon which teachers can flourish (or be suppressed) . . ." (Peled, Kali & Dori, 2011, p. 242). Machado and Chung (2015) similarly found that principals and administrators have the power to promote a vision and objective measures for technology integration to affect teachers' beliefs.

Administrative "power" of promotion (or inhibition) can vary based on a principal's level of technology training. One study found that ". . .the amount of technology training received in the preceding 12 months did significantly influence the level of technology integration" (Dawson & Rakes, 2003, p. 44). Unfortunately, another study found that, among administrators, technology was often imposed upon schools without sufficient preparation, knowledge of technology, or an understanding of successful integration (Berrett, Murphy, & Sullivan, 2012). Consequently, research suggests that principals who wish to increase their ability to support their teacher's technology practices must also make efforts in their own training (Dawson & Rakes, 2003). Specifically, Dawson & Rakes (2003) found, ". . . principals with as little as 13 to 25 hours were significantly different from principals with fewer than 13 hours tends to suggest that increasing principal training will produce higher levels of technology integration into schools" (p. 44).

Professional development, technical support, and resources. Targeted professional development that engages technology is essential not only for administration, but also for teachers. Research has demonstrated that lack of technology-specific skills and knowledge is a frequent barrier in the effective integration of technology (Blocher et al., 2011; Hew & Bush, 2007). With this in mind, Scott and Mouza (2007) suggested that for innovative technology integration to occur, technology-related professional development must be provided to classroom teachers. Researchers have found that professional development needs to be on-going, customized to the teachers' needs, and hands-on in order to help teachers effectively integrate technology in

their classrooms (Mouza, 2002; Ham, 2010). Scott and Mouza (2007) claimed that "the lack of innovative technology use in the classroom is partly attributed to the inadequacy of professional development available to teachers . . ." (p. 232). The "inadequacy" might be explained by the fast-paced progression of technology. Blocher, et al. (2011) explained that the gap between what was termed "digital immigrants," or veteran teachers who were not raised with technology nor trained in teacher education programs for the appropriate use of technology in the classroom, and "digital natives," who have been immersed in technology much of their lives, is at least partly responsible for the ineffectiveness of professional development involving technology integration. The researchers (2011) noted that " . . . many teachers who have been in the classroom a number of years most likely did not grow up with technology" (p. 159). Teachers entering the field in recent years who have utilized technology in their everyday lives are, on the other hand, more comfortable with technology integration. This disparity between the two groups of teachers can impede the quality of technology integration, as well as the quality of professional development created by educators.

Researchers also offered another factor besides professional development that impacts educators' willingness and ability to integrate technologies: educators' level of access to technical support for both hardware and software. Despite federal, state, and local funding influxes for technology integration, a mistrust of technology's reliability has been shown to discourage integration (Cuban et al., 2001; Hur et al., 2016). Cuban et al. (2001) wrote, "Teachers also said that the technology itself is unreliable and they expressed deep ambivalence about powerful machines that often broke down . . ." (p.

829). When teachers feel ambivalent to technology, they are less likely to include it in their curriculum. Although some school organizations have even funded personnel to aid teachers with technology integration, many technical support issues cannot be immediately addressed. Cuban et al. (2001) observed that " . . . support personnel were often overwhelmed by teacher requests, out of replacement parts, or they just could not respond swiftly or adequately . . ." (p. 829). If teachers cannot get the technical support they need on site, technology integration itself is inefficient.

Even with ongoing, technology-focused professional development and available technical support, many K-12 teachers still lack essential resources for implementing technology, such as appropriate technological devices and basic Internet access, despite these resources being more affordable than ever. Advances in technological devices such as tablets and laptop devices, with operating systems largely utilizing cloud data instead of hard drive space (such as Chromebooks), have made educational technologies more cost-efficient, faster to use, and more portable in the past decade (Varier, Dumke, Abrams, Conklin, Barnes, & Hoover, 2017). The U.S. Department of Education echoed this finding in its most recent National Educational Technology Plan (2017). It noted, "The cost of digital devices has decreased dramatically, while computing power has increased, along with the availability of high-quality interactive educational tools and apps" (p. 7). In addition to federal funding allocated for educational technologies, many corporations are providing money for schools to obtain the resources they need for technology integration. In 2014, Apple, Microsoft, AT&T, and Verizon each pledged to donate money for this purpose, totaling $750 million (Cheng, 2014). However, despite

this positive trend in overcoming economic barriers to adequate resources for technology integration, Internet speed and reliability persist as relevant problems in limiting effective integration as they impede access and increase frustration, which, in turn, often results in the decreased use of technology (Peterson & Scharber, 2017; Varier, et al., 2017).

Teacher attitudes about technology and pedagogical framework. While the lack of administrative support, professional development, and essential resources account for a large portion of implementation barriers, teachers' attitudes toward technology contribute significantly on their own (An & Reigeluth, 2011; Ertmer et al., 2012; Vatanartiran & Karadeniz, 2015). In fact, " . . . the top three barriers - resources (40%), knowledge and skills (23), attitude and beliefs (13%) - made up for 76% of those mentioned in current literature" (Blocher et al., 2011, p. 158). A teacher's attitude about classroom technology, or even about technology in general, can influence their respective levels of willingness and resistance to implement its use for their own students (Salleh, 2016). While negative attitudes can be related to a school's existing technological infrastructure, restrictive internet policies, and deficient professional development, they are also shaped by a teacher's anxiety regarding their own skill level and/or students' negative behaviors while using technology (Blocker et al., 2011; Vatanartiran & Karadeniz, 2015). All of these factors can be demotivating for teachers and create resistance to implementing technology in the classroom (Vatanartiran & Karadeniz, 2015).

If they had sufficient and consistent technological skills, which also play a vital role in the successful integration of technology in K-12 classrooms, teachers might feel

less resistant. However, teachers often lack the pedagogical framework with which to build practical implementation of technology in their classrooms. Not only should teachers be competent in technology at a basic level to meet their own needs, but they should be able to transfer their knowledge and skills into implementation at the student level (An & Reigeluth, 2011; Ertmer et al., 2012; Vatanartiran & Karadeniz, 2015), so that they can confidently make decisions about the role technology will serve within their instructional design (Ertmer, et al., 2012; Inan & Lowther, 2010). Ertmer and Ottenbreit-Leftwich (2010) asserted that " . . . knowing how to use the tools is only the foundation. Teaching with technology requires teachers to expand their knowledge of pedagogical practices across multiple aspects of the planning, implementation, and evaluation processes" (p. 260).

The limits of instructional exposure to and choices about their pedagogical framework ultimately impact teachers' uses of technologies in the classroom (Kim et al., 2013). Decision-making regarding the role of technology directly relates to a teacher's instructional design (Ertmer, et al., 2012; Inan & Lowther, 2010), and recent research has demonstrated that teachers need to be well-informed about the fundamental beliefs of technology integration, in addition to its practices (Bleakley & Mangin, 2013; Ertmer et al., 2012; Kim et al., 2013) to successfully integrate technology in their classrooms. As such, integration of technology in the classroom requires the development and education of teachers in both fundamental beliefs and technological practices (Reiser, 2001). More important than the actual philosophical choice, it is vital that teachers choose a framework and work within its philosophical tenets. As noted by An and Reigeluth

(2011), "It is possible that teachers who are learner-centered in philosophy are teacher-centered in actual practice . . ." (p. 60), and such a discrepancy can cause significant implementation issues.

While each of these barriers – lack of administrative support, lack of professional development, technical support, and resources, and beliefs and attitudes about technology – has been discussed separately, they all are dependent on one another, and contribute jointly to creating barriers for implementing technology integration in the K-12 classroom. However, research has demonstrated that the nature of 1:1 initiatives lends itself to teachers adapting to changes in their current instructional methods and educational philosophies (Swallow, 2015), which can lead to more learner-centered methods of instruction (Swallow, 2015).

Technology Integration Instructional Models for 1:1 Environments

In a study conducted by Inan and Lowther (2010), researchers found that technology integration "can be grouped primarily into three broad categories; technology for instructional preparation, technology for instructional delivery, and technology as a learning tool" (p. 138). Models for instruction that occur with the aid of technology guide integration within content-area instruction, so it is important to have a framework to examine the categories of instructional delivery and learning tools based on their respective intricacies as well as their dependency on one another. Two systematic and popular models used in tandem for this purpose are the Substitution, Augmentation, Modification, and Redefinition (SAMR) model (Puentedura, 2014) and the Technology, Pedagogy, and Content Knowledge (TPACK) model (Koehler, Mishra, & Cain 2009).

SAMR and TPACK are commonly used as formal guides for teachers' self-assessment of their technology integration within 1:1 initiatives (Irish, 2017; Marlatt, 2019).

The SAMR model (Puentedura, 2014) is a step-based tool that begins with a teacher making instructional changes using existing knowledge to incorporate technology; the model later emphasizes methods of instruction and integration that may require additional technical experience, knowledge, and training. In the initial steps of technology integration, educators often utilize technology for enhancement purposes through *substitution* of face-to-face, physical experiences with technological experiences that do not alter functionality. For instance, teachers may replace assignments traditionally completed on paper with computerized versions. As another enhancement model, teachers may *augment* learning experiences with the additional functionality unique to technological tools, such as using the collaborative editing features of Google Docs or Microsoft Word to enhance writing instruction with the peer-editing process. At the transformation levels of SAMR, teachers transition to using technology as a *modification* to learning experiences, in which the task is significantly redesigned. One example of *modification* would be allowing students to independently discover multimedia resources to supplement learning and share online with their classmates. Lastly, *redefinition* in the SAMR model is achieved by the creation of learning experiences in ways that would be impossible without the unique functions of technological tools. An example of this would be allowing students to use various multimedia, like video, digital presentation tools, or digitally-created art, rather than the traditional essay, to demonstrate text analysis.

These transformative acts of integration with SAMR may lend themselves to more student-centered forms of instruction, but SAMR alone does not account for different instructional approaches or learning theories. Because of this, the SAMR model is often paired with the TPACK model. Designers of the TPACK framework, Koehler, Mishra, and Cain (2009), asserted,

> There is no "one best way" to integrate technology into curriculum. Rather, integration efforts should be creatively designed or structured for particular subject matter ideas in specific classroom contexts. Honoring the idea that teaching with technology is a complex, ill-structured task, we propose that understanding approaches to successful technology integration requires educators to develop new ways of comprehending and accommodating this complexity. (p. 14)

Consequently, Koehler et al. (2009) recommended that teachers find a "dynamic equilibrium" between content, pedagogy, and technology (p. 17). The validation of pedagogy and content knowledge for technology integration found in the TPACK model supports the connections made previously between literacy and learner-centered instruction.

Learner-Centered 1:1 Environments in ELAR

As demonstrated previously, the increasing accessibility and customization of technology has inspired state standards for educators to incorporate purposeful integration of technology in learner-centered, ELA classrooms (NGA & CCSSO, 2010; Teach for Texas, 2016). Downes and Bishop (2015), along with other researchers, have

recognized the need for teachers to reinterpret not only the method of teaching but also the impact that technology has on student learning. In a learner-centered, 1:1 classroom, students take ownership in their own learning experiences with the aid of technology, so learning tends to be more constructivist in nature while the teacher is assigned the role of advocate and facilitator (Amiel, Kubota, & Wives, 2016). In the secondary ELA classroom, a learner-centered classroom serves students in their literacy training through teacher facilitation of knowledge. In practice, this may include class discussions over a common text; with technological tools, students can extend those discussions online asynchronously, with more media possibilities beyond print text and verbal communication, and without temporal or physical limitation (Larson, 2009). Moreover, the collaborative possibilities of the Internet enhance students' learning through increased exposure to other perspectives, beyond what may be available in a single classroom (Wiley, 2014). Students may learn from the perspectives of other students on their campus but outside their classroom, and they may also learn from other Internet users around the world. In a learner-centered environment, the ELA teacher promotes these experiences while teaching and supporting students with *new literacy* skills needed to operate fluently in digital spaces.

Social-Constructivism & Technology Integration in ELA

The ways in which teachers adopt the facilitator role in a learner-centered environment are affected by their educational philosophies; in a technology integrated classroom, those philosophies guide educators' perceptions of technology's role and function as it impacts student learning. Vygotsky's (1979) theory of social-

constructivism is often linked to technology-supported learning based on its assertion that

knowledge is constructed by the learner through engagement with other learners. One of

the most common applications of Vygotsky's (1979) work in education is the *Zone of*

Proximal Development, which is a theoretical model for the idea that learning has the

best potential when a student gains knowledge and skills with the guide of an educator

and educational resources. The teacher would build scaffolds and provide learning

opportunities for students that establish a student-centered learning environment (Ng,

2015). Vygotsky (1979) also theorized that social interaction is a fundamental

component to a child's development and learning. On this social development, Vygotsky

(1979) wrote, "Every function in the child's cultural development appears twice: first, on

the social level, and later, on the individual level; first, between people

(interpsychological) and then inside the child (intrapsychological)" (p. 57). When

teachers apply this theory to technology integration practices, they can provide enhanced

social spaces for students to experience learning and still develop individually through

Internet tools and local as well as global contexts (Bonk & Cunningham, 1998).

Vygotsky's foundational theories created opportunities for practical application in

learner-centered classrooms. For example, Cultural-Historical Activity Theory (CHAT)

built on Vygotsky's social constructivism but added to it practical applications regarding

the psychological and cultural contexts of students and the tools they use for learning

purposes (Engeström, 1987). Researchers Amiel, Kubota, and Wives (2016) recognized,

"In CHAT, multiple actors engage toward an *object* and produce a shared, historically

determined outcome that is mediated by tools" (p. 3). The implications for the classroom

are that the actors (students), who are historically and culturally positioned as individuals, are gaining knowledge and skills that are also historically and culturally bound in context; moreover, they are achieving learning through the mediation of similarly bound technological tools. Therefore, educators may use CHAT as a lens to identify and analyze the tensions that exist based on social, historical, and cultural contexts. Their analysis would, then, enable teachers to bring about changes to mediate tensions and enhance the learning experience for students (Amiel, Kubota, & Wives, 2016).

Narrowed by tenets of CHAT, social-constructivism theory can be a guiding framework for teachers to adapt their 1:1 classrooms to be more learner-centered and dialectic. Connecting these ideas, Gilakjani, Leong, and Ismail (2013) affirmed, "Constructivist approaches, with their focus on student-centered learning, have long advocated student involvement in the process of gaining knowledge and . . . for teachers to become advocates in the learning process rather than as figures who only dictate information" (p. 59). As a result, the teacher becomes more of a facilitator-advocate who guides students through their learning experiences while validating students' own knowledge and promoting participation in their own learning (Gilakjani, Leong, & Ismail, 2013). Equipped with this framework, a teacher can integrate technology for learner-centered purposes by which students are empowered to utilize tools to interact with other learners, enhance learning through the social and cultural experiences uniquely offered by new technologies, and customize and make relevant their learning experiences to meet their needs (Bower, 2017).

In the secondary English language arts classroom, social-constructivism accounts for the changing functionality of *new literacy*. Echoing this response, Leu (2000) maintained,

> Because the technologies for information and communication are increasingly powerful, complex, and continually changing, no one person can hope to know everything about the technologies of literacy. As a result, literacy learning will be increasingly dependent on social learning strategies, even more than traditional contexts for literacy learning. (p. 630)

By using CHAT and social-constructivism, literacy as deictic is supported by the social, historical, and cultural contexts for which the theories account. In examination of technology's ever-changing nature, Downes (2005) asserted that our connected age inherently offers a celebration of given freedoms, but engaging those freedoms also requires a discerning eye and an acknowledgment of the prejudices inherent in public knowledge. Because anyone is capable of producing and publishing information for consumption, Downes (2005) claimed, " . . . a knowledge-forming community can be easily misled or deluded, just as a person can suffer from delusions and misunderstandings" (p. 100). Therefore, a primary responsibility of ELA teachers is to instruct students on *new literacy* skills like critical thinking, including source evaluation and digital safety, to direct their content knowledge (Bowers, 2017; Kop & Hill, 2008).

Impact of 1:1 on Student Achievement in ELAR

Research establishes the positive effects of 1:1 initiatives and student achievement in secondary English language arts and reading (ELAR) classrooms (Corn et al., 2011;

Gulek & Demirtas, 2005; Rosen & Manny-Ikan, 2011). In a 2006 meta-analysis on

learning in 1:1 environments, researchers Zheng, Warschauer, Lin, and Chang found that

that across six studies included in their analysis, " . . . one-to-one laptop programs helped

improve students' general ELA achievement by .15 of a standard deviation on average"

(p. 1059). Accounting for this positive trend in a separate, single study, Corn et al.

(2011) claimed technology has the ability to ". . . lead students to a more thorough

understanding of content, help them complete higher-level assignments, and individualize

their learning experiences" (p. 6). Moreover, Corn et al. (2011) found that " . . . laptops

helped to reinforce grade-level learning goals, provide remediation, and accelerate

grammar skills" (p. 17). As such, evidence indicates that a more current examination of

1:1 technology integration and student achievement in ELA should yield positive results.

Summary

New literacy evolved from multi-various literacies that have made way for

technology's rapid development. It is a response to the increased use of educational

technology around the world and the popularity of initiatives like 1:1 integration. These

initiatives were stimulated by institutional mandates at the federal, state, and local levels,

aiming to better prepare students with necessary skills for achievement in the global

marketplace. However, the success of 1:1 initiatives can be inhibited by common

implementation barriers, including teachers' lack of administrative support, lack of

targeted professional development that incorporates technology, limited access to

essential resources and technical support, and attitudes towards technology in general.

Educators should refocus on a pedagogical framework that combines Vygotsky's

theoretical social constructivism and CHAT's practical applications. With this refocused framework, educators can apply more learner-centered instructional methods and provide a foundational approach for curriculum design associated with 1:1 integration. The following chapter on the methodology of meta-synthesis is guided by these ideas and provides necessary background on the method for the purposes of this study.

CHAPTER III

Research Method

Introduction

  As one form of research methodology, meta-synthesis allows the researcher to examine existing qualitative research on a topic in comparison. More specifically, this form of methodology grants the researcher the ability to view the themes prevalent in existing research on a particular topic in juxtaposition in order to holistically present the emerging themes. This chapter will demonstrate the methods for this study and the rationale for use.

Meta-synthesis: An Origin Story

  The origin of attempts in collecting existing studies for the purpose of examining the research issue holistically was first addressed in the work of Feldmen (1971) in an article entitled "Using the Work of Others: Some Observations on Reviewing and Integrating." Early attempts at synthesis and review, some dating as early as 1904 with Karl Pearson's work, ultimately lacked uniformity in method; nevertheless, the need for such methods was acknowledged by many researchers in the 20th century (Cooper & Lindsay, 1998). The call for synthesis evolved systemically with the advent of meta-analysis, a methodology in which quantitative studies were pooled and interpreted. First

coined *meta-analysis* by Gene Glass in his 1976 study, "Primary, Secondary, and Meta-analysis of Research," this type of method found a relevant position in many fields of research such as medicine, psychology, and education. Glass's purpose for engaging in this type of research is evident in his stance: "As educational researchers, we find ourselves in the mildly embarrassing position of knowing less than we have proven. The proofs reside in a vast literature that is often superciliously scorned and insufficiently respected" (Glass, 1976, p. 8). In other words, meta-analysis served the research purpose of going beyond one study to examine phenomena by closely examining and compiling all relevant research within one study. This method required the utilization of an integrative technique (Dixon-Woods, Agarwal, Jones, Young, & Sutton, 2005) in conjunction with deductive logic common to quantitative designs (Saini & Shlonsky, 2012)

Meta-analysis was not viewed favorably by all, as many doubted its validity and credibility. Critics argued that meta-analysis are inherently derivative, biased, and statistically imprecise based on its attempt to compare quantitative studies with vast variability in methodologies, theoretical frameworks, populations, and analytic processes (Chalmers, Hedges, & Cooper, 2002). Nevertheless, many researchers took up the call to improve the method though standardization in process, creation of guidelines for reliability and trustworthiness, and definition and practice of related methodologies that would be able to include an even broader range of studies (Chalmers et al., 2002). In turn, meta-synthesis was born a product of this effort as a tool for use in synthesizing and providing new interpretations of qualitative studies.

An Overview

Unlike its predecessor (meta-analysis), meta-synthesis investigates qualitative studies, which requires different types of analysis related to thematic patterns in existing research. As a result, the researcher must make conclusions through inductive reasoning (Saini & Shlonsky, 2012). According to researchers Saini and Shlonsky (2012), "The meta-synthesis report includes a synthesis of new knowledge through interpreting and refining meanings, concepts, and theories across studies" (p. 31).

One important detail for advocates of meta-synthesis is its distinction from literature reviews (Thorne, Jensen, Kearney, Noblit, & Sandelowski, 2004; Erwin, Brotherson, & Summers, 2011). While literature reviews are collections of studies on particular topics and are necessary to define and position the problem for a new study, it often includes a broad consolidation of studies related to a topic and lacks the meta-synthesis goal of weighing findings and engendering new interpretations and theories from the collection and juxtaposition.

Engaging in meta-synthesis requires complex skills, actions, and perspectives. Jenson (2004) goes as far to argue " . . . it can be understood as a form of discourse that contributes to a fuller understanding of the phenomenon of interest. Particularities are retained, and the reconstruction enhances the complexity" (as expressed in Thorne et al., 2004, p. 1346). Regarding this complexity, Walsh and Downe (2005) outline some of those elements involved in synthesizing research:

Challenging assumptions and interrogating both consistent and familiar data and the dissident and strange play a part in expanding the boundaries of understanding

and explanation. Openness and transparency are additional hallmarks of the

method. (p. 210)

As a result of the existence of these integral aspects and processes of the methodology,

meta-synthesis has been determined to be a rule-bound, scientific method. Those

common characteristics compose the methodology, and yet, despite this, meta-synthesis

still makes room for variation based on diversified research needs.

Approaches to Meta-Synthesis

While the definition of meta-synthesis has been supported and in widespread use

across disciplines, it is also considered to be an "umbrella term" for research conducted

on primary research studies (Kinn, Holgersen, Ekeland, & Davidson, 2013). As such,

various forms of meta-synthesis have emerged that are aligned with the purpose and basic

methodology of meta-synthesis but contain variations that have emerged out of need to

include other types of qualitative research and types of analysis. The choice of variation

resides within the researcher.

According to Saini and Shlonsky (2012), meta-synthesis researchers must make

decisions that will ultimately impact the study's form of the meta-synthesis methodology,

its processes, and its purpose. Moreover, these researcher decisions stem from the

following: ". . . (a) the epistemological and ontological stance of the researcher; (b)

whether the research question is predefined or iterative; and (c) whether the method is

aggregative, integrative or interpretive . . ." (Saini & Shlonsky, 2012, p. 24). For the

purposes of this study, the researcher based her decisions on her stance delineated before

data collection, the premise that the research questions were iterative, and the method as both aggregative and interpretive, though separately conducted.

Beyond the variations in the types of data included, the researcher must also determine his/her technique of synthesizing the data. While meta-analysis was primarily integrative in its synthesis (Dixon-Woods et al., 2005), researchers conducting meta-synthesis vacillate between the assumption that a synthesis must be approached in an aggregative manner or through an interpretive position (Aguirre & Bolton, 2014). The researcher's choice of technique will further align with the type of meta-synthesis conducted.

A researcher conducting meta-synthesis may approach their research with interpretive purposes, as this study demonstrates. Defining this approach, Saini and Shlonsky (2012) stated:

> Unlike aggregative and integrative methods, which rely on predetermined questions to guide the analysis, interpretive methods involve interpretation of findings across studies to generate new inductive understandings of the phenomena, events, or experiences . . . [These methods] use an iterative process to explore what might be involved in similar situations and to understand how things connect and interact. (Saini & Shlonsky, 2012, p. 31)

As a result, the researcher may approach an interpretive synthesis with slightly broader research questions that will be later refined through the criteria that narrows the studies that have been included in the analysis, as was done within this study. According to Walsh and Downe (2005), "Philosophically, interpretivists endorse constructionist and

postconstructionist thought, which emphasize the contingent, meaning-making nature of knowledge production" (p. 205). Consequently, inductive reasoning through the interpretive method usually lends itself to stimulate new insights.

At the same time, many researchers hold the claim that meta-synthesis in its ultimate form should remain intrinsically interpretive. Writing in an independent section of a co-authored article, Sandowski (2004) claims, "Metasyntheses are integrations that are more than the sum of parts, in that they offer novel interpretations of findings" (Thorne et al., 2004, p. 1358). Similarly, in the same article, Jenson (2004) argues,

> The goal [of meta-synthesis] is clearly interpretive, not mere aggregation to achieve unity; it is not a summary portraying the lowest common denominator. Meta-synthesis is not a method designed to produce oversimplification; rather, it is one in which differences are retained and complexity enlightened. (Thorne, et al., 2004, p. 1346)

Accordingly, the choice of an interpretive method requires a willingness to allow the research to lead itself to meaning, rather than allowing the researcher to make those connections based on their views and purposes.

Conducting a meta-synthesis with an interpretive approach is a form of discourse (Kinn et al., 2013; Thorne et al., 2004). Regarding the role of the researcher as bricoleur in this discourse, Kinn et al. (2013) claim, " . . . the metasynthesizer engages in a dialogue with the text and achieves an understanding by deeply questioning multiple secondary interpretations and exploring the hermeneutic circle where the parts (the constituent studies) illuminate the whole "the phenomenon of interest" (p. 1290).

Namely, an interpretive approach allows the researcher to place existing research studies together to engage and share their commonalities and diversity with each other (through the researcher) in order to further the conversation and reach new conclusions. As such, conducting a meta-synthesis may be viewed as much artistic expression as a scientific pursuit.

Despite the artistry one might view within meta-synthesis, researchers must also take into account the complexity it requires. Regarding this, Walsh and Downe (2005) caution, "This is not to say that the technique is easy or straightforward, as it requires advanced skills in understanding and doing qualitative research and a highly developed ability to be reflexive" (p 210). While the methodology allows for some flexibility, understanding those aspects that are malleable to the researcher's needs and which elements that cannot be ethically ignored is vital in conducting a meta-synthesis.

Criticisms of meta-synthesis. Critics of meta-synthesis are armed with a plethora of reasons to resist engaging in research synthesis, for both qualitative and quantitative studies. These criticisms have proven beneficial for the method as it has increased the standardization of processes within the method and ensures that the criticisms will be addressed and accounted for within the research. Some of the broad rationale in its criticism resides in the following elements of the methodology: (1) the determination of topical similarity among the included synthesized studies; (2) the researcher's assumptions and biases in setting inclusion criteria; (3) the determination of methodological comparability among the studies; and (4) the researcher's development and communication of the techniques used to compare the findings of each study

(Sandelowski, Docherty, & Emden, 1997). In addition, attempting to account for variation in the definition of concepts used within individual studies and yet placing those concepts, which may be contrary to each other could be viewed problematic to the findings. Furthermore, the mere act of synthesizing may affect those findings that were specific to the individual contexts of the original studies. Therefore, it becomes an essential question of " . . . how to synthesize without sacrificing the relevance or integrity of individual studies" (Erwin, et al., 2011, p. 191).

Even before the act of synthesizing the research, critics are quick to scrutinize the process of determining the quality of those studies that the researcher decides to include. Those who practice meta-synthesis recognize that researchers cannot assume published articles meets quality criteria on their own, which can cause a number of issues for the meta-synthesizer (Erwin et al., 2011; Major & Savin-Baden, 2010; Cooper & Lindsay, 1998). For example, a published article may be absent of critical criteria such as a conceptual or theoretical framework within a study, which would make the work of aligning methodology across studies difficult (Major & Savin-Baden, 2010). In addition, many published studies may be found deficient in the providing ethical and honest accounts of validity and trustworthiness for the research, which would in turn affect the trustworthiness of the meta-synthesis in question (Major & Savin-Baden, 2010). Likewise, some meta-synthesis researchers admit that their own research may be among those studies that are not exhaustively evaluated (Dixon-Woods et al., 2005).

Criticisms related to the role of the researcher cannot simply be overlooked; rather, it is of utmost importance that the researcher reflect extensively upon her role in

conducting the research and the impact of not demonstrating candor in their processes. In this type of methodology, the researcher has the potential to be oppressive to the work of other researchers. While many meta-synthesis researchers taut the artistry of discourse engaged in the methodology (Kinn et al., 2013; Thorne et al., 2004), discourse in any form is implicitly associated with oppressive practices (Freire 1970/2000). In reference to this, Sandelowski (2006) specifically notes, "Instead of giving voice to the voiceless, qualitative researchers have too often engaged in 'ventriloquy', controlling the voices of the voiceless and, thereby, maintaining their voicelessness" (p. 10).

Benefits of meta-synthesis. Because of the fact that meta-synthesis was created as a means of information and interpretation on a given topic, this form of research has many possibilities to benefit a number of stakeholders. In a specific expression of the advantages of meta-synthesis in the field of research, Major and Savin-Baden (2010) assert,

Governments across the globe are increasingly interested in user-guided research, which is necessarily qualitative in its stance and process. However, without qualitative research synthesis we risk missing opportunities to provide policy and practice solutions that really do make a difference to a range of stakeholder groups. (p. 109)

As many researchers will admit, one study cannot prove an absolute truth, if a researcher even acknowledges absolute truths exist. Therefore, both aggregating and interpreting data across multiple studies can provide some new answers or perspectives to the

problems they seek to solve. In education, meta-synthesis may be especially beneficial to scholar-practitioners and policy-makers who seek positive change in schools.

Even if one argues that a meta-synthesis is too limited a method to adequately inform practice on various levels, it can still help further research. Erwin et al. (2011) claim, "Synthesizing a collective body of qualitative or ethnographic research to identify common themes and/or to compare and contrast different groups on a general topic provides deeper insights that might not be available in a single study" (p 187). Consequently, a future study may benefit from the insights gained through previous, related meta-syntheses. As such, it is important to keep in mind the caution heeded by Thorne at al. (2004) that "metasynthesis cannot provide all the answers, but it might generate something capable of informing our practice" (p. 1347). While this claim may be a caution, it also serves to demonstrate that this type of research could impact others with variability that is nevertheless beneficial.

Conversely, the impact of ignoring the significance of engaging in meta-synthesis has detrimental potential. In regard to this, Erwin et al. (2011) contend, "The danger in not synthesizing qualitative research in education eventually lands on the intended beneficiaries of the research, including children, families, practitioners, administrators, and policy makers" (p. 190). In other words, when it comes to the education of youths in our country, the potential impact of meta-synthesis as a methodology on research and practice is too great to ignore and was thus taken into account by this study's researcher.

Role of the Researcher

While some aspects of the role of the researcher have been previously addressed, the tremendous power and control the researcher has in synthesizing research makes it essential to delineate further. In all areas of the research synthesis process, the researcher must exhibit candor. Because researcher assumptions are inherent in the meta-synthesis, it is conclusive that clarity in those assumptions and the resulting methods and analyses must be included in the research (Saini & Shlonsky, 2012).

In alignment with the expectations of the meta-synthesis research, the researcher of this study adequately and openly presents all assumptions, biases, and methods involved in this particular study. The researcher has four years of classroom teaching (various grades between 6-12) in English language arts and reading, and she is experienced with implementing 1:1 technology initiatives in the classroom and across a campus. She has also provided trainings on using technology in the classroom for both teachers and administrators.

While the researcher's professional interests led her to create the initial research questions regarding the impact of 1:1 technology initiatives on student acquisition of new literacy skills, she remained ethically open to all possible findings related to the questions in existing research and entered the study willing and ready to present all findings whether negative, positive, or null. The use of the theoretical frameworks additionally served to frame the study and its interpretations with established philosophical tenets and minimize researcher bias. Furthermore, as part of her role, the researcher ensured that

within the aggregation of the studies, each study's contexts, procedures, design, and original findings are preserved and represented accurately and with due credit.

Data Collection

The procedures for conducting meta-synthesis are based on precedents set by existing meta-syntheses and other qualitative methods, though it is somewhat flexible depending on the research in question and the researcher's needs. As with any study, the researcher begins with the creation of research questions which ". . . drive the research forward, from determining who or what will be studied, what methods will be for collecting data, and what the approach for data analysis will be" (Major & Savin-Baden, 2010, p. 44). The following research questions were established for the purposes of this research study:

1. What are the common trends within current research on 1:1 technology initiatives in secondary ELAR classrooms?

2. What does current research demonstrate about the relationship between 1:1 technology initiatives and student acquisition of new literacy skills in those initiatives?

3. What does current research demonstrate regarding the relationship between 1:1 technology initiatives and student practice of new literacy skills in those initiatives?

In regard to meta-synthesis, the purpose of the research questions requires an examination of existing research on a particular topic more closely (Major & Savin-Baden, 2010). The purpose should inform both the form and approach to meta-synthesis

(see previous section on approaches of meta-synthesis). Next, the researcher must take into account " . . . initial topical (what), population (who), temporal (when), and methodological (how) parameters" for the search for studies (Sandelowski & Barroso, 2007).

Thomas and Harden (2008) asserted, "When searching for studies for inclusion in a 'traditional' statistical meta-analysis, the aim of searching is to locate all relevant studies. Failing to do this can undermine the statistical models that underpin the analysis and bias the results" (p. 4). In order to implement this strategy with fidelity, it is vital for the researcher to exhaust all sources of information as possible, which will most likely be time-consuming and create a demand for the researcher's organization of the search results (Sandelowski & Barroso, 2007). After the researcher has sufficiently exhausted all available research on the topic, it is time to appraise the data, both individually on each study and then comparatively (Sandelowski & Barroso, 2007).

In alignment with the aforementioned established meta-synthesis data collection procedures, the researcher of this study began by conducting a literature search. Search terms were based on the initial grouping of the terms "new literacy AND 1:1 OR one-to-one technology initiatives", with variations of equivalent or similar terms. Variation of the term "new literacy" included "literacy", "reading and writing skills", and "21st century skills". Variations of "1:1 technology initiatives" included "1:1 computing", "ubiquitous computing", "1:1 laptops", "1:1 devices", and "one-to-one classroom". The databases used were EBSCO (namely, ERIC and Academic Search Premier for peer-

reviewed journal articles and dissertations), JSTOR, and Google Scholar, as well as

ProQuest Dissertations and Theses.

After the initial search, criteria were established to narrow the studies included for

synthesis. The following inclusion criteria were used for studies identified as potential

participants: (1) publications from peer-reviewed journals or dissertations; (2)

publications written in English; (3) topic must include 1:1 technology initiatives and

language arts or literacy achievement (though not necessarily with those terms); (4)

literacy skills addressed could be considered new, 21st century, digital or as reading,

writing, and critical thinking; (5) the data collected must be qualitative in nature; (6) the

participants are secondary school students; and (7) published between the years 2008-

2018. The results yielded from these narrowed criteria produced 32 journal articles and

dissertations on the topic, with no duplicates of publications.

The exclusion criteria served to narrow the results further, eliminating studies that

(1) did not have clear methods of data collection or analysis; (2) were theoretical papers;

(3) findings did not address the impact on new literacy skills either in name or definition;

(4) assigned quantitative values to the original qualitative data; (5) studies in which the

researchers did not distinguish between secondary and elementary students within in the

findings so that secondary student findings may be isolated; and (6) those studies that

focused solely on the teacher experience of integrating technology rather than student

learning. With this exclusion criteria, six studies were included as the final participants.

The work of Major and Savin-Baden suggests, "…between 6 and 10 studies is optimal to

provide sufficient yet manageable data" (p. 54)

Data Analysis

Starting by collecting, appraising, and aggregating the data from the participating studies, the researcher of this study conducted an analysis through thematic coding in order to discover interpretive findings. The first step after data collection, in alignment with many types of qualitative methods, requires that the data be coded thematically based on emerging patterns from across the data (Major & Savin-Baden, 2010). After establishing cross-study themes, meta-synthesis researchers recommend starting the process of synthesizing by ". . . combining themes across the studies . . ." and ". . . identifying second order themes across studies . . ." (Major & Savin-Baden, 2010, pp. 63-64). As such, the researcher of this study synthesized the research in two phases; the first to aggregate the original findings from each study, and the second to describe the overarching themes across the studies.

The final step in the analytic process is to provide an interpretation of the findings from the synthesis. In alignment with Major and Savin-Baden (2010), the researcher of this study upheld the belief and practice that interpretation occurs in "iterative cycles" and emerges from "interactive interpretation" through revisiting and rethinking of the participating studies' "themes, metaphors, ideas, concepts, and contexts" (p. 67). Moreover, the researcher in this study based her interpretations on the premise that " . . . interpretation involves translating information into something understandable that bears resemblance to the original studies but that takes it to a higher level" (p. 64).

Provisions for Trustworthiness

For meta-synthesis, the topic of trustworthiness is a significant element in addressing criticisms to the methodology and must be accounted for by every researcher. Many of the provisions that are effective for other forms of qualitative methods may also be applicable to research synthesis such as audit trails, conceptual framing, dense description of context, dense description of findings, dense description of methods, experience over time, member checking, peer examination, triangulation, and researcher positionality statement (Major & Savin-Baden, 2010, pp. 77-78).

However, as previously mentioned, the biggest variable affecting trustworthiness is the honesty of the researcher for all parts of the process. In accordance with this premise, the researcher acknowledges the limitations of research synthesis based on the interpretive quality of the research. Expounding the essential attribute that should be paired with interpretive findings, Major and Savin-Baden (2010) asserted,

> Verisimilitude . . . is simple in that it argues for demonstrating the appearance of truth; the quality of seeming to be true, which is arguable a more realistic quest than uncovering 'truth'. The underlying idea is that research cannot prove anything true; rather, research could focus on disproving truth. (p. 81)

While this researcher acknowledges that the definition and/or existence of truth may be debated, she maintains her attempt at verisimilitude is supported through her transparency in data collection and analysis procedures, as well as her related experience in this topic and biases. As a classroom teacher in a district that has adopted a 1:1 technology initiative, the researcher acknowledges the impact of her experience on the formation of

the research questions guiding this study. At the same time, to remain ethical, the

researcher took great care to not allow her experience to impact the interpretation of the

original studies included as participants.

Summary

As previously demonstrated within this chapter, meta-synthesis is uniquely

positioned to provide comprehensive insights to what research indicates about 1:1

technology initiatives and the impact on new literacy. The researcher of this study

utilized the features of trustworthiness, data collection, and data analysis associated with

meta-synthesis to ensure fidelity of the research and express candor. The following

chapter demonstrated the aggregative findings of the participating studies and the

emergent themes across the studies.

CHAPTER IV

Findings

Introduction

As part of the meta-synthesis methodology, Major and Savin-Baden (2010) caution, "the overarching goal is to tell the story of multiple presenters and authors directly and plausibly to the audience, recognizing that the story is indeed that: a story that represents the multiple realities of the participants" (p. 95). Therefore, in an attempt to acknowledge the varied "realities" of this study's participants and provide the clarity of process essential to trustworthiness, the aggregated findings of this study were presented in two phases. The purpose of the first phase is to provide dense description of context, findings, and methods of each study, as described within this study's methodology section. Within the second phase, the researcher described the emergent themes from across all of the participating studies.

Overview of the Studies

Each of the six participating studies met the inclusion and exclusion criteria established for this meta-synthesis. Despite the particularly narrowed scope of studies limited by these criteria, the studies still had overall similarities and differences in the theoretical framework grounding their study, the research settings, technological devices

63

used in the participating 1:1 environments, conceptualizations of new literacy (or related literacy), and types of participants.

Each of the studies utilized qualitative methodologies; only one of them, however, was not a type of case study (Corn, Tagsold, & Patel, 2011). Of the six studies, five originated from southern, mid-western, and north-eastern areas of the United States (Corn, Tagsold, & Patel, 2011; Jett, 2013; Dillon, 2017; McKeeman, 2008; West, 2019) while one originated in Sweden (Molin & Lantz-Andersson, 2016). The 1:1 classroom environments varied by technological devices used by the participants: two studies' participants in 1:1 laptop environments (McKeeman, 2008; Jett, 2013), one with 1:1 iPad initiative (Molin & Lantz-Andersson, 2016), and the others did not determine the specific type of device, only that the setting was a 1:1 environment (West, 2019; Dillon, 2017; Corn et al., 2011). Each study included student participants in secondary school, with two studies focusing solely on high school (grades 9-12) students (McKeeman, 2008; Corn et al., 2011) and two solely on middle grades 6-8 students (Jett, 2013; Molin & Lantz-Andersson, 2016). While the inclusion and exclusion criteria limited this study's participants to include student participant data as part of their findings, all of the final participating studies further included other participants such as teachers, administrators, or parents in their overall data collection.

The frameworks guiding each study varied greatly in theories and practical models and included the theoretical framework of Diffusion of Innovation (Dillon, 2017), the Framework for 21st Century Learning (Corn et al., 2011), New Literacy Theory (McKeeman, 2008; Molin & Lantz-Andersson, 2016; West, 2019), theories stemming

from socio-cultural studies such as social constructivism (McKeeman, 2008; Molin & Lantz-Andersson, 2016), and Koehler, Mishra, and Cain's (2009) conceptualization of the TPACK model (Jett, 2013). Moreover, the studies' use of terminology related to literacies also varied greatly among the studies' frameworks and findings. Two of the studies bypassed literacy terms and instead focused on 21st century skills (Corn et al., 2011; Dillon, 2017) or reading and writing skills (Jett, 2013). Despite using the terms 21st century or reading/writing skills, the accompanying definition of such skills were aligned the criteria for the types of new literacies included in this meta-synthesis. Regardless, three of the studies explicitly utilized the term *new literacy* in relation to their findings (McKeeman, 2008; Molin & Lantz-Andersson, 2016; West, 2017).

Phase 1: Overview of Each Study's Methodologies and Findings

Corn, Tagsold, & Patel (2011). In this study entitled, "The Tech Savvy Teacher: Instruction in a 1:1 Learning Environment," Corn, Tagsold, and Patel (2011) collected qualitative data through focus groups, interviews, and classroom observations from select schools participating in North Carolina State Board of Education's pilot program NC 1:1 Learning Technology Initiative (NC1:1LTI). The researchers from the Friday Institute for Educational Innovation at North Carolina State University were tasked to provide a three-year evaluation of the initiative. The participating subjects in this research were 595 high school teachers and 9,764 students across 18 high schools in North Carolina. The campuses were grouped into Cohorts A, B, and C for research purposes based on the point at which laptops were provided. Students in Cohort A received laptops in 2007, Cohort B in 2008, and Cohort C in 2009. Although the researchers did not provide the

accompanying research questions for this particular evaluative piece, the researchers explicitly stated the purpose of this particular article was to examine "the role of instructional practices in successful implementation of a 1:1 program" (Corn et al., 2011, p. 1). The emergent themes framing the findings in this study were presented under the following topics: (1) technology use; (2) communication; (3) role of the teacher; (4) learning environment; and (5) challenges to effect use of laptops for teaching and learning (Corn et al., 2011).

Reporting the data from the teacher surveys, Corn et al. (2011) found that although teachers' perception of their own technological skills decreased in the first year due to technical challenges, the findings suggested that over the three-year time period, "teachers at most schools improved their technology skills over the course of the laptop initiative" (p. 5). The findings related to teacher attitudes and beliefs about technology had mixed results; while there was a significant increase in the number of teachers reporting laptops served as a distraction to their teaching and that technology failure requires teachers to have a back-up instructional plan, teachers also reported increased positive attitudes regarding technology enhancing their instruction and curriculum goals. Teachers' frequency of technology-use for classroom activities and assessments also increased over the three-year time span.

Utilizing evidence from the interviews and focus groups, the researchers found that teacher communication demonstrated a positive impact of 1:1 technology in the classroom in regard to increased frequency and quality in communication between teachers, students, and administration. Likewise, students reported enhanced

communication between other students and their teachers, and evidence also suggested increased quality in "written communication skills" (p. 14). Moreover, data also demonstrated positive trends concerning parent-teacher communication frequency and quality (with less interruptions).

Teacher reports further demonstrated a shift in their role in the classroom from "traditional prescriptive roles" to facilitators of student-directed learning (p. 14). In addition, lesson plans were perceived as enhanced as they moved to "exhibit more creativity and authenticity as teachers and students gained access to new technologies" (p. 15). Similarly, redefinition of pedagogical approaches as a result of the laptop initiative was another emergent theme found. Within English language arts, themes of student learning were expressed positively:

> English teachers asserted that laptops helped to reinforce grade-level learning goals, provide remediation, and accelerate grammar skills. They also reported that writing improved as a result of the 1:1 initiative, and papers were "better and longer." Students began writing for worldwide audiences rather than only for the teacher or peers. (Corn, et al., 2011, p. 17)

Teachers also reported increased student technology and typing skills. The learning within the 1:1 environment was further described by teachers and students as more authentic. Nevertheless, teachers and administrations in this study also conveyed their doubts about the transferability of such learning to the state-mandated test materials and methods.

As part of emergent themes within challenges to effective use of laptops for teaching and learning, teachers cited common technical issues and instructional barriers such as lack of time to learn how to incorporate technology into lessons and monitoring student work. Another commonly cited barrier for instruction and learning was inadequate professional development for support of 1:1 learning environments. Teachers from Cohorts A and B, those in which students were engaged in the 1:1 environment for a longer period of time, also conveyed concerns of "technology becoming a crutch for students" as they utilize technology to access information for answers without having to remember or fully absorb them (p. 19).

Jett (2013). The researcher of this dissertation utilized a multiple case study for the purposes of "investigat[ing] the ways in which five middle grade English language arts teachers in established 1:1 laptop settings utilize the available technology for writing instruction" (Jett, 2013, p. 5). As stated by the researcher, the original research question guiding this study was "How are teachers' pedagogical strategies for teaching writing influenced by their students' 1:1 laptop access?" (p. 9). The setting of the study was two rural North Carolina school districts: an Eastern North Carolina district which has been engaged in 1:1 across the secondary grade levels for nearly a decade, and a Southwestern North Carolina district which implemented the same five years later than its counterpart.

The participants of this study comprised of five middle-school teachers from both sites (two from Eastern and three from Southwestern) and two focus groups of four students from each site (for a total of eight middle-school students). Data were collected from 26 hours of classroom observations, accompanying field notes, instructional

artifacts, focus group interviews, and researcher reflections. Predominant themes found

from this study were grouped into the following topics: (1) the challenges teachers and

students encounter in the 1:1 setting; (2) the changing nature of writing activities and use

of instructional time in the 1:1 setting; (3) the impact of 1:1 technology access on the

student writing process; and (4) the influence of 1:1 computer settings on teachers'

pedagogical strategies for teaching writing.

Speaking to the primary challenge to writing instruction found by teachers in the

1:1 classroom, the data from observations and interviews supported technology as a

major source of student distraction. Jett (2013) further found that the secondary

challenge for teachers was grading and providing feedback to student online writing and

tertiary challenges included "the gap of technology prowess between students and their

teachers, equipment reliability, and issues of varying access among students" (p. 148).

From the student data, Jett (2013) found the "technical challenges" theme within each

student's report.

Acknowledging the changing nature of writing activities and use of time for the

writing process in the 1:1 setting, Jett (2013) found

> Five of the eight students in the study expressed a preference for using their
>
> computers rather than traditional notebooks to create text, with two students and .
>
> . .[one teacher from the Southwestern site] expressing particular enthusiasm for
>
> the creativity that ubiquitous computing access permits. (p. 151)

Similarly, the research demonstrated student and teacher identification of the use of

technology for research to support writing as crucial. In addition, each participant

recognized that despite the resources afforded by the computers, there was still a need for "traditional paper and pen activities" (p. 152).

Regarding the impact of 1:1 environments on the writing process, this study found that ubiquitous computer access "generally makes research, editing, revising, and, for some students, organizing more facile" (p. 158). Teacher participants also noted the critical component of flexibility within writing instruction based on student need. Namely, the flexible needs mentioned within this study centered on the preferences and functionality of online writing or traditional writing utensils with paper.

Lastly, the study addressed teachers' pedagogical strategies for teaching writing and found "teachers in the 1:1 setting utilize a unique blend of TPACK in implementing instructional activities in their English language arts classrooms" and "these writing teachers relied on their value system to guide the subtle day-to-day choices inherent to classroom activity" (p. 160, 162). In other words, there was great variation between the teachers in the strategies and activities used for writing instruction. More significantly,

> Teachers in this study demonstrated that 1:1 access influenced their ability to engage in the four C's of 21st century learning (Partnership for 21st century skills, 2003) which include collaboration, communication, creativity, and critical thinking. One-to-one laptop classrooms equipped these teachers with access to tools, applications, and activities that addressed each area. (Jett, 2013, p. 163)

From these findings, the researcher acknowledged that more research is needed to address the best practices for writing instruction in 1:1 environments.

Dillon (2017). For this dissertation study, Dillon (2017) utilized an instrumental case study in order to:

> . . . Examine administrator, student, and teacher perceptions of organizational structures, systems, and supports implemented to aid technology integration, and the potential for that technology integration to achieve 21st century skill acquisition and deeper learning in a 1:1 environment. (p. 2).

Selecting from a small, suburban high school in the New England region (no state specified) in their second year of 1:1 implementation, this study included the following participants: seven administrators, 16 teachers divided into focus groups of 4-5 based on their content-area subject, and 18 students representing all grade levels (grades 9-12). Data collected for this study were from 60-minute researcher interviews with each of the focus groups. These data were paired with campus and district documents related to 1:1 (high school program of studies, student handbooks, website content, lesson plans, and student work) as part of triangulation of the data.

In response to the research question "How has the district organized itself to support technology integration by teachers with the specific intent of fostering deeper learning and 21st century skills," four themes emerged from the data:

(1) "Strategic planning and reliable systems were essential for a Glendale Public Schools' 1:1initiative to drive 21st century skills and deeper learning,"

(2) "A reliable infrastructure and compatible hardware and software were necessary to support technology integration, 21st century skills, and deeper learning competencies at Glendale Public Schools,"

(3) "Communication around roll-out, implementation and teaching and learning

expectations were critical to Glendale Public Schools' transition to 21st century

educational environments," and

(4) "On-going support for technology integration into instruction was critical to

developing 21st century skills and deeper learning at Glendale High School" (Dillon,

2017, p. 85).

In response to the second research question, "How do administrators, teachers,

and students perceive the implementation of 1:1 and its impact on 21st century skills and

deeper learning," four additional themes emerged from the data:

(1) "Equity of 1:1 devices and access to resources have positive educational

impacts on Glendale student learning,"

(2) "1:1 devices lead to improved assessment strategies and actionable feedback,

resulting in increased student performance at Glendale Public Schools,"

(3) "Tensions exist between traditional instructional practices and 21st century,

deeper learning strategies at Glendale Public Schools," and

(4) "Glendale's 1:1 programs increase opportunities for acquisition of deeper

learning competencies and 21st century skills" (Dillon, 2017, p. 85).

Upholding the definition 21st century skills as "communication, collaboration, critical

thinking and creativity skills that students need for success in a global economy" (Dillon,

2017, p. 162), this study emphasized the positive perception on impact of the 1:1 program

on student acquisition of 21st century skills by the participants in this New England high

school setting.

McKeeman (2008). As part of a dissertation case study, McKeeman (2008)'s study took place within one rural, small Midwestern public high school that was in the third year of a 1:1 laptop initiative. The participants included 43 high school students from grades 9-12, ten teachers, five administrators, and an unspecified number of parents. Data were collected over a three-month period in 2008 from five varied sources: (1) open-ended qualitative surveys; (2) classroom observations and field notes; (3) teacher interviews; (4) student focus group interviews; (5) varied documents and artifacts such as school board meeting minutes, teacher lesson plans, student assessment scores, classroom handouts, and student work samples.

The four research questions guiding McKeeman's study was as follows:

1. How has the one-to-one laptop initiative's technology been utilized by participants?

2. How has content area literacy instruction been affected as a result of the one-to-one laptop initiative?

3. What has been the role of the new literacies as a result of the implementation of the one-to-one laptop initiative?

4. What has been the role of critical literacy within classrooms with the one-to-one laptop initiative? (p. 79)

Notable within these research questions, McKeeman (2008) makes a distinction between critical literacy and new literacies as entirely separate functions with varied characteristics. For the purposes of this research synthesis —which included critical literacy as adjacent to and incorporated within new literacies— only the data analysis and

findings related to research questions three and four were detailed and described within the overview of McKeeman's (2008) study. Furthermore, the data from the language arts classroom were isolated from those collected from other content areas. These acts of exclusion can be done without affecting the original findings due to the researcher's offered explication of the sources of data, analysis procedures and results, and findings organized within the text by individual research question and classroom setting.

    Role of new literacies. Making a small but significant observation on the data collection on the role of new literacies in 1:1 settings, McKeeman (2008) noted, "When interviewing and talking with teacher and administrator participants, they found the terminology associated with the new literacies was somewhat new, foreign, and unfamiliar" (p. 137). As a result, the researcher decided to include only data collected from extended classroom observations and survey data from teachers and students for direct interpretation analysis in this area. The researcher categorized the data by skills that foster new literacy proficiency, a categorical frame supported by researchers Leu, Kinzer, Coiro, and Cammack (2000) and presented in the reproduction in Figure 1.

**Instructional Occurences
of Skills Fostering New Literacy Proficiency**

- ■ Identifying Questions
- ■ Locating Information
- ■ Critically Evaluating the Usefulness of Information
- ■ Synthesizing Information to Answer Questions
- ■ Communicating Answers to Others

Note: Categories from Leu, Kinzer, Coiro, & Cammack, 2000
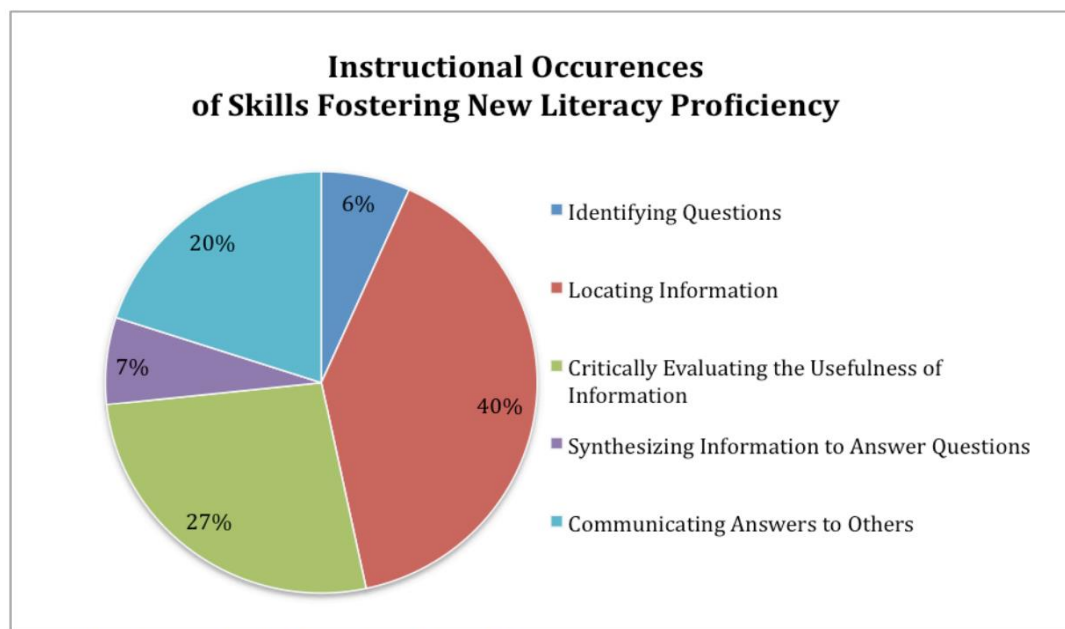
Figure 1. A graphic of McKeeman's (2008) results relating to the Instructional

Occurrences of Skills Fostering New Literacy Proficiency. (Sources: McKeeman, L.

(2008, p. 140).)

In the language arts classroom, McKeeman (2008) identified the evidence of new

literacy practices and characteristics and noted,

> The nature of new literacies is deictic as are the new literacies themselves.
>
> Students within the language arts classroom were documented as being hesitant to
>
> make mistakes and encouraged to take risks when it came to working on a draft of
>
> their final senior project. (p. 142)

Furthermore, McKeeman (2008) acknowledged the nature of the role of the language arts teacher stating, " . . . teacher instruction remains relatively unaltered; it is just packaged within a new literacies façade" (p. 142).

Overall, McKeeman (2008) found that her study " . . . sustains the stance that the new literacies of the Internet and other [Information Computer Technologies (ICTs)] include skills and strategies to successfully utilize, negotiate, and foster proficiency within the environment of new literacies" (p. 176). Framing her findings on new literacy within Leu, Kinzer, Coiro, and Cammack (2000)'s ten principles of new literacy perspective, McKeeman (2008) related evidence to support practices for each of the new literacy principles.

Role of critical literacy. Data sources utilized for analysis of this research question included teacher interviews and classroom observation. Those data were analyzed first by aggregating the data by the following categories based upon the foundational concepts of critical literacy (Dozier, Johnston, & Rogers, 2006): student sense of agency and the power dynamics represented in the classroom setting. Regarding student sense of agency, the data reported mixed findings as teacher support for student learning through taking risks and making mistakes was not consistently observed or able to maintain stable student self-agency. McKeeman (2008) also found that "the traditional paradigm of *delivering* the curriculum/perspective *to* the students" was frequently observed, but on the occasion teachers did relinquish this role in the dynamic, students were more empowered to exercise their own perspectives in the classroom (p. 182).

Molin & Lantz-Andersson (2016). In this case study conducted in Sweden, researchers Molin and Lantz-Andersson (2016) asked two research questions: (1) "what reading practices are significant in a 1:1 educational context", and (2) "which aspects become structuring resources in the students' activities during a regular school week and what does this imply in terms of evoking reading practices?" (p. 133). As part of this study, a class of 13-14 year olds who were involved in a 1:1 iPad initiative in one school served as participants, and data were collected from participant observations and video recordings over one week. Interviews were also conducted, but they served to indirectly inform the researchers rather than a source of data in the study's findings. Data included recordings and observations from various secondary-level courses: Swedish, English, chemistry, mathematics, and history. While most of the original data was originally in Swedish, it was translated into English, taking care to account for equivalent informal colloquialisms.

Utilizing an interaction analysis, Molin and Lantz-Andersson (2016) initiated the analysis process by creating a broad transcript of the observation notes and videos. Selections of the transcription were chosen based on criteria that "illustrated diverse reading practices that to a varying extent involved the digital tool, not only in different lessons but also within the same lesson" (p. 138). An analysis was conducted on this data;

Thereafter, the reading practices were identified by using the Four Resources

Model (Freebody & Luke, 1990, 1999, 2003, this model is also used more

recently in, e.g., Serafini, 2012). The model recognizes what it is to be literate

today, encourages that reading and writing are always situated in specific contexts

with specific purposes, and also acknowledges that text goes beyond print and

paper. (p. 138)

Preceding with analysis, the researchers then studied the ethnographic descriptions and

the video transcriptions of student interactions to yield further findings regarding reading

practice support.

In this study, the researchers framed the findings within the Four Resources

model, as they did in their analysis. As a result, they were able to identify the reading

practices and reading structuring resources within this model's principles across all

included content areas. Overall, the researchers asserted,

For centuries, a key function of the educational system has been to provide

students with basic reading skills. However, due to the rapid evolving

technologies and their impact on the representation of text and, thereby, what it is

to read, the premises for schoolwork and instruction related to reading literacy are

changing. The findings of our study aligned with findings from many earlier

studies, and policy reports suggest that skills for dealing with the traditional,

typographical text are no longer sufficient alone. (Molin & Lantz-Andersson,

2016, p. 150)

Regarding the first research question on significant reading practices in this 1:1 setting,

Molin and Lantz-Andersson (2016) found that "task-solving" is still a prominent focus

for the students in this setting just as it has been in traditional reading comprehension and

texts. Regarding the second research question on structuring resources, the researchers found that teacher scaffolding of text features in the digital format were fundamental to literacy development in 1:1 setting.

      West (2019). In this theoretical analysis study, "Using New Literacies Theory as a Lens for Analyzing Technology-Mediated Literacy Classrooms," West (2019) utilized data collected from a multiple case study previously conducted in 2014-2015. The participants of the original case study were a 4th grade teacher and two students from her class and a 9th grade teacher and two of his students. Data sources included observations, interviews, artifacts collected, and retrospective digital writing think-alouds. The think-aloud activities were paired with video recordings from cameras installed on the students' eye glasses while engaged in classroom computing. The researcher of this study utilized the *Eight principles of New Literacy Theory* (Leu et al., 2017) as part of her deductive analytical framework to guide her data analysis (see Figure 1).

1. The Internet is this generation's defining technology for literacy and learning within our global community.
2. The Internet and related technologies require additional new literacies to fully access their potential.
3. New literacies are deictic.
4. New literacies are multiple, multimodal, and multifaceted.
5. Critical literacies are central to new literacies.
6. New forms of strategic knowledge are required with new literacies.
7. New literacy practices are a central element of New Literacies.
8. Teachers become more important, though their role changes, within new literacy classrooms.

(Leu et al., 2017: 5)

Figure 2. A graphic of West's (2019) original table presenting the *Eight Principles of New Literacy Theory* described by Leu et al. (2017, p. 5). (Source: West, J. A. (2019, p. 154).)

For the purposes of the present meta-synthesis, the presentation of data collected from the 9th grade teacher and students and the associated findings were isolated without harming the integrity of the original study. The purpose of this action was to put focus on those findings that were able to be synthesized within the present study's parameters. As such, any findings related to the participants across the grade levels were excluded, as well the findings related to data from the 4th grade teacher and students.

The study's guidance of the eight Principles of New Literacy Theory (Leu et al., 2017), the data from the high school teacher and student participants alone demonstrated evidence of six of the eight principles. In defense of the use of the eight Principles of new literacy as part of her analytic framework for resulting themes, West (2019) claimed,

> By analyzing the classroom contexts according to each of the eight principles, I was able to develop a nuanced understanding of the learning environments in which the adolescents' literacy experiences occurred in this study. I was also able to identify important differences between contexts in terms of the ways in which technology-usage mediated the literacy instruction in each learning environment and constrained or enabled students' literacy actions. (p. 170)

Notably, the two principles absent of evidence from the data were the deictic nature of new literacy and the multimodality of new literacy. However, the author acknowledged that the limitations of the study may have affected the researcher's opportunity to view the multimodality of new literacy activities within this classroom.

Demonstrating evidence for the Internet as a literacy technology, the 9th grade teacher used the functionality components of the Google Docs program as writing tools.

Furthermore, his use of Blackboard for his learning management tool served as evidence of a mode of online communication. On this teacher's connection to literacy technology West (2019) noted a vital gap:

> Although the Internet was the primary means of literacy engagement in Mr. Matthews' classroom, the lack of technology infrastructure in the building to support the administration of the high-stakes assessments meant that students' literacy skills were assessed using a tradition pencil and paper approach. This means that students did not have access to the electronic tools and resources that had previously enabled their literacy actions as writers when they were formally assessed on their literacy skills. (p. 156)

Within the analysis of how the Internet requires new literacies, West (2019) acknowledged that the teacher's use of web tools with specific and varied log in and browser needs created challenges that can possibly have negative effects on student motivation and engagement. Concerning the centrality of critical literacies, West (2019) connected evidence from the students' use of the Internet, sometimes inappropriately, which requires critical assessment of sources of information and critical assessment of appropriate movement within space. One challenge brought up by this evidence was the teacher's inability to simultaneously monitor all student online activity and provide individual support to his students.

In regard to the strategic knowledge principles, West (2019) claimed, "The nonlinear nature of the Internet afforded by hypertext technologies means that users

must learn to negotiate multiple navigational pathways in order to access information" (p. 161). Observing one 9th grade student's inefficient decision-making concerning font choice in her essay, West (2019) expounded on the principle, stating, "Students must also develop strategic knowledge of the purposes for and meanings associated with various options available to them when writing digitally" (p. 162). Evidencing the ability of technology to create opportunities for sharing new literacy practices, two instances were noted: one in which a peer helped another create a folder in Google Docs, and another in which the teacher assisted two students in a technological skill. In addition, acknowledging the connection to the changing role of the teacher, West (2019) asserted that the teacher's authority and classroom management were mediated by technology. He demonstrated evidence of using the tools within the technology to monitor student work and redirect off-task behavior. In this case, the teacher's role was shifted slightly by the digital context.

Phase II: Overarching Themes Across Participating Studies

After the initial aggregation phase, the next phase involves synthesis of the participating studies' findings within emergent themes across all studies. According to Major and Savin-Baden (2010), "This stage involves taking the analysis of thick description further, not just locating themes across the studies but also bringing themes from the studies together" (p. 63). In phase one, each study's findings were described thematically, which may be identified as first order themes. In phase two, second order or overarching themes were discovered by an examination of each study's themes in relation to the other studies. Developing labels for these themes, the researcher

synthesized the study's contribution to the themes, preserving the original language of the participating studies.

1:1 Environments Necessitate & Support the Acquisition of New Literacy Skills

In examination of new literacy skills in 1:1 environments, McKeeman (2008) found,

> . . . New literacies of the Internet and other ICTs include skills and strategies to successfully utilize, negotiate, and foster proficiency within the environment of new literacies. These include the ability to: (a) identify questions, (b) locate information, (c) critically evaluate the usefulness of information, (d) synthesize information to answer questions, and (e) communicate the answers to others. (p. 176).

Similarly, Molin and Lantz-Andersson's study (2016) also found that students primarily focused on task-solving as a literacy practice and "in such instances where the technologies are used more inclusively, the possibilities of using the technology and help from peers become the main structuring resources" (p. 150). Also identifying a observable relationship between 1:1 environments and learning through communication with peers, West (2019) noted, "While students were observed interacting with their peers to give and receive technology help, they were also observed engaging in interactions that were counter to accomplishing the goals that Mr. Matthews established for each class period" (p. 163).

Focusing on the new literacy skills associated with writing in 1:1 environments, Jett (2013) had mixed findings: "While some practices have been enhanced by

laptop access, such as warm-ups, vocabulary story writing, and reflective responses, others remained more traditional, as when the teachers had their students freewrite or use notebook paper for personal journal responses" (p. 155). In the case of research practices and skills, Jett (2013) found that "laptops were crucial for student success" (p. 152). Observing the balance of online and traditional writing activities among the study's participants, Jett (2013) noted the findings " . . . affirm[ed] the dynamic nature of TPACK for each teacher as she navigated the activities best scribed as opposed to those enhanced by 1:1 access based on her personal knowledge base" (pp. 155-156).

Overall, many of the studies acknowledged that 1:1 environments dualistically function to generate and foster new literacy practices and skills. For example, in the study conducted by Corn et al. (2011), the researchers found that "the 1:1 initiative increased students' engagement in and development of deeper learning competencies and 21st century skills in classrooms that purposefully integrate technology when teaching and learning expectations are in place and attended to" (p. 14). The conditions needed for this result was found in this study to be linked to teachers' purposeful integration of technology in order to more effectively meet learning objectives, allow student directed learning, and make larger, real-world connections within the content. Nearly identical findings were established in Dillon's study (2017), in which she asserts, "Students will experience increased engagement, the acquisition of 21st century skills, and greater opportunities for deeper learning in 1:1 environments where teachers purposefully integrate technology for deeper learning" (p. 157).

The types of skills used by students in these environments, no matter how the skills were labeled, were found to be similar in their definitions and portrayals. For example, Corn et al. (2011) made connections to new literacy skills in their observation,

> All teachers reported an increase in student typing and technology skills, including file and folder management, e-mail attachments, and the ethics of digital citizenship. One teacher reported, 'They're learning how to appropriately behave in a digital world.' This skill is especially important for digital learners of the 21st century. (p. 17)

At the same time, McKeeman (2008) found that "critical literacies are central to the new literacies" (p. 179), essentially positioning critical literacy within new literacy skills.

The Role of the Teacher Shifts in 1:1 Environments

Each of the six studies identified the changing role of the teacher as an emergent theme in their findings, either in part or as a major finding. As West (2019) claimed, "Teachers are no longer dispensers of literacy skills, but now orchestrators of learning contexts" (p. 164). Citing the variables of the 1:1 environment and available resources, Jett (2013) acknowledged, "1:1 access impacted the teacher's strategies for carrying out writing instruction" (p. 161). In the study conducted by McKeeman (2008), for instance, the researcher found that "when skills and dispositions associated with the new literacies were employed within the classroom setting, the teacher's role transitioned into one of a facilitator and supporter" (p. 180). Also identifying teacher's new role as facilitators, Corn et al. (2011) observed that 1:1 environments were "shifting teachers out of traditional prescriptive roles and into more substantive ones" (p. 14). Similarly

classifying the teacher's role as primarily to scaffold reading practices in 1:1 environments for the students, Molin and Lantz-Andersson (2016) witnessed, "The teacher mostly contributes with scaffolding of the reading practice that recognizes features of text conventions and patterns of traditional reading on the web pages or apps . . ." (p. 150).

In addition, in some of the participating studies, the researchers acknowledged variables that may have a negative impact on changing the teacher's role in the classroom. For example, Dillon (2017) found,

Glendale teachers transform teaching and learning through 1:1 programs to support student acquisition of DL [digital literacy] and 21st century skills when district and building leadership provide them with reliable infrastructure and technology, job-embedded professional learning, sufficient time for peer-to-peer collaboration, and recognition from their administrators. (p. 169)

Furthermore, Jett (2013) recognized teacher values had the biggest impact on their instruction: "One participant was passionate about writing, while two others were student-centered in their approach. Yet another teacher valued professionalism among students. The teachers' act of coaching writing was clearly influenced by these values" (p. 162). Likewise, West (2019) also found that the teacher's values and technology practices in the classroom affected the extent of shift in the teacher's role, as evidenced by "Mr. Matthew's assertion of authority and mediation" and use of technology to re-direct and monitor students' off-task or undesirable behaviors (p. 164).

New Literacy in 1:1 Environments is Deictic

The idea that new literacy's meaning, function, and practices is determined upon a changing context was found across the studies. In particular, McKeeman (2008) claimed, "As the relay of information and literacy practices evolve, so does the technology that supports them" (p. 178). In their study, Molin and Lantz-Andersson (2016) related, "The findings of our study aligned with findings from many earlier studies, and policy reports suggest that skills for dealing with the traditional, typographical text are no longer sufficient alone" (p. 150). Furthermore, despite an acknowledgment of the sustainability of some traditional instructional practices, Jett (2013) also recognized that their study's teacher participants' use of TPACK "and choices concerning the use of time and the nature of writing tasks have necessarily evolved to meet student needs and curriculum demands" (p. 151).

Challenges in 1:1 Integration May Impact Further Technology Integration and New Literacy Learning

Across the participating studies in this meta-synthesis, the barriers, tensions, and challenges found in 1:1 integration were connected to frequency, level of integration, and perceptions of technology integration in the classroom. For example, Corn et al.'s (2011) participants cited a number of specific "technical problems," "instructional barriers," and ineffective or inefficient professional development as the biggest challenges to 1:1 integration. To these challenges, Corn et al. (2011) reinforced the idea, "Ultimately, when laptop initiatives are grounded in quality professional development, careful lesson

planning, and thoughtful technology use, instructional practice and the nature of learning become more appealing to 21st century educators and students alike" (p. 20).

Speaking to technical challenges as constraints, West (2019) offered the following evidence: "When I asked Nicolasia what she liked least about writing with technology, she identified experiencing frustration when the computer "freezes" or does not respond appropriately to the commands she enters" (p. 169). Similarly, in Dillon's (2017) study, the researcher found evidence to support that "reliable infrastructure and technology" and "lack of teacher expectations" were among the biggest challenges to transformative teaching practices in 1:1 environments (p. 165). In specific attention to 1:1 environments in writing instruction, Jett (2013) found three common challenges from the study's teacher participants: (1) "the presence of distractions for students" (p. 146); (2) "grading and providing feedback for online writing" (p. 148); and (3) the combination of "the gap of technology prowess between students and their teachers, equipment reliability, and issues of varying access among students" (p. 148).

Summary

Through the initial presentation and aggregation of the contexts and findings from each of the six participating studies in phase one, this chapter represented the researcher's efforts for trustworthiness and contextual placement of the studies. The second phase presented in this chapter served to provide the synthesis of emergent overarching themes across all six studies. The final chapter of this meta-synthesis will establish the researcher's interpretations of the synthesis and the resulting implications.

CHAPTER V

Interpretations and Implications

Overview

While the former chapter aimed to provide first and second order theme aggregation and synthesis, this final chapter serves to provide an additional layer and shift to a third order of analysis that begins the interpretive processes of meta-synthesis. According to Major and Savin-Baden (2010), "this process involves reviewing important patterns and connections among first and second order themes and ensuring that iterative cycles of interpretation occur" (p. 67). Moreover, they argue, "it is only when synthesists can truly view the process as cyclical and iterative that the meaning from the original studies can emerge and present itself" (Major & Savin-Baden, 2010, p. 71). Guided by this prominent idea, this chapter first provided a summary of this study and connection to the original research questions. Second, the current chapter was a further demonstration of the researcher's interpretations of the participating study's original findings and overarching themes as discussed in chapter four. Lastly, the chapter served to offer implications for future practice and the researcher's recommendations for future research, developing from the findings of this meta-synthesis.

Summary of the Study

The increasing popularity and implementation of 1:1 initiatives in schools has exponentially grown in the past decade. As a result, the traditional methods of teaching and learning have undergone transformative processes in response to the emergent needs of a digital world and the types of learning students need to be prepared for an increasingly globalized future. Information is much more readily accessible, and students are able to be creators and broadcasters of information. Consequently, the literacy skills needed to operate in this changing environment have shifted in order to fill the learning gaps that traditional literacy creates for students.

Meta-synthesis became the researcher's choice of research method based on the ability to examine current research trends on the narrowed topic, placing the research findings in its own context and against the context of others. After establishing the research questions influenced by this problem, the researcher generated inclusion and exclusion criteria to bound the research studies as closely together as possible. Extensive research across multiple databases, mediums, and search engines resulted in six studies that were used as participants in this meta-synthesis.

First, the research took care to explicate each study's methodologies, theoretical frameworks, and findings individually. Each study's original thematic categorizations were preserved and presented. This was done in order to make every effort to ethically represent the context and findings of the original studies and provide clarity in process. In the second phase, the original themes of each study were compared against the others so the researcher could recognize emergent overarching themes. The following themes

emerged as a result: (1) 1:1 creates and supports new literacy acquisition; (2) the role of the teacher shifts in 1:1 environments; (3) new literacy is deictic; and (4) challenges in 1:1 integration may impact further technology integration and new literacy learning. As a final step in the interpretive process of this meta-synthesis, the research questions were revisited in order to provide the additional layer of interpretive lens presented within this chapter.

Revisiting the Original Research Questions

While conducting the aggregation and synthesis of chapter four of each study's findings, the researcher's priority was to represent the studies as they were originally presented. The researcher then coded the emergent themes across the studies, taking care not to misrepresent the original study's findings and contexts while also comparing them against the findings and contexts of other studies. Therefore, it was vital that the researcher's own research questions set forth in chapter one did not impact the findings or overarching themes within the meta-synthesis.

In the final chapter of this study, the researcher had the opportunity to utilize the original research questions to re-examine the overarching themes that were already established. The researcher conceived the original research questions based on a lens of social-constructivist learning theories and new literacy studies that were described in chapter two of this study. Reiterating the original inquiries set forth in chapter one, the research questions were as follows:

1. What are the common trends within current research on 1:1 technology initiatives in secondary ELAR classrooms?

2. What does current research demonstrate about the relationship between 1:1 technology initiatives and student acquisition of new literacy skills in those initiatives?

3. What does current research demonstrate regarding the relationship between 1:1 technology initiatives and student engagement with new literacy skills in those initiatives?

Serving as an additional lens from which the researcher examined the original studies after the first two phases of interpretation, these research questions allowed another layer of interpretation and engendered further categorizations of overarching themes.

Interpretations of current research trends on 1:1 technology initiatives in secondary ELAR. The overarching themes emergent from the meta-synthesis of the six included studies serve to demonstrate some of the current research trends on findings regarding 1:1 environments in secondary English Language Arts and Reading (ELAR). Namely, those overarching themes were identified as: (1) 1:1 creates and supports new literacy acquisition; (2) the role of the teacher shifts in 1:1 environments; (3) new literacy is deictic; and (4) challenges in 1:1 integration may impact further technology integration and new literacy learning. As themes, these findings exemplify the observable trends in how 1:1 environments are impacting literacy instruction and learning in the secondary ELAR classroom in ways that are unique to the resources available and skills inherent in 1:1 initiatives.

Furthermore, additional interpretations were identified outside of the findings. The lack of unified terminology for the type of literacy emerging from increased technology

use, functionality, and mass information access, circulation, and creation. While two primarily used the term *21ˢᵗ century skills* (Corn et al., 2011; Dillon, 2013), others used terms *new literacy, new literacies,* and *critical literacy* (McKeeman, 2008; Molin & Lantz-Andersson, 2016; West, 2019). Despite their varied labels, their definitions and observed evidence of these literacy practices were aligned. While word choice may not seem to be majorly significant, the lack of uniformity is a symptom of the digital age learning represented in Seimen's (2004) theory of connectivism.

With its origins in social-constructivist theory, connectivism speaks to the chaos inherent in mass information and the impact of trying to organize and make sense of chaos on the learner. Seimen (2004) asserted,

> Self-organization on a personal level is a micro-process of the larger self-organizing knowledge constructs created within corporate or institutional environments. The capacity to form connections between sources of information, and thereby create useful information patterns, is required to learn in our knowledge economy. (para. 16).

In other words, chaos is a natural response to change, yet it is also vital to begin to organize the patterns in the information and generate connections so that the information may be more useful to others. In this case, the findings demonstrate that while researchers' terminology regarding the emergent form of literacy may be misaligned, it is important that the expressions are connected in the same space so that educational institutions, policy-makers, and future researchers may recognize the patterns and establish unity against chaos.

Additionally, among three of the six participating studies, those that utilized the term *new literacy* supported their observations through the lens of the theory of new literacies and socio-cultural theories like social constructivism (McKeeman, 2008; Molin & Lantz-Andersson, 2016; West, 2019). Thus, *new literacy* and socio-cultural theories are conceptually interrelated in that the definition, evidences of skills, practice, learning, and instruction of *new literacy* are influenced by socio-cultural frameworks. The connection between the diction and theoretical framework suggests that the trending chaos may be mediated by the collection and organization of theories related to the emerging literacy.

Interpretations of student acquisition of new literacy skills in 1:1 initiatives. From the participating studies, the findings suggest that 1:1 initiatives and the resulting 1:1 environments have a unique contribution to student acquisition of new literacy skills. All participating studies demonstrated positive or mixed-results (both advantages and disadvantages) on the impact of 1:1 environments on student acquisition of new literacy skills. For example, Corn et al. (2011) acknowledged, "the presence of laptops appears to have enhanced multiple aspects of instructional practice" (p 19). Meanwhile, Jett (2013) observed mixed-results on the impact of 1:1, indicating both the advantages and disadvantages of technology-integrated instruction and learning, and reflected, "1:1 access impacts writing process for students in a variety of ways and along a continuum" (p. 157).

Significantly, however, a common theme found across the studies was the uniqueness of 1:1 initiatives as they increase student access to internet-enabled technological devices for learning. In McKeeman (2008)'s study, for instance, the researcher found, "The

perceptions of the laptops, within the one-to-one laptop initiative toward student learning were overall favorable" (p. 188). Furthermore, she found that with the 1:1 initiative, "Cardinal Creek High School has bridged the gap between the "haves" and "have nots" regarding access to the technology" (McKeeman, 2008, p. 186). Similarly, Dillon (2017) noted,

> Building and district administrators emphasized the provision of Chromebooks for all students removed economic advantages, while giving students the tools and resources they needed to access materials and develop 21st century skills. Thus, in their opinion, the 1:1 program equitably allows all students to engage in their academic work, regardless of income. (p. 105)

Therefore, the findings regarding the question of the impact 1:1 environments suggest that the increased access inherent in such initiatives provides students increased support in acquisition of new literacy skills.

Interpretations of student engagement with new literacy skills in 1:1 environments. Because the overarching themes presented in phase two of this study's interpretive process was not influenced by the researcher's original research questions, student engagement with new literacy skills was not found to be an emergent theme across all of the studies' findings. However, with the application of this question's lens to observations made within the participating studies, new understandings of student engagement surfaced.

Acknowledging the medium is not as important as method in regard to student engagement, Corn et al. (2011) stated, "The secret to engagement, with or without

laptops, seems to be the use of varied, appropriate teaching styles and assessment methods" (p. 20). In this case, the teacher was observed to have a bigger impact than the 1:1 access and use of technology. On the other hand, Dillon (2017) attributed technology as the greater catalyst to engagement in her observation, "Students and teachers emphasized that the 1:1 program has enhanced student engagement with relevant materials" (p. 106). Emphasizing the idea of evidence of student engagement in the student's interaction with their own learning, West (2017) also acknowledged the impact of technology. The researcher noted, " . . . the Internet was the primary means of literacy engagement in both English Language Arts classrooms, and using the Internet required students to develop new literacies in order to take full advantage of the affordances of their Internet-mediated literacy practices" (West, 2017, p. 171). As such, student engagement in *new literacy* in 1:1 environments was evidenced.

These observations are consistent with previous meta-synthesis research that found while many studies do not specifically measure engagement, positive relationships between 1:1 initiatives and student engagement still emerge within the studies (Penuel, 2006). In his own meta-synthesis, Penuel (2006) demonstrated, "Half of the studies in this synthesis reported positive effects of laptop programs on student motivation or engagement, but just three attempted to measure it in some way other than by a single self-report item" (p. 342). The findings from this study continue to support the positive impact of 1:1 initiatives and student engagement, and offer new, connections in this engagement regarding *new literacy*.

Implications for Practice

The primary purpose of this study, as demonstrated in the problem, was to provide insights that may impact practice regarding 1:1 initiatives and *new literacy* acquisition in secondary ELAR students. The overarching themes presented in phase two of the findings and the additional researcher's interpretations gleaned from the original research questions have a number implications for practical applications.

First, the shift in the teacher's role from expert in the classroom to facilitator and co-learner indicates educators need to be prepared for such a change and will require quality professional development. Moreover, educators will need to become more comfortable with using technology both for personal use and in instruction to be a more effective facilitator to their students. Also recognizing this need, McKeeman (2008) asserted,

> Teachers need to take risks, explore different ideas, and expand upon current practices in order to keep abreast with technological trends. Teachers will also need to rethink their role in order to allow for expertise to originate from all present within the classroom, thus allowing for others to support and guide instructional activities or applications when appropriate. (p. 196)

The shift to teacher as facilitator supports the practice of a learner-centered classroom and may be framed within socio-cultural theories that can guide teachers' instructional designs and methods. Consequently, pre-service teachers will need new types of training for this new role and veteran teachers will need support for such a drastic change in pedagogy.

Additionally, the emergent theme and evidence for *new literacy* as deictic in nature indicates that educators should be more flexible in establishing how they will meet students' needs. Because literacy functions, practices, and skills are dependent upon an ever-changing context, teachers will need to be prepared with skills that go beyond content and technological knowledge that may be replaced by future advances. In doing so, educators will fulfill the adage of teaching a man to fish, rather than feeding him.

The findings of this study also have implications for policy-makers. While many current state and federally-endorsed policies and standards have already been impacted by the influence of positive research regarding technology integration in the ELAR classroom (ESSA, 2015; ISTE, 2019; U.S. Department of Education, 2017; NGA & CCSSO, 2010; TEA, 2014), current research trends offer more specific insights that could offer changes in those policies. For instance, policy-makers have the ability to unify the terminology regarding the emergent new literacy in order to put forth more-specific learning standards and resources to support teachers' instruction in the 1:1 ELAR classroom. Moreover, policies, standards, or recommendations might offer acknowledgment of the common challenges and barriers to effective 1:1 initiatives found in current research. In doing so, policy-makers may wield the power to better prepare campus administrators and educators to more effectively implement such initiatives so that they may anticipate those challenges and problem-solve proactively before the common barriers cause tensions for teachers and students.

Recommendations for Future Research

The narrowed focus of this meta-synthesis and the process of applying the inclusion and exclusion criteria on all related existing research lead to the researcher's realization that future meta-analyses on quantitative and mixed-method studies on the same narrowed topic may yield additional insights and interpretations. Furthermore, yielding such a small number of qualitative studies on this topic indicates that additional research is needed. Because the context of qualitative studies is so unique and bound by the setting, participants, and research methodologies, additional research on the same topic is necessary in order to provide more richly descriptive narratives to represent the rapidly developing 1:1 phenomenon and subsequent shifting form of literacy occurring on a global scale. Moreover, historical-comparative studies may be more able to record and observe the shifts in literacy occurring over time for further analysis.

It is also important to identify related areas of research that may fill in some of the gaps of research presented in this meta-synthesis to yield additional interpretations. For instance, future research should address the difference between the experiences of native and non-native language speakers' acquisition of new literacy skills in 1:1 environments. Another existing gap is the connection between the ELAR learning and instructional standards and the deictic nature of literacy. Furthermore, this meta-synthesis demonstrated that a unified terminology regarding new literacy is not established despite the fact that the similarities in the practices and understandings of the emergent type of literacy. Current research frequently utilizes the terms *new literacy* (in the singular and plural), *critical literacy*, *digital literacy*, and *21st century skills* as though they are

synonymous. In order to be able to significantly influence practice and policy, future research should be clear and purposeful in their choice of terminology and its theoretical foundations.

Concluding Remarks

This chapter began with a summary of the overarching themes surfaced from the second phase of meta-synthesis interpretation. The researcher proceeded to apply her original research questions and theoretical framework as an additional lens of interpretation. As a result of the researcher's additional interpretive lens, three additional findings emerged: (1) the increased access inherent in 1:1 initiatives is a positive characteristic in student acquisition of *new literacy*; (2) dissonance in terminology regarding the emergent new literacy aligns Seimen's (2004) connectivist idea of chaos in digital information and connectivist calls for creating useful connections; and (3) student engagement is supported by 1:1 environments and *new literacy* practices.

In her implications for practice and recommendations for research, the researcher emphasized how educators and education researchers may consider how this research can inform 1:1 technology integration in the secondary ELAR classroom. For research purposes, much will need to be considered regarding how researchers will frame the emergent type of literacy in the age of mass information and increased Internet access, and the various ways research may be designed. Moreover, educator practitioners may become more aware from this meta-synthesis of the type of support necessary to teachers implementing a 1:1 initiative and the findings that encourage the practice of 1:1 for student acquisition of *new literacy* skills.

The researcher's own current position of secondary ELAR teacher in a 1:1 classroom allows for immediate application of these findings in her own setting. In particular, this meta-synthesis was an opportunity to come to a better understanding of the value of 1:1 learning environments and the types of literacy skills students need to be equipped with in this ever-changing world. Giroux (2001) wrote, "A radical theory of literacy must search through the cultural meanings and practices of different groups and begin to ascertain how their contradictory natures can be used to promote a critical comprehension of reality" (p. 231). For the researcher, this meta-synthesis was a practice of the type of "search" Giroux is speaking; the natures of machine and humanity are often contradictory, but by searching within these contradictions the researcher has found how humans and technological tools may be used in tandem to enhance holistically the literacy education and learning experiences of students.

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