4-4-2017

Identifying eBook Pedagogies for Literacy Instruction: A Qualitative Content Analysis

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A Dissertation Submitted to

The Faculty of
The Annsley Frazier Thornton School of Education
Bellarmine University
In partial fulfillment of the requirements for the degree of

Doctor of Philosophy
in
Education and Social Change

April 4, 2017

Dissertation directed by

Dr. Kathleen S. Cooter
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BELLARMINE UNIVERSITY

The Annsley Frazier Thornton School of Education of Bellarmine University certifies that Jamey Twitchell Herdelin has successfully defended her dissertation for the degree of Doctor of Philosophy in Education and Social Change as of April 4, 2017. This is the final and approved form of the dissertation.

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Abstract of the Dissertation

Students in K-6 support becoming digital learners but many lack the digital skills needed to engage with information communication technologies such as eBooks. Change can occur when educators perceive a sense of self-efficacy to and the value of eBook integration but some lack the technological and pedagogical knowledge to adjust instruction and meet students' needs. This study examined the extant body of research on the use of eBooks with K-6 literacy instruction in order to address the perceived lack of effective evidence based practices. The study's goal was to identify effective pedagogical knowledge regarding when, how, and why to integrate eBooks with K-6 literacy instruction. The research questions driving the study were: According to the extant literature, what types of K-6 literacy practices and engagements with eBooks are identified? What does the body of research recommend as the technological instructional pedagogies and knowledge needed by educators to meet the diverse needs of K-6 students as they engage with eBooks to develop digital literacy skills and competencies?

The conceptual frameworks were the Technological Pedagogical Content Knowledge (TPACK) framework and the Technology Integration Matrix (TIM) model. TPACK enabled the researcher to amass the extant body of research on eBooks with K-6 literacy instruction in order to develop a body of pedagogical knowledge. The TIM model provided the tools to identify when and how eBooks were integrated, the technological pedagogical knowledge educators need to build self-efficacy. Qualitative content analysis was selected as the study's methodology. It provided the rigor and structure for the researcher to utilize the research questions and conceptual frameworks to narrow the field of research, select relevant text for analysis, and identify why eBook integration is of value.

The analysis showed eBooks have been integrated with the components of a balanced approach to literacy instruction. eBooks were integrated across a range of learning environments and levels of technology integration as defined by the TIM model. The analysis revealed three connected themes: eBooks have a positive effect in building and sustaining reading motivation and engagement. This leads to literacy growth and development. The catalyst for much of the change that took place was the integrative tools and features embedded within the eBooks. In summary, the study's significance is eBooks can be an effective tool for supporting students' growth in literacy when teachers and media specialists have the technological pedagogical knowledge how eBooks can change literacy instruction.

Key words: balanced approach to literacy instruction, eBook pedagogies, eBooks in education, literacy instruction, qualitative content analysis, self-efficacy, technological pedagogical knowledge, technology integration matrix (TIM) model, TPACK framework.

Acknowledgements

I would first like to thank my committee and my outside coders for their support and encouragement. Dr. E. Dinkins and her guidance in regards to qualitative analysis, and Dr. J. Stemmer whose librarianship helped me to see that though this study narrowed its focus to K-6 setting, has relevancy to our broad profession and roles we perform to support students' engagement with literacy and learning. My outside coders Dr. E. Beardsley, Dr. J. Poston, and Dr. P. Lanata for your patience and perspective that helped me strengthen and fine tune my coding frame, the heart of QCA.

Second, I would like to thank the School of Education at Bellarmine University and especially the Drs. Kathleen and Robert B. Cooter, Jr. both of whom were on my committee. Your vision and ability to enact change through this Ph.D. program gave me the opportunity to travel down an unknown path. You brought to life the Robert Frost (1916) poem "The Road Not Taken". My life, and those I touch, are permanently altered. Dr. R. B. Cooter, Jr. your expertise in literacy instruction and academic writing, and coursework helped me land this plane. Dr. K. Cooter, my Dissertation Chair. Words are inadequate in expressing my thanks. Your breadth and depth of knowledge pertaining to education, poverty, and change agency is unlimited. You enabled me to identify an issue that engages a number of interests near and dear to my heart; how can I help educators engage with technology in a way that promotes literacy development for students who live in poverty, who struggle with reading. Being literate is the path out of poverty. Your insights and creativity as a change agent allowed me to tap into my passions and skills. Thank you for your faith and encouragement as I developed into a change agent.

Finally, I would like to thank my family for their unwavering support these past six years. To my parents, Bob and Jan Twitchell who instilled in me the responsibility to be a change agent in my own way. To my children Nils, Kendall, Allyson, and Christian Herdelin who will create their own path of change. And finally, to my husband Jeffrey Herdelin. You are my rock, the foundation that nourished me throughout this whole journey. Your patience and insight into my thinking process provided me the light to see where I was going when I got lost. Your faith in my ability to complete this project boosted me over the hurdles I put in my way. Thank you LOML!

I shall be telling this with a sigh
Somewhere ages and ages hence;
Two roads diverged in a wood, and I-
I took the one less traveled by,
And that has made all the difference.
(Frost, 1916. p, 270)

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Chapter 1: Introduction

Overview

Technology has created a change in how books are utilized in the learning environment to support student engagement and literacy development (Biancarosa & Griffiths, 2012; Cavanaugh, 2006a; Felvégi & Matthew, 2012, p. 43; "*Harnessing the potential"*, 2014; International Literacy Association, 2012). Information is stored in multiple digital media such as eBooks, audio books, books online, and can be accessed by employing a range of digital technology known as information and communication technology (ICT) (Cavanaugh, 2006a; "Key design consideration," 2014; Leu, Kinzer, Cioro, & Cammack, 2010). Utilizing ICTs to solve authentic problems in a technology driven world requires developing literacy skills beyond those essential for comprehending print resources (American Library Association, 2013; Felvégi & Matthew, 2012; International Literacy Association, 2009). Students are required to develop digital literacy skills and competencies that enable them to access information from a variety of resources, synthesize and evaluate arguments from different perspectives before drawing conclusions ("Information, media, and technlogy skills," n.a.; International Literacy Association, 2012; Murnane, Sawhill, & Snow, 2012; OECD, 2010; Pellegrino & Hilton, 2012; US Department of Education, 2010). Educators have the responsibility to integrate such digital literacy skills and competencies with instruction so that students can participate in the global society (International Literacy Association, 2009, 2012).

Educational organizations and curriculum standards support embedding information and communication technologies (ICTs) in instruction (American Association of School Librarians, 2007; International Literacy Association, 2009; International Society for Technology in

Education, 2007; "Key design consideration," 2014; National Council of Teachers of English, 2007). State legislative mandates such as the Common Core State Standards ("Key design consideration," 2014) call for students to engage with multiple texts including digital, across the curriculum in order to answer and solve global problems. National organizations' position statements and guidelines recommend educators interweave ICT's with student learning to foster the development of strategic readers and lifelong reading (American Association of School Librarians, 2007; International Literacy Association, 2009, 2012; International Society for Technology in Education, 2007; National Council of Teachers of English, 2007).

Data suggest that eBooks are increasingly becoming the literacy product of choice in schools and school libraries (Hutchison & Reinking, 2011). Technology is enabling many text based resources to be converted from print to digital resulting in schools purchasing substantial numbers of etextbooks (US Department of Education, 2010). Since 2010, the number of U.S. K-12 school libraries providing eBook collections doubled to 66 percent by 2014 ("*Ebook usage*", 2014), and the number of 6 to 17 year olds who have read an eBook has more than doubled, from 25 percent to 61percent (Scholastic Inc., 2014).

Statement of the Problem

Students in K-12 grades support becoming digital learners but a number of identified impediments need to be addressed (Cavanaugh, 2006a; Geck, 2006). Many students lack the digital literacy skills needed to competently, effectively, and creatively access and engage with ICTs such as eBooks (Geck, 2006; Murnane et al., 2012; OECD, 2010; Park, 2012; Rideout, Foehr, & Roberts, 2010). Some educators lack the technology competencies and pedagogical understanding to support students' desire and need to become digital leaners and employ digital

literacy skills and ICTs in real world context (Cavanaugh, 2006a; L. Larson, 2013; Mautino & Biancaniello, 2005; Mishra & Koehler, 2006). Finally, there does not appear to be a clear consensus with respect to the pedagogy regarding when, how, and why to integrate ICTs such as eBooks into literacy instruction (Felvégi & Matthew, 2012; Hutchison & Reinking, 2011; Roskos, 2013).

Media specialists encounter additional issues when supporting students' engagement with ICTs. As program administrators, information specialists, and instructional partners, media specialists identify and purchase appropriate resources and technology to support students' reading needs, their development of lifelong reading habits, as well as meet local, state, and national educational goals (American Library Association, 2013; Collier & Berg, 2011; "*Ebook usage"*, 2014; "*Empowering learners"*, 2009). As information leaders and instructional partners, media specialists collaborate with other educators to ensure students develop the literacy skills to engage with ICTs such as eBooks (American Association of School Librarians, 2010; Collier & Berg, 2011; "*Empowering learners"*, 2009). Recent surveys have reported the adoption of eBooks is slowly increasing among school libraries but students' use of eBooks remains low ("*Ebook usage"*, 2013; "*Ebook usage"*, 2014; "*Ebook usage"*, 2015). Factors affecting libraries' and students' eBook use include the Common Core State Standards, tight school budgets, students' preference for print over eBooks, a lack of awareness that eBooks collections exist, and a lack of training on how to use eBooks. While the surveys were not able to draw any correlation between lack of demand, lack of awareness, and lack of training, others have found that a disconnect exists between researchers and educator (Duke & Keene, 2011; Felvégi & Matthew, 2012; Forzani & Leu, 2012; International Literacy Association, 2009, 2012).

The body of research pertaining to digital literacy instruction and ICT integration is growing but what is known has not been consistently disseminated in ways that support building teacher or media specialist capacity (Duke & Keene, 2011; Felvégi & Matthew, 2012; International Literacy Association, 2009). Forzani and Leu (2012) found ICT research has neglected to examine the integration of digital technologies during the critical primary years, including at risk children who come from low socioeconomic households. Instead most of the research has focused on the intermediate and above grades when students shift from self-contained classrooms to discipline focused classrooms. Yet some intermediate grade content area teachers lack the literacy background to effectively embed discipline-specific literacy in the classroom (International Literacy Association, 2012). The result appears to be not all primary age children are engaging with ICTs while upper grade teachers lack the literacy skills needed to engage adolescents with ICTs across all disciplines (Forzani & Leu, 2012; International Literacy Association, 2012).

There also appears to be a disconnect regarding the type of reading done outside of school as compared to in school reading (Hutchison & Reinking, 2011; International Literacy Association, 2012). Not all educators are convinced that engagement with the new reading and writing genres students access outside of school (social networking tools, blogs, and wikis, etc.) will meet the needs of the curriculum (Hutchison & Reinking, 2011). Students, on the other hand, often consider in school reading experiences as academic in nature and not relevant to their personal lives; they "reject literacy tasks that are lacking in purpose and interest" (Pitcher et al., 2007, p. 395). Consequently, they are not motivated to read, do not engage in reading, nor consider themselves readers, and a disconnect occurs. Students utilize ICTs such as social media tools to read and write digital text and are motivated to access and read the Internet for

research purposes, but they do not consider this a valid form of reading or writing (Pitcher et al., 2007).

Researchers believe that students' attitude as nonreaders and their lack of motivation to read will change when students engage with educators who meet their literacy needs and support multimodal resources (International Literacy Association, 2012; Pitcher et al., 2007) such as eBooks. In order to meet students' literacy needs, educators need to "believe" eBooks will be effective and of value (Ertmer & Ottenbreit-Leftwich, 2010; Harris, Mishra, & Koehler, 2009; Hutchison & Reinking, 2011; Leu & Kinzer, 2000; Mishra & Koehler, 2006; Ottenbreit-Leftwich, Glazewski, Newby, & Ertmer, 2010; US Department of Education, 2010). It is suggested that "each of us must bring our special areas of expertise to the study of literacy within the new worlds of the Internet and other ICT's" (Leu et al., 2010, p. 1602) and establish a range of evidence-based practices that meet the diverse instructional needs and interests of the students (Hutchison & Reinking, 2011; International Literacy Association, 2002; Leu et al., 2010). This involves identifying essential digital literacy skills required by educators to access and engage with eBooks, gain competency in assessing these skills and dispositions, and finally develop instructional pedagogies for implementation. In short, eBooks integration in literacy instruction can occur when educators utilize their technological pedagogical knowledge (M. Koehler & Mishra, 2010), their understanding how eBooks can affect literacy instruction to best meet students' instructional needs and interests.

Purpose

The purpose of this study was to examine the extant body of research on the use of eBooks in the K-6 school setting in order to address the perceived lack of published effective

evidence-based practices. The goal was to identify effective pedagogical knowledge regarding when, how, and why to integrate eBooks into literacy instruction. Then media specialists can collaborate with educators to build their perceived sense of self-efficacy and the value of eBook integration so that students can develop the digital literacy skills and competencies they need to access and engage with eBooks (American Association of School Librarians, 2010; Duke & Keene, 2011).

Qualitative content analysis was selected as the study's methodology because it provided the rigor and structure for the researcher to utilize the research questions and the conceptual frameworks to narrow the field of research and select relevant text for analysis (Schreier, 2012). This qualitative content analysis focused on a specific ICT, eBooks ("*Harnessing the potential"*, 2014) and their integration in the K-6 educational setting since "literacy educators have the responsibility to integrate these new literacies into the curriculum to prepare students for successful civil participation in a global environment" (International Literacy Association, 2009, p. n.p.). QCA provided the means to generate a body of research based K-6 literacy practices and engagements with eBooks and extract the technological pedagogical knowledge needed by educators to develop the belief that eBook integration is of value and they have the self-efficacy to integrate.

Conceptual Frameworks

A conceptual framework explains the key factors, variables, and/or constructs to be studied and the presumed relationships among them (Miles & Huberman, 1994). To address these pedagogical knowledge challenges, this study selected two theories for its conceptual framework: the technological, pedagogical, and content knowledge (TPACK) framework for

teacher knowledge (M. Koehler, Mishra, & Cain, 2013; Mishra & Koehler, 2006) and the technology integration matrix (TIM) model (Allsopp, Hohfeld, & Kemker, 2007).

TPACK is the study's formal conceptual framework because it integrates technology with pedagogy and content in such a way that it enables educators to develop "the types of flexible knowledge needed to successfully integrate technology use into teaching" (M. Koehler et al., 2013, p. 13). TPACK focuses specifically on the relationship between technology, content, and pedagogy and uses "this understanding to develop appropriate, context-specific strategies and representations" (Mishra & Koehler, 2006, p. 1029). It is built around the construct that effective instruction involves establishing a range of evidence-based practices that meet the diverse instructional needs and interests of the students (Hutchison & Reinking, 2011; International Literacy Association, 2002; Leu et al., 2010).

The Technology Integration Matrix (TIM) model (Allsopp et al., 2007) is the second conceptual framework used in this study. The TIM model provides the lens to examine the relationship between technology, content, and pedagogy and explain how eBooks were utilized in terms of level of technology integration and in what type of classroom setting; instructional practices, strategies, and resources educators need to implement effective teaching (Kidwell, 2015). The TIM model is grounded in a constructivist theoretical framework and "is based on two models that support the integration of technology for facilitating student center instruction" (Allsopp et al., 2007, p. 4); the Apple Classrooms of Tomorrow (ACOT) levels of technology integration model (D. C. Dwyer, 1995) and Jonassen's constructivist learning environments model (Allsopp et al., 2007).

Summary of Methodology

The TPACK and TIM frameworks worked collectively with qualitative content analysis (QCA) research methodology. QCA is "a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use" (Krippendorff, 2013, p. 24). QCA's rigorous methodology enabled the researcher to select a body of data to study and specific key factors to analyze (Krippendorff, 2013). TPACK provided justification for QCA to study the development of teacher knowledge about eBook technology. The resulting technological pedagogical knowledge can be used to understand how a specific eBook tool and interactive features can change literacy instruction and support student learning (M. Koehler et al., 2013). The TIM model identified the specific key factors that support the integration of eBooks and QCA analyzed the level of eBook integration and the type of literacy instruction. Together the two frameworks and research methodology provided educators with the pedagogical knowledge to develop and implement technology embedded instructional practices required by diverse digital learners. Specifically, the two frameworks and research methodology provided media specialists with a lens to examine the evidence-based use of eBooks in literacy instruction and embed the new understanding within collaborative instruction with classroom teachers. The findings can also serve as the rationale for resource and technology procurements that support students' engagement with ICTs ("*Empowering learners"*, 2009; Sobel & Grotti, 2013). Finally, teacher and media specialist capacity to engage with eBooks can be developed by disseminating the findings through professional development opportunities.

Goal of the Study

This study was a qualitative content analysis (QCA) of the extant research on eBook integration with K-6 literacy instruction in order to identify technological pedagogy that could inform approaches to instruction in other K-6 literacy instruction. The QCA provided the rigorous research method (Krippendorff, 2013) needed by the TPACK framework to identify effective technology pedagogies so that an "analytical lens for studying the development of teacher knowledge about educational technology" (Mishra & Koehler, 2006, p. 1041) can be applied to the results. Moreover, QCA provided the "convergence of evidence from a variety of study designs that is ultimately scientifically convincing" (International Literacy Association, 2002, p. 2); the data educators need to "believe" eBooks will be effective and of value. Therefore, the goal of this QCA was to:

- examine and synthesize the research pertaining to the integration of eBooks in K-6 literacy instruction in order to identify the technological instructional pedagogies and knowledge needed by educators to competently support students' development of digital literacy skills and competencies; and
- share the results so that media specialists and other literacy educators can best use their leadership role to provide students and educators with the technological pedagogy and resources needed to access and engage with eBooks.

Research Questions

The questions driving the QCA of the use of eBooks in the K-6 literacy are:

1. According to the extant literature, what types of K-6 literacy practices and engagements with eBooks are identified?

2. What does the body of research recommend as the technological instructional pedagogies and knowledge needed by educators to meet the diverse needs of K-6 students as they engage with eBooks to develop digital literacy skills and competencies?

Significance of the Study

The study's outcome was significant to media specialists because it can impact their role as program administrators and leaders. Media specialists can potentially enhance students' engagement with digital text when they (media specialists and students) apply their understanding of eBook technological pedagogy to eBook selection (American Library Association, 2013; Bogel, 2009). Media specialists can also utilize the study to lead the school community and its stakeholders through the changes required to becoming a 21st century learning environment ("*Empowering learners"*, 2009).

As instructional partners and information specialists, media specialists can use the outcomes to collaborate with educators and better meet the needs of a diverse group of students (Mishra & Koehler, 2006). This is accomplished by:

- supporting educators in their own development of technological pedagogical knowledge; and
- providing educators with evidence-based practices as they identify the essential digital literacy skills required to access and engage with eBooks, how to assess these skills and dispositions, and then develop instructional pedagogies for implementation (Hutchison & Reinking, 2011; International Literacy Association, 2002; Leu et al., 2010).

Finally, "today's twenty-first century students must be able to discover, analyze, evaluate, interpret, and communicate ideas, information, and knowledge in a variety of ways"

(American Library Association, 2013, p. 1). This requires access to a wide variety of resources and formats (including print and digital) and the skills to engage with them. School library programs are instrumental in providing students with these skills and resources. Media specialists will be able to use this technological pedagogical knowledge to build digital library collections that supports educators' and students' inclusion of eBooks into their literacy experiences (American Library Association, 2013; "*Empowering learner"*, 2009).

Definition of Terms

The targeted outcome of the study was to foster and advance educators' technological pedagogical knowledge that is essential for supporting students' development of the digital literacy skills and competencies needed to access and engage with eBooks. For this study the following definition was adopted because digital literacy is defined in many ways (Martin & Grudziecki, 2006) and this definition embeds three dimensions of literacy that are woven throughout other digital literacy definitions (Hwang, Tsai, & Yang, 2008):

> Digital literacy is the awareness, attitude and ability of individuals to appropriately use digital tools and facilitates to identify, access, manage, integrate, evaluate, analyze, and synthesize digital resources, construct new knowledge, create media expressions, and communicate with others, in the context of specific life situations, in order to enable constructive social action; and to reflect upon this process (Martin & Grudziecki, 2006, p. 255).

The eBook definition for this study was derived from a content analysis performed by Vassiliou and Rowley (2008). Its two-part definition "capture[s] both the persistent characteristics of e-books, and their dynamic nature, driven largely by the changing technologies

through which they are delivered and read" (Vassiliou & Rowley, 2008, pp. 363-364) . Embedded in the definition is the understanding that the dynamic nature of eBooks will change over time and so must the second part of the definition. Below is the definition used for this study:

1. An e-book is a digital object with textual and/or other content, which arises as a result of integrating the familiar concept of a book with features that can be provided in an electronic environment.
2. E-books, typically have in-use features such [as] search and cross reference functions, hypertext links, bookmarks, annotations, highlights, multimedia objects, and interactive tools (Vassiliou & Rowley, 2008, p. 363).

Information and Communication Technology (ICT) are digital forms of communication (Hutchison & Reinking, 2011). Often it is used as an overarching term to describe the technology and its application to create access to information (Rouse, 2005).

Pedagogical knowledge is knowledge derived from research and practice (Shulman, 1986). It is a framework that requires educators to practice reflective awareness and interweave knowledge about learning and about individual students with content in order to differentiate instruction to meet students' learning needs. It "requires an understanding of cognitive, social, and developmental theories of learning and how they apply to students in the classroom" (M. Koehler & Mishra, 2010, p. 14)

Technology integration is defined as "the pervasive and productive use of educational technologies for the purposes of curriculum-based learning and teaching" (Harris, 2008, p. 252).

It is not about the technology itself but about the effective use of technology to transform learning in order to meet the students' needs.

Limitations

The main limitation of this study pertained to the selection of research for analysis. The parameters for selecting research studies narrowed the focus to scholarly peer reviewed research regarding literacy instruction in order to identify evidence-based practices as recommended by educational standards (International Literacy Association, 2002). The parameters excluded research and studies conducted but not peer reviewed. Cavanaugh (2006a, 2006b, 2015) has published three professional resources that support educators' integration of eBooks in the school setting including literature circles. Two of Larson's studies (2010, 2015a) were collected for this qualitative content analysis but others were excluded (2008, 2009; 2012).

Another limitation is the context focused on the K-6 school setting. eBooks are being used throughout the learning environment including preservice teacher courses (L. C. Larson, 2012) and in high school and post-secondary settings.

In summary, the purpose of this study was to delve into peer-reviewed research and identify evidence-based practices for integrating eBooks with K-6 literacy instruction. The context parameters were selected because of the need for research to be disseminated to teachers and media specialists. The parameters also excluded a plethora of research and professional resources from the study that could be examined to expand the technological pedagogical knowledge educators and media specialists need so as to integrate eBooks with literacy instruction and support student engagement. A future research project could be to develop a

technology integration matrix type model around the integration of eBooks with literacy instruction and embed examples from all of these resources.

Chapter 2: Review of the Literature

Purpose

The purpose of this section was to review the extant research relevant to the integration of eBooks with K-6 literacy instruction. To accomplish the task, the review of the literature was divided into two sections; critique of the conceptual frameworks and review of the scholarly literature concerning the problem being examined, and its significance. The review began with a critique of the conceptual frameworks which identify and explain the key factors to be studied and their presumed relationship (Miles & Huberman, 1994). For this study, the technological, pedagogical, and content knowledge (TPACK) framework for teacher knowledge (M. Koehler et al., 2013; Mishra & Koehler, 2006) was utilized as the formal conceptual framework. It provided the rationale for curating research on eBook integration in literacy instruction in order to identify technological pedagogical knowledge (TPK) educators need to believe eBook integration is of value. The technology integration matrix (TIM) model (Allsopp et al., 2007) provided a lens to concretely identify when and how eBooks have been integrated into literacy instruction. Together the two frameworks provided the lens for examining a large body of data and funneling its focus to a specific objective; finding concrete data to address the research goal; to examine and synthesize the research pertaining to the integration of eBooks in K-6 literacy instruction in order to identify examples of technological pedagogy that could inform approaches to instruction in other K-6 literacy instruction. Figure 1 shows the conceptual framework's role on shaping and directing the dissertation's methodology.

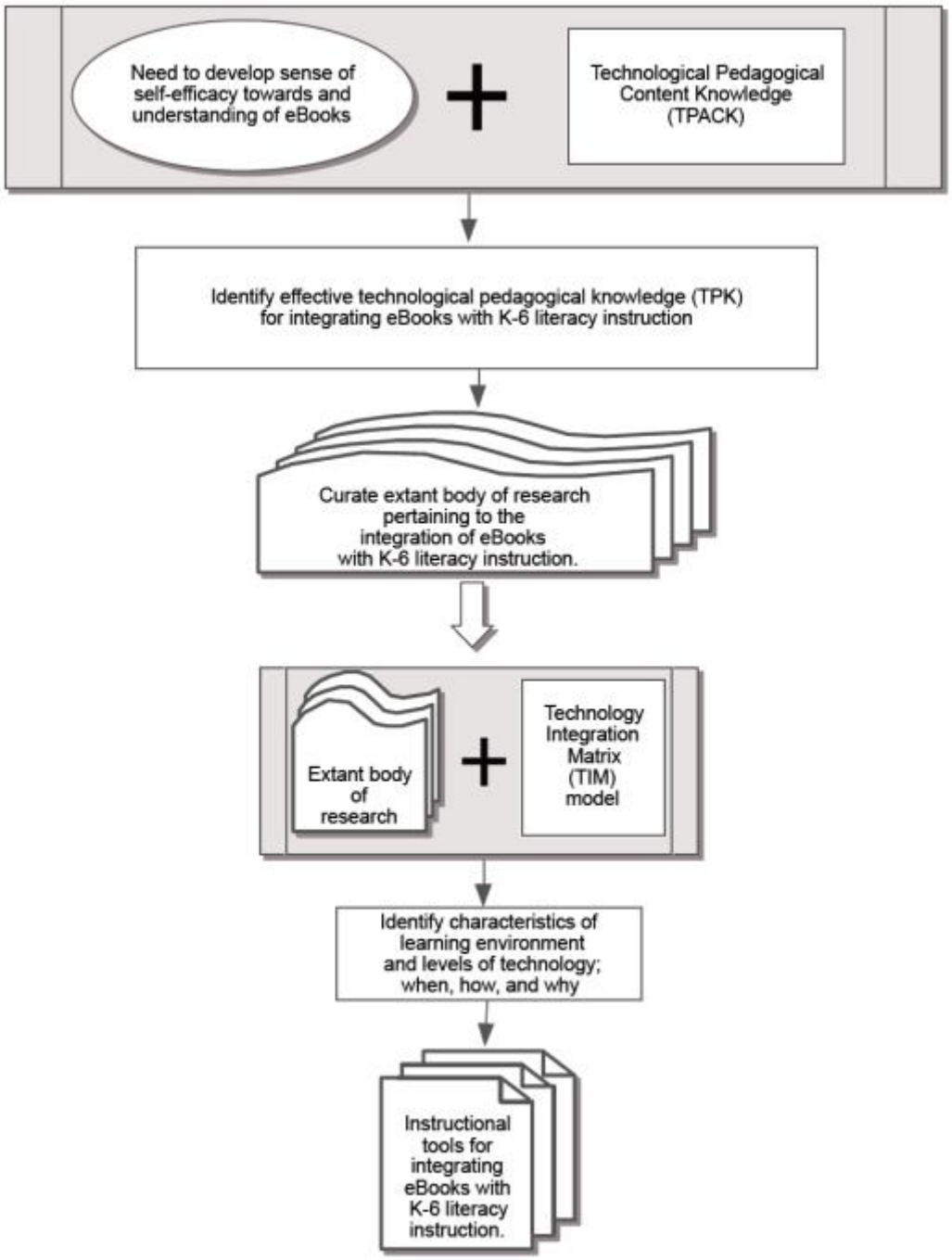

Figure 1. The role of the TPACK framework and TIM model in the study's methodology. Adapted from *Qualitative data analysis*, by M.B. Miles and A. M. Huberman, 1994, p. 18-22. Copyright 1994 by SAGE Publications.

The second section is a review of the scholarly literature concerning the problem being examined, and its significance. For this study, the problem pertains to the current status of

eBook integration with K-6 literacy instruction and the barriers preventing effective integration. Students in K-12 grades support becoming digital learners (Cavanaugh, 2006a; Geck, 2006) but some educators lack the technology competencies and pedagogical understanding to support students' digital literacy development (L. Larson, 2013; Mautino & Biancaniello, 2005; Mishra & Koehler, 2006). Digital literacy is a "necessary life skill, much like the ability to read and write" (Federal Communications Commission, 2010, p. 174). Educators have a responsibility to provide students with these life skills, yet there does not appear to be clear consensus on the when, how, and why eBooks can be integrated into literacy instruction (Hutchison & Reinking, 2011; International Literacy Association, 2009; Roskos, 2013).

In summary, the purpose of the literature review was to provide the context for the study by identifying where educators and media specialists are in regards to integrating eBooks with K-6 literacy instruction. It may furnish the rationale for the use of the technological pedagogical content knowledge (TPACK) framework and the technology integration matrix (TIM) model with the qualitative content analysis in order to identify the technological pedagogical knowledge (TPK) educators need to effectively integrate eBooks with K-6 literacy instruction.

Technological Pedagogical Content Knowledge

Technological pedagogical content knowledge (TPACK) was the formal conceptual framework for this study and was chosen to help develop a rationale for curating research regarding eBook integration in literacy instruction. TPACK does not describe or identify when or how technology should be utilized or integrated. TPACK addresses the issue of 'functional fixedness' (M. Koehler & Mishra, 2010, p. 6), the inability to use technology for different or atypical purposes. TPACK recognizes the protean nature of technology and provides educators

with a framework that brings together the complexities and challenges of teaching, differentiating instruction to meet the learning needs of students. TPACK integrates technology knowledge with pedagogy and content knowledge in such a way that it enables educators to develop "the types of flexible knowledge needed to successfully integrate technology use into teaching" (M. Koehler et al., 2013, p. 13), develop the mindset to integrate technology with instruction in different or atypical ways.

Challenge of developing the mindset for integrating technology with instruction. Integrating eBooks with instruction to support student learning is complex because just knowing how to use technology is inadequate (Schmidt & Gurbo, 2008). Digital technologies' inherent properties such as being protean in nature (having multiple usages) and unstable (constantly changing), make it difficult for educators to use them in a straightforward manner (Biancarosa & Griffiths, 2012; M. Koehler & Mishra, 2010). The protean nature of digital technologies offers educators a range of tools to apply across curriculum but it requires educators to be knowledgeable about all those tools in order to know how, when, and why to apply them in specific situations (M. Koehler & Mishra, 2010).

The unpredictable changes to digital technology add an additional challenge (M. Koehler & Mishra, 2010). Digital technology is not robust; hardware, software, and connectivity updates occur constantly, are often not fully tested, or are not error-proof. Schools often adopt the latest technology without investigating how the new tool will affect existing infrastructures (bandwidth and connectivity) or its ability to support student engagement (Biancarosa & Griffiths, 2012).

Finally, technology necessitates educators be life-long learners willing to juggle constant change, ambiguity, and frustration in order to meet the needs of students (Biancarosa & Griffiths,

2012; Collier & Berg, 2011; M. Koehler & Mishra, 2010). This complexity requires educators employ the mindset there are multiple solutions to meeting students' needs and that those will differ across content and context (M. Koehler & Mishra, 2010). This mindset entails developing deep and broad technology knowledge so that educators can be fluid and flexible in identifying when specific digital technologies can help or hinder literacy learning, and adapt as needed (Schmidt & Gurbo, 2008). The TPACK framework supports the development of such a mindset.

The TPACK framework. Developing and implementing effective learning is a complex process and requires flexibility because learning is context dependent; decisions are based on factors beyond curriculum such as specific student needs and different learning environments (M. Koehler & Mishra, 2010). TPACK provides educators with a model for integrating technological knowledge with pedagogical content knowledge and allows for fluid and flexible planning (M. Koehler & Mishra, 2010). The TPACK framework is built upon Shulman's (1986) construct of pedagogical content knowledge (PCK). This construct is grounded in the belief that content knowledge of its own is not enough to support student learning and neither is pedagogical knowledge. It is the interweaving of the two that will enable educators to adapt and adjust instruction and learning opportunities to fit both content and context. The TPACK framework integrates technology knowledge with the PCK framework so that educators develop "the types of flexible knowledge needed to successfully integrate technology use into teaching" (M. Koehler et al., 2013, p. 13) and meet the diverse needs of the students (see Figure 2). Effective teaching arises when educators understand and utilize TPACK's seven interconnected constructs; (a) content knowledge (CK); (b) pedagogical knowledge (PK); (c) technological knowledge (TK); (d) pedagogical content knowledge (PCK); (e) technological content

knowledge (TCK); (f) technological pedagogical knowledge (TPK); and (g) technological pedagogical content knowledge (TPACK) (M. Koehler & Mishra, 2010) .

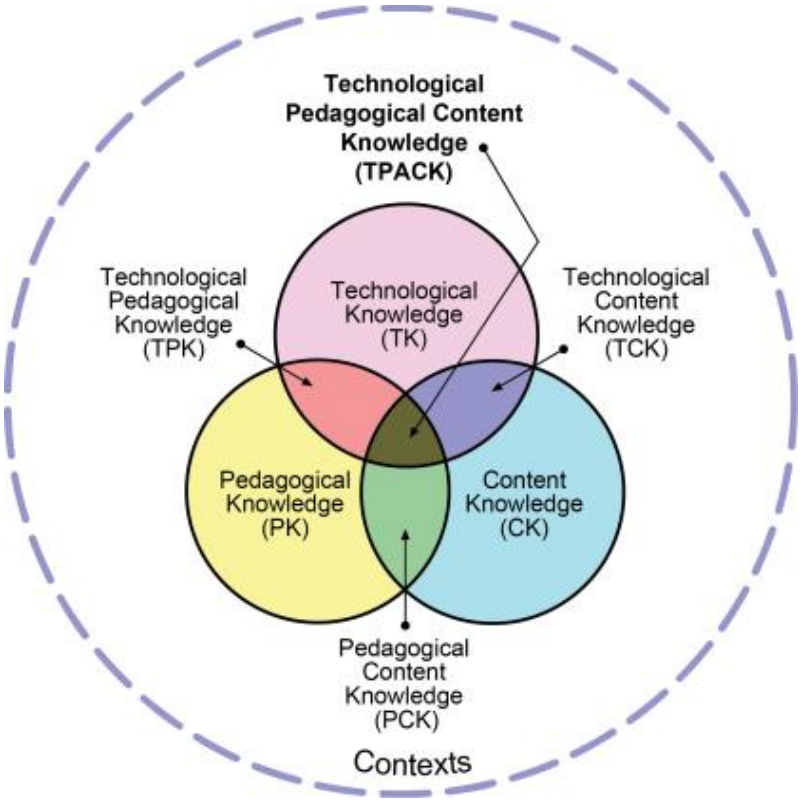

Figure 2. TPACK model. TPACK model shows the interrelationship between pedagogical knowledge, content knowledge, and technological knowledge. Reprinted from TPACK.org by M. Koehler, 2011, www.tpack.org: TPACK.org. Reproduced by permission of the publisher, © 2012 by tpack.org.

TPACK's seven constructs. Koehler and Mishra (2010) define the seven constructs as follows. Content knowledge (CK) pertains to the breadth and depth of knowledge about the instructional content to be taught or learned. Pedagogical knowledge (PK) is having the depth of understanding about best practices for teaching and learning the targeted content. It includes knowledge about how students construct knowledge and acquire skills, and the ability to differentiate instruction to meet their needs. Technological knowledge (TK) goes beyond the basic understanding of specific technology because it is always changing. It requires knowing about a range of technology and what tools and tasks they each offer that support learning. TK

requires enough knowledge about different technologies that educators can look to possibilities beyond its common usage.

Pedagogical content knowledge (PCK) interweaves content with best practices and flexibility so that all students' learning needs are met. It supports transformative learning through cross-content connections and embedding different perspectives. Technological content knowledge (TCK) requires a deep understanding of the reciprocal relationship between the role technology plays in accessing content and how content decides which technology is better (M. Koehler & Mishra, 2010). Technology and content both influence and constrain the other. Technological pedagogical knowledge (TPK) is the understanding of how instruction changes when a specific technology is selected. This occurs when educators have an open mind towards technology and a deep understanding of its constraints and affordances so that they develop the creative flexibility needed to adjust technology to meet learning needs of students.

Technological pedagogical content knowledge (TPACK) requires an understanding of the interplay between all three knowledges and the flexibility to adjust because there is no one way to learn or instruct (M. Koehler & Mishra, 2010). The TPACK framework provides educators with the lens to examine all three components individually and collectively and then decide the best plan of action to meet the learning needs of the students. Below is a synopsis of the seven constructs of TPACK and examples pertaining to using technology in literacy instruction.

Table 1.

TPACK definitions and examples

TPACK Constructs	Definition	Example
CK	Knowledge about the instructional content to be taught or learned	By the end of 3rd grade, students are able to fluently and accurately read and comprehend grade level material.
PK	Depth of understanding about the best practices for teaching and learning	Teacher utilizes cooperative learning (e.g., literature circles) to support reading comprehension and build self-efficacy of struggling readers.
TK	Knowledge about different technologies that enables educators to view possibilities beyond its common usage.	eBooks tools (e.g., highlight, note posting, interactive dictionary) provide scaffolding for struggling readers' comprehension of books above their reading level.
PCK	Knowledge to interweave content with best practices and flexibility so that all students' learning needs are met.	Teacher and students create and implement literature circles to support all students' reading comprehension.
TCK	Knowledge of the reciprocal relationship between the role technology plays in accessing content and how content decides which technology is better	eBooks are offered as a Literature Circle choice because eBook tools (embedded hyperlinks and videos) support struggling readers' engagement with and comprehension of above reading level text.
TPK	Knowledge of how instruction changes when a specific technology is selected	Teacher selects eBooks for Literature Circle because the built-in dictionary and audio tools provide scaffolding for independent reading comprehension while developing self-efficacy.
TPACK	Knowledge of and ability to use a variety of different strategies and technology tools to differentiate instruction and meet specific learning needs of all students	Students including struggling readers and English as a second language learners, utilize a variety of eBooks and embedded tools during literature circles in order to deepen comprehension.

Note. Adapted from "A review of technological pedagogical content knowledge" by C.S. Chai, J. H Ling Koh, and C-C Tsai, 2013, *Educational Technology & Society*, 16, p. 33. Copyright 2013 by Educational Technology & Society; "TPCK in K-6 literacy education" by D. A. Schmidt and M. Gurbi, 2008, *Handbook of technological pedagogical content knowledge (TPCK) for educators*, p. 12-18. Copyright 2008 by Taylor & Francis; *Literature circles: Voice and choice in the student-centered classroom* by H. Daniels, 1994, p. 18. Copyright 1994 by Stenhouse Publishers.

TPACK's use in research. The TPACK framework has been employed in various context for educational research, ranging from examining its affect during the development of pre-service teachers to its affect when embedded in professional development for in-service educators (Hutchison & Woodward, 2014; Mouza, Karchmer-Klein, Nandakumar, Yilmaz Ozden, & Hu, 2014; Schmidt & Gurbo, 2008; Spires, Hervey, & Watson, 2013). These studies provided a record of the mindset change that can take place as educators begin to develop their TPACK. As preservice and educators develop their understanding of TPACK, they began to recognize the role TPACK has in how they shape and direct when and why they should integrate technology with instruction.

Mouza, Karchmer-Klein, Nandakumar, Yilmaz Ozden, and Hue (2014) engaged the TPACK framework to weave a pre-service teachers' educational technology course with the methods courses and field experience. The study analyzed the effect this type of framework had on supporting pre-service teachers' TPACK development and practice. Participants observed, designed, and then implemented authentic technology infused instruction. They completed the process documenting their TPACK growth through guided personal reflection called case reports. The case reports provided data on the participants' strategic thinking process as they planned, organized, and implemented their lesson. The analysis of the case reports along with the pre-and post *Survey of Pre-service Teachers' Knowledge of Teaching and Technology* results showed the intentional interweaving of the three had significant positive influence on the pre-service teachers' ability to design and implement content specific lessons that integrated technology ($P < 0.05$). The study concluded that while stand-alone educational technology courses can enhance pre-service teachers' technology knowledge, pre-service teachers' understanding of TPACK increases when combined with content knowledge, methods courses,

and the chance to implement in a classroom. Technology integration does not occur only with technological knowledge. Integration occurs when educators understand and utilize the complex interplay between technological knowledge, pedagogical knowledge, and content knowledge (M. Koehler & Mishra, 2010; Mouza et al., 2014).

Spires, Hervey, and Watson (2013) embedded the TPACK framework within a project-based inquiry graduate class for 20 English language educators as they learned how to integrate technology in their instructional methods. The analysis reported a change in their attitude towards technology integration and an increase sense of self-efficacy tempered by the realization it also adds a new layer of pressure because it is a complex messy process. The TPACK framework enabled them to view technology as an integral part in developing the flexible pedagogy needed to deliver relevant and effective 21st century instruction.

Schmidt and Gurbo (2008) utilized the TPACK framework to examine how educators can effectively teach K-6 literacy. They found there is no one preferred approach or one model and concluded that the TPACK framework provides educators the understanding and structure to consider all facets of literacy instruction and students' needs in order to design effective learning activities. Educators require authentic experiences with literacy instruction that effectively demonstrate the relationship between technology, pedagogy and content. This includes observing, participating, and reflecting on these experiences and then applying their knowledge and skills to enhance and expand literacy learning in their classrooms. Educators can improve their classrooms' literacy learning when they focus on "creating awareness of the range of possible learning activity types, and helping teachers to know how to select and combine these to help students meet content and process standards in ways that are congruent with their differentiated learning needs and preferences" (Harris, 2008, p. 256). One way to identify those

possibilities is bringing to light what currently exists in the realm of research and examine it (Voogt, Fisser, Roblin, Tondeur, & van Braak, 2013) through QCA.

Hutchison and Woodward (2014) employed the TPACK framework in a qualitative study of a second year sixth-grade English Language arts teacher because it provided the lens for examining the technology choices. The TPACK allowed them to "identify the types of knowledge and understandings that were contributing to the teacher's choices and to explore which types of knowledge guided her use of technology and the classroom instruction" (Hutchison & Woodward, 2014, p. 318). Students were grouped and assigned different multimodal texts and then used technology to create a persuasive movie. The findings found the teacher's lack technological knowledge hindered her ability to instruct and the students' ability to utilize technology for learning. The initial bulk of the time was spent troubleshooting the technology and thus the students' activities and exploration were constrained. Once the teacher felt more empowered with the technology and understood its affordances, changes were observed: the teacher considered other methods for students to express new understandings. Instruction switched from teacher-structured to student centered; student collaboration and discussions ensued as they discussed ways to use technology to further their project.

Hutchison and Woodward (2014) concluded with eight suggestions for integrating technology into literacy along with the recommendation for further research. The points are salient because the focus is not on the technology that can be used but rather on how technology can be used to support student engagement:

1. Identify and adhere to a clear instructional goal when integrating digital technology
2. Identify an appropriate instructional approach for the instructional goal

3. Select an appropriate digital or non-digital tool to support instruction
4. Foresee how the tool can contribute to the instructional goal
5. Take advantage of the affordances of the tool
6. Identify the constraints of the tool to determine if they can be overcome
7. Understand how the instruction will need to be delivered or altered due to the tool
8. Reflect on the resulting instruction and make changes as needed (Hutchison & Woodward, 2014, p. 333).

In summary, the studies reviewed demonstrate the role TPACK can play in shaping and guiding literacy instructional decisions. Integrating technology with instruction is an evolving process and TPACK can provide the framework to guide educators' thinking process as they develop and implement authentic technology infused instruction (Mouza et al., 2014). TPACK enables attitudes to change towards supporting technology integration and increases educators' sense of self-efficacy (Schmidt & Gurbo, 2008). Effective literacy instruction that utilizes technology integration requires intentional planning (Hutchison & Woodward, 2014) and TPACK as a framework, can provide educators with a tool for developing effective instruction that is context dependent (M. Koehler & Mishra, 2010; Schmidt & Gurbo, 2008).

TPACK as the conceptual framework. For this study, the TPACK framework was selected as the conceptual framework because it identified and explained the key factors to be studied and their presumed relationship (Miles & Huberman, 1994), identifying the knowledge and skills needed by educators to effectively integrate eBooks with literacy instruction. TPACK is viewed as a knowledge base and is context dependent (M. Koehler & Mishra, 2010), supporting the rationale for curating research on the integration of eBooks with K-6 literacy instruction. The resulting data can then be analyzed for when, how, and why eBooks were used.

In order to do so, the technology integration matrix (TIM) model (Allsopp et al., 2007) was selected as part of the conceptual framework in order to identify how eBooks are being utilized in terms of level of technology integration and in what type of classroom setting. The TIM model was designed "to provide teachers models of how technology can be integrated into instruction in meaningful ways" (Florida Center for Instructional Technology, 2013). The knowledge garnered from utilization of the TIM model provided educators with concrete examples when and how eBooks were integrated with literacy instruction to meet the diverse instructional needs and interests of the students. The examples present educators with a range of evidence-based practices needed to "believe" eBooks will be effective and of value and thus worth the time and effort to integrate with literacy instruction (Ertmer & Ottenbreit-Leftwich, 2010; Harris et al., 2009; Hutchison & Reinking, 2011; Leu & Kinzer, 2000; Mishra & Koehler, 2006; Ottenbreit-Leftwich et al., 2010; US Department of Education, 2010).

Technology Integration Matrix Model

The technology integration matrix (TIM) model was developed by the Florida Center Instructional Technology funded by the Florida Department of Education (Allsopp et al., 2007). Its purpose is twofold; to provide educators with a research-based tool for determining their level of technology integration for specific learning experiences and offer educators a vehicle for identifying and accessing a range of instructional models for authentic ICT integration. The TIM model was created through a rigorous process that employed literature reviews, field-testing of the instructional characteristics that frame the matrix, and continual feedback from reading, instructional, and technology experts. (Allsopp et al., 2007). The resulting 25 cell matrix is an adaptation of and a correlation between two models for integrating technology as a means to promote student learning: The Apple Classrooms of Tomorrow (ACOT) levels of technology

integration model and Jonassen's constructivist learning environments model (Allsopp et al., 2007).

TIM's two constructs. The TIM model is grounded in the constructivist theoretical framework and "is based on two models that support the integration of technology for facilitating student center instruction" (Allsopp et al., 2007, p. 4), the Apple Classrooms of Tomorrow (ACOT) levels of technology integration model and Jonassen's constructivist learning environments model. The two models enable educators to focus the conversation of technology and education on how technology can enhance and facilitate learning (Allsopp et al., 2007; D. C. Dwyer, 1995). The ACOT model identifies the change process teachers progress through as they become familiar with the technology's potential to enhance student engagement and begin to integrate technology with student centered instruction as is recommended by the Jonassen's constructivist learning environments model (Allsopp et al., 2007).

The Jonassen constructivist learning environments model (Allsopp et al., 2007) is based on the theory that students learn best when they can engage in "active, constructive, collaborative, intentional, complex, contextual, conversational, and reflective" (p. 4) learning activities (Allsopp et al., 2007; Ertmer & Ottenbreit-Leftwich, 2013). A constructivist learning environment enables students "to regulate their own learning by providing supportive rather than intervening learning environments" (Jonassen, 1991, p. 13). The model supports the postulate that technology, as a tool, can promote these attributes when teachers acquire the technological pedagogical knowledge to do so effectively (Allsopp et al., 2007). Therefore, when developing the learning activity, it is the "nature of the learning and the context in which it will occur should be considered before committing to one theory or the other" (Jonassen, 1991, p. 13). Ertmer and Ottenbreit-Leftwich's (2013) research on pedagogical changes needed to support Jonassen's

theory reiterates this point. They concluded that it is not the technology in itself that will transform learning nor should it be the starring role in student learning. It is the teacher's pedagogical knowledge of how technology can transform authentic learning through a supportive role that will enable students to successfully engage in learning and active problem solving; technological pedagogical knowledge (TPK) in action (M. Koehler & Mishra, 2010).

The ACOT levels of technology integration model is "a framework for collaboration [that] can support teachers in the change process" (D. Dwyer, 1994, p. n.p.). The five levels of technology integration identify the stages of progression teachers go through as they develop their technology knowledge (TK) and self-efficacy, and begin to transition to more authentic technology integration (Allsopp et al., 2007). The five stages are: entry, adoption, adaptation, appropriation, and invention. As teachers develop their technological pedagogical knowledge (TPK), technology usage transforms from learning how to use technology (entry) to its use to support instructional activities (adoption). The next stage, adaptation, is defined by the incorporation of technology into traditional learning activities. The appropriation of technology stage occurs when students use a variety of technology tools during project-based cooperative learning activities. Whereas the final stage, invention, occurs when teachers utilize technology beyond its original constructs to support student engagement in new and inventive ways.

The process of adapting and correlating the two models for the matrix resulted in the following two changes and the development of the 25-cell matrix (Allsopp et al., 2007) (see Figure 3). The matrix consolidated Jonassen's eight constructivist learning environment characteristics into five – active, collaborative, constructive, authentic, and goal directed. ACOT's top level of technology integration changed from invention to transformation in order to reflect authentic student engagement in learning opportunities that would be impossible to do

without technology. The 25-cell matrix has become an interactive tool to identify different ways to and reasons for integrating technology in instruction.

Levels of Technology Integration into the Curriculum

Characteristics of the Learning Environment	Entry	Adoption	Adaptation	Infusion	Transformation
Active	Information passively received	Conventional, procedural use of tools	Conventional independent use of tools; some student choice and exploration	Choice of tools and regular, self-directed use	Extensive and unconventional use of tools
Collaborative	Individual student use of tools	Collaborative use of tools in conventional ways	Collaborative use of tools; some student choice and exploration	Choice of tools and regular use for collaboration	Collaboration with peers and outside resources in ways not possible without technology
Constructive	Information delivered to students	Guided, conventional use for building knowledge	Independent use for building knowledge; some student choice and exploration	Choice and regular use for building knowledge	Extensive and unconventional use of technology tools to build knowledge
Authentic	Use unrelated to the world outside of the instructional setting	Guided use in activities with some meaningful context	Independent use in activities connected to students' lives; some student choice and exploration	Choice of tools and regular use in meaningful activities	Innovative use for higher order learning activities in a local or global context
Goal-Directed	Directions given, step-by-step task monitoring	Conventional and procedural use of tools to plan or monitor	Purposeful use of tools to plan and monitor; some student choice and exploration	Flexible and seamless use of tools to plan and monitor	Extensive and higher order use of tools to plan and monitor

Figure 3. Technology integration matrix model. Matrix cells provide examples of technology integration in different learning environments. Reproduction from "Technology integration matrix" by Florida Center for Instructional Technology, 2016, http://fcit.usf.edu/matrix/matrix.php. Copyright 2016 by The Florida Center for Instructional Technology, fcit.usf.edu. Reprinted with permission.

TIM as a measurement tool and resource. Since its development, a number of educational institutions have adopted TIM as a tool to support and evaluate educators' development with and integration of technology in the K-12 setting (Anahua Independent School

District, n.d.; Arizona K12 Center, 2012; New York State Education Department, 2015; Virginia Department of Education, 2008). University based organizations such as the Florida Center for Instructional Technology (2013) and the Arizona K12 Center (2012) have developed interactive TIM models. Each cell in the matrices provides links to technology integrated learning activities for language arts, math, science, and social studies content. Holland Public Schools ("Technology instruction," 2016) have adopted the TIM model as the vehicle to drive technology integration because the matrix "provides educators an interactive framework for targeting and visualizing desired improvements in the integration of technology for teaching and learning and monitors and assesses progress toward those targeted objectives" (Allsopp et al., 2007, p. 5). Muilenburg and Berge's (2015) research on teacher preparation recommended embedding the TIM model in teacher preparation programs. Technology is "technology transience" (Muilenburg & Berge, 2015, p. 94), changing so rapidly that learning how to integrate technology effectively and efficiently is a complex endeavor. Models like TIM provide the framework needed by teachers to understand the process of technology integration. The New York State Education Department (2015) integrated TIM into the school library media program evaluation (SLMPE) rubric used by media specialists to support and enhance students' technological literacy.

TIM has been widely used as a tool to measure educators' development with and integration of technology in the K-12 setting and recently in regards to student engagement. Barbour (2015) examined the correlation between technology integration and student engagement. The study's rationale was if a positive correlation existed between the two, then educators could utilize TIM to develop clearer learning objectives to improve student engagement. Technology engagement measurements were given to educators and their students

in both career and technology focused classes and non-career and technology focused classrooms; TIM for the educators and the Class Maps Survey 7-12 (CMS) for the students (Doll et al., 2010). Pearson correlation coefficients were calculated and the analysis found a positive correlation for career technology focused classes ($r = 0.69$, $n = 70$) and for the non-career technology focused classes ($r = 0.67$, $n = 70$) (Barbour, 2015). The significance of such validation is individual teachers can identify their level of technology integration using the TIM model and adjust as needed to support student engagement.

In terms of eBook integration, individual educators and media specialists can employ TIM constructs to develop learning objectives that integrate eBooks with literacy instruction in order to improve student engagement. For example, for a literacy lesson on close reading for emotion, the teacher reads from an eBook, a replacement for the print. This is an example of entry level of technology in an active learning environment in which information is passively received. With some understanding of eBook tools such as note taking and highlighting, the instruction and learning activity changes so that students work in pairs to read the passage and highlight examples of emotion within the text and note their rationale, demonstrating their understanding of the learning target, reading close for emotion. The learning target remains the same but the level of technology and learning environment change to collaborative adaptation.

In summary, the TIM model presents educators the opportunity to see the value in integrating technology. The matrix, comprised of characteristics of the learning environment and the levels of technology integration affords educators the tools to identify how and when technology can change instruction such as in the example given earlier (Allsopp et al., 2007). The two models provide the framework to evaluate current instructional practices and the tools to ascertain other ways technology can enhance and facilitate learning. The correlation between

TIM and student engagement enables educators to develop the understanding that changing their instruction can have a positive effect on student achievement (Barbour, 2015). In terms of eBook integration with K-6 literacy instruction, the TIM model provides educators and media specialists the framework with which to begin building a matrix for developing eBook technological pedagogical knowledge. The correlation between TIM and student engagement enables educators to understand the value of embedding eBooks with literacy instruction and the self-efficacy to do so.

TIM as the conceptual framework. For this study, the focus of this study was to examine the research on the integration of eBooks with K-6 literacy instruction and study how and when they were used. The TIM model was selected as the study's conceptual framework; the tool to identify and explain "the main things to be studied--the key factors, constructs or variables--and the presumed relationships among them" (Miles & Huberman, 1994). The components of the TIM model are the key factors to developing eBook technological pedagogical knowledge (TPK); identifying how eBooks are being utilized in terms of level of technology integration, in what type of classroom setting, and how instruction was changed as a result (Allsopp et al., 2007; M. Koehler & Mishra, 2010). The resulting body of data can be utilized by media specialists and educators to support their understanding of how eBooks are effectively integrated to support student learning (Allsopp et al., 2007), the TPK needed to differentiate instruction and meet specific learning needs of all students (M. Koehler & Mishra, 2010; Schmidt & Gurbo, 2008). In short, the TIM model as the study's conceptual framework, provides the tools to examine evidence-based practices in terms of the level of technology integration and type of classroom (Allsopp et al., 2007; Miles & Huberman, 1994).

The next step in the review of the literature was to examine the current trends regarding the integration of eBook with literacy instruction. Issues central to the development of eBook technological pedagogical knowledge will be identified along with steps for moving forward.

eBook Pedagogy Knowledge and Literacy Instruction

The purpose of this section of the review of the literature was to identify issues central to developing the technological pedagogical knowledge educators need to effectively integrate eBooks with literacy instruction. This section began with initiatives that have driven ICT adoption, challenges that have emerged, barriers that have been identified, and finally identifying the factors that support forward movement.

Technology has transformed how information is created, stored, and shared (International Literacy Association, 2012; "Key design consideration," 2014; Leu et al., 2010; Schmidt & Gurbo, 2008), making digital literacy a “necessary life skill, much like the ability to read and write” (Federal Communications Commission, 2010, p. 174). This transformation has resulted in the constant redefining of the literacy skills needed to access, engage, and communicate with different forms of information communication technologies (ICTs) (International Literacy Association, 2012; "Key design consideration," 2014; Leu et al., 2010; Schmidt & Gurbo, 2008) and the need to examine its effect on literacy instruction in K-6 classrooms.

Primary age through secondary grade students support becoming digital learners (Cavanaugh, 2006a; Geck, 2006) but lack the digital literacy skills needed to competently, effectively, and creatively access and engage with ICTs such as eBooks (Geck, 2006; Murnane et al., 2012; OECD, 2010; Park, 2012; Rideout et al., 2010). Educators have a responsibility to provide students with these life skills, but lack the technology competencies and pedagogical understanding to support students’ digital literacy development in real world context

(Cavanaugh, 2006b; Hutchison & Reinking, 2011; International Literacy Association, 2009; L. Larson, 2013; Mautino & Biancaniello, 2005; Mishra & Koehler, 2006; Roskos, 2013).

The result of the transformation of information is there is no clear consensus with respect to the pedagogy regarding when, how, and why to integrate ICTs such as eBooks into literacy instruction (Felvégi & Matthew, 2012; Hutchison & Reinking, 2011; Roskos, 2013). The evolution of ICTs has necessitated educators to examine how and why they educate:

> Technology is at the core of virtually every aspect of our daily lives and work, and we must leverage it to provide engaging and powerful learning experiences and content, as well as resources and assessments that measure student achievement in more complete, authentic, and meaningful ways (US Department of Education, 2010, p. ix).

In summary, this section of the literature review began with the initiatives that have driven ICT adoption, the challenges that have emerged, and the barriers that have been identified in order to better understand the factors that support forward movement.

Twenty-first century literacy initiatives and digital text adoption. Twenty-first century literacy instruction requires engaging students in reading skills beyond the basic five constructs of literacy instruction: phonics, phonemic awareness, fluency, comprehension, and vocabulary (Leu et al., 2010; Murnane et al., 2012). Being literate entails developing deep comprehension skills (Cavanaugh, 2006a; International Literacy Association, 2009). The amount of information available is boundless, necessitating a different set of comprehension skills for effective engagement. To be literate in the 21st century involves thorough reading and synthesizing of information from various resources (including print and digital text), evaluating credibility and relevancy of each resource, reflecting on different perspectives, and developing new understanding before sharing new knowledge (International Literacy Association, 2012; Leu

et al., 2010; Murnane et al., 2012). It also dictates acquiring specific skills to access and engage with digital text and its dynamic nature such as graphics, images, hyperlinks, and embedded video and audio (Biancarosa & Griffiths, 2012; Leu et al., 2010; Levine & Donitsa-Schmidt, 1998; OECD, 2011). eBooks are a form of digital text and movement has begun towards embedding digital text in the K-12 school setting and integrating deep comprehension instruction in the classrooms (Cavanaugh, 2006a; Collier & Berg, 2011; "*Ebook usage"*, 2014; International Literacy Association, 2012). Yet, the transition to digital text is far from complete.

Initiatives to integrate digital resources into K-12 curriculum began in 2009 (Digital Textbook Collaborative, 2012; "*Ebook usage"*, 2014; US Department of Education, 2010). In June 2009, the National Governors Association and Chief State School Officers formed a bipartisan partnership to address the needs of the 21st century learning environment ("Key design consideration," 2014). They developed the English language arts (ELA) and math standards required by post-graduation students to be college & career ready in a technological society ("Key design consideration," 2014). By June of 2014, 43 states have adopted and are locally implementing these standards known as the Common Core State Standards (CCSS). The ELA standards recommend students utilize digital text because ICTs play a transformative role in students' ability to effectively access and engage with a wide range of media in order to answer questions and solve problems ("Key design consideration," 2014). The standards identify what students need to know and not what educators should teach ("Myths vs. facts," 2014). This poses a challenge for educators who lack the technology competencies and pedagogical understanding to support students' engagement with digital text (L. Larson, 2013; Mautino & Biancaniello, 2005; Mishra & Koehler, 2006) because there is no clear consensus on the when,

how, and why eBooks can be integrated into literacy instruction (Hutchison & Reinking, 2011; Roskos, 2013).

In 2010, the US Department of Education introduced the National Education Technology Plan (US Department of Education, 2010). Its purpose is to provide K-12 schools with a long-term plan for integrating technology with learning so that post-graduates have the necessary skills and knowledge to compete in a global economy. Its framework includes goals such as 4.3, "supports the development and use of open educational resources" (US Department of Education, 2010, p. 61) so that students have access to resources when and where they need it. Open educational resources (OER) are digitalized teaching, learning, and research resources such as digital libraries and etextbooks. OER enables schools and students access to resources when and where they need them. OERs are housed in the public domain or are available via an intellectual property license for the purpose of sharing, accessing, and collaboration.

In 2011, the Federal Communications Commission and the U.S. Department of Education (Digital Textbook Collaborative, 2012) launched the Digital Textbook Playbook guide to support NETP implementation. The guide provides the support K-12 educators and administrators need to develop transitional plans for digital textbooks and OERs adoption by 2017. Some states have begun the school implementation process. Florida was the first state to mandate schools purchase etextbooks. Beginning in the 2015-2016 school year, all instructional materials are to be available in digital format. California began a free STEM etextbooks initiative for grades 9-12 in 2009. Nationwide, the actual transition by K-12 schools to adopt etextbooks has been slow. In 2015, 1 percent of the school libraries surveyed purchased all of its textbooks in digital format and 2 percent were mandated to transition to etextbooks. Twenty-five percent purchased some and 11 percent were considering etextbook purchases while 61 percent had no transition

plans at all ("*Ebook usage"*, 2015). Some of the hindrances towards eBook usage are technology costs, infrastructure and compatibility issues, and lack of professional development training for educators to integrate technology to support student learning ("*Ebook usage"*, 2015; Tomassini, 2012).

eBook usage. K-12 school libraries reported an increase in the number of eBooks in school library collection between 2010 and 2015 but the percentage of school libraries offering eBooks experienced a drop in 2015, so did eBook circulation ("*Ebook usage"*, 2015). The median number of eBooks in the school library collection was 32 in 2010 and increased to 235 in 2015. In terms of overall collection, the ratio of eBooks to print in 2015 was 1:55, an improvement from the 2014 ratio 1:60 ("*Ebook usage"*, 2014; "*Ebook usage"*, 2015).

Decreases occurred in the percentage of school libraries offering eBooks and the median number of eBooks circulated. The percentage of school libraries offering eBooks rose from 33 percent in 2010 to 66 percent in 2014 and then dropped to 56 percent in 2015, returning to the 2013 level ("*Ebook usage"*, 2015). In 2015, 50 percent of the elementary school libraries surveyed offered eBooks, a drop of 11 percent from 2014. Factors that might inhibit adoption in elementary schools are tight school budgets (58 percent) and a lack of e-reader devices at home or at school (69 percent) ("*Ebook usage"*, 2015). A majority of the elementary school students surveyed reported a low to no interest in eBooks (56 percent) and preferred print (50 percent). Forty-two percent were unaware eBooks existed and 31 percent did not read eBooks because the process to access them was too complicated.

Finally, eBook usage appears to be affected by a perceived lack of coordinated plans within schools for developing eBook collections and incorporating them into the curriculum

("*Ebook usage"*, 2015). In 2015, 83 percent of elementary school libraries surveyed said they did not have plans for building eBook collections nor plans to engage in systematic collaboration with teachers to coordinate eBooks with classroom use. Nineteen percent reported such planning was done at the district level and only 18 percent have met with faculty and department chairs to develop a strategy for integrating eBooks with curriculum instruction. Three recommendations made to support wider eBook usage included the implementation of the Common Core Standards ("*Ebook usage"*, 2013), integrate eBooks into library instruction, and collaborate with teachers to embed eBooks with curriculum instruction ("*Ebook usage",* 2015).

In summary, the CCSS defines the characteristics of a 21st century literate students and expands the definition of text to include multimodal formats, the NETP focuses on learning from digital textbooks, and the Digital Textbook Playbook provides K-12 schools with the blueprint for designing and using such resources in the classroom (Dalton, 2014). "Teaching children to become successful readers means teaching them to become successful e-readers… Every child should be reading e-books as part of his or her literacy curriculum" (Dalton, 2014, p. 43). Yet K-12 educators and media specialists are not fully utilizing digital text in the learning environment.

Challenges of embedding technology in the learning environment. Embedding technology in instruction has resulted in a positive correlation between teachers' use of technology in the classroom and higher achievement but only a small minority of teachers are involved in implementing these practices (Agodini et al., 2003; Jones-Kavalier & Flannigan, 2008; Vockley & Partnership for 21st Century, 2007). More often some educators are simultaneously implementing technology skills while learning how to use the technology, resulting in ineffective instruction (OECD, 2012). Others view technology as a supplemental teaching tool because they are not competent, effective, or creative in using technology

themselves (Ertmer & Ottenbreit-Leftwich, 2010; OECD, 2012). Often professional training focuses more on how to use the technology as a management tool to continue existing practices rather than as best practices strategies to facilitate learning (Harris, 2008; Harris et al., 2009; M. Koehler & Mishra, 2010; Tucker & Courts, 2010). In order for educators to provide students with technology-rich literacy experiences, they "must not only understand how to use technology, but they must also determine how technology changes the way literacy is taught" (Schmidt & Gurbo, 2008, p. 67). That can occur when existing impediments and barriers are identified and addressed.

Embedding technology in the learning environment is a complex process. It requires addressing a number of impediments; in particular, changing instructional pedagogy from a system that promotes teaching and using technology as a tool to complete tasks to one that transforms learning through integrating technology with instruction (Ertmer & Ottenbreit-Leftwich, 2010; Harris, 2008; OECD, 2012; US Department of Education, 2010; Vockley & Partnership for 21st Century, 2007). Educators have access to well-established pedagogy for literacy instruction and a plethora of published research on best practices for engaging students with print text; the same cannot be said for digital text resources (Hutchison & Reinking, 2011; Kamil, Pearson, Moje, & Afflerbach, 2011; *Theoretical models and processes of reading*, 2010). This is a concern for a number of reasons: "Literacy educators have a responsibility to effectively integrate these new technologies into the curriculum, preparing students for the literacy future they deserve" (International Literacy Association, 2009, p. 1). Students have found technology useful when technology instruction is effective and the resulting competency provides them some control of their learning (Ertmer & Ottenbreit-Leftwich, 2010; OECD, 2012;

Ottenbreit-Leftwich et al., 2010). But without direct and explicit instruction, students' technology skills and competencies may be hindered (Tucker & Courts, 2010).

Barriers to technology integration and teacher change. The current body of research has identified some barriers that prevent technology integration in K-12 instruction (Ertmer, 2005; Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012; Hew & Brush, 2007; Hutchison & Reinking, 2011). These include first order or extrinsic barriers and second order or intrinsic barriers (Ertmer, 2005; Ertmer et al., 2012). First order barriers include lack of resources (includes hardware, software and time constraints) and institutional barriers (leadership, scheduling constraints, school vision and mission). Second order or intrinsic barriers include lack of pedagogical knowledge and skills by educators, and their beliefs and attitude towards technology integration.

Hew and Brush (2007) analyzed the relationship between the barriers and reported the following. Subject culture and assessment barriers had an indirect influence on technology. Institutional barriers, lack of resources, educators' attitudes and beliefs, and their pedagogical knowledge and skills had direct influences on technology integration. The study found a reciprocal relationship between educators' attitudes and beliefs and their pedagogical knowledge and skills. It identified educators' lack of pedagogical knowledge and skills as a major barrier.

Hutchison and Reinking (2011) analyzed 1,441 literacy teachers' perception of ICT integration into literacy instruction. The survey's questions reflected a distinction between technological integration and curricular integration. Technological integration is defined as "a stance that views ICTs as separate from, or not fully integrated into, curriculum" (Hutchison & Reinking, 2011, p. 314). Curricular integration is defined as "a stance that views ICTs as

integral to the curriculum" (Hutchison & Reinking, 2011, p. 314). The data analysis determined that teachers with surface definitions or incomplete perceptions of ICT integration are less likely to integrate ICTs authentically. A majority of those surveyed understand the importance of students developing 21st century literacy skills; virtually all reported ICTs should be integrated into instruction, its benefits would be moderate to large (86 percent). Yet 66 percent indicated they utilized ICTs along the lines of technological integration as follows; use ICTs in supplemental roles such as presentation tools (38 percent) and supplemental/replacement tools (20 percent), or as a tutor (15 percent) versus by students to publish work (15 percent) or engage with alternative reading formats (13 percent). Further analysis revealed that the stronger the perception that ICTs usage is important to literacy instruction, the more likely teachers will develop self-efficacy towards technology and will access and integrate ICTs into their literacy instruction.

Technology integration barriers can be addressed when change takes place within the teacher, but teacher change has its own obstacles to overcome (Ertmer, 2005; Ertmer & Ottenbreit-Leftwich, 2010). The lack of technological pedagogical knowledge and skills and self-efficacy affect the type and level of technology integration. Change can be supported when there is a better understanding of the affect teachers' technological pedagogical knowledge and beliefs have on instructional practices. Focusing on this understanding may enable researchers and educators to facilitate a better alignment between research, practice, and beliefs, and to provide more effective ways of supporting teacher change (Ertmer, 2005).

Role of self-efficacy with teacher change. Teachers appear to be hesitant to adopt technology in the classroom when they lack the technological knowledge and the technological pedagogical knowledge to select, plan, and implement the most appropriate ICTs to support

student engagement with subject specific concepts (Ertmer & Ottenbreit-Leftwich, 2010). More importantly is the effect of low self-efficacy and existing belief systems (Ertmer, Ottenbreit-Leftwich, & York, 2007; Wozney, Venkatesh, & Abrami, 2006). Self-efficacy is defined as "what we believe ourselves capable of doing or learning" (Ruddell & Unrau, 2010b). Having knowledge of best practices does not guarantee teachers will integrate technology in the classroom (Bandura, 1993). Teachers who lack self-efficacy in their ability to utilize technology for student learning and engagement show weak commitment to integrating technology and spend less time educating students. It is their perceived sense of self-efficacy that supports or hinders their ability to take on new challenges: "Efficacy beliefs influence how people feel, think, motivate themselves, and behave" (Bandura, 1993, p. 118). Educators with a strong sense of perceived self-efficacy in utilizing technology are more likely to set high goals for technology integration and remain committed to them (Bandura, 1993; Wozney et al., 2006).

Ertmer's and Ottenbreit-Leftwich's seminal research on teacher beliefs and technology integration strengthens the ability of teachers to "leverage technology resources as meaningful pedagogical tools" (Ertmer & Ottenbreit-Leftwich, 2010, p. 255) by identifying intrinsic and extrinsic factors which affect them as agents of change. Ertmer, Ottenbreit-Leftwich, and York (2007) surveyed 25 exemplary technology-using teachers about their perceived intrinsic and extrinsic factors that affect their success as exemplary technology users. The data analysis concluded with the following outcomes. Intrinsic factors were significantly more influential than extrinsic (t (24) = 7.23, $p < .001$). Their inner drive and their personal beliefs were most significant (M= 4.84 each on a 5 point Likert scale). Commitment to using technology was significant (M=4.76) because they believed technology increased their ability to enhance student engagement.

The Ertmer and others (2012) multiple case-study research examined the alignment between teacher beliefs regarding technology integration and instructional practices. Twelve award-winning K-12 classroom teachers' websites and face-to-face interviews were analyzed to examine the alignment between beliefs and practices. A 5-point Likert scale identified the teachers' perception of the impact different internal and external barriers had on ICT integration and students' use of technology. The conclusions are in alignment with prior research (Ertmer, 2005; Ertmer & Ottenbreit-Leftwich, 2010); their internal factors personal attitudes and beliefs (M=1) and knowledge and skills (M=1.42) were the compelling factors for technology integration. As one teacher reported, "Technology has to be the center piece or one of the center pieces. That's my big belief" (Ertmer et al., 2012, p. 428). The teachers perceived the principal barrier to integrating ICT in their schools resided in the attitudes and beliefs others had towards technology integration (M=3.17). Their response identified other teachers' barriers to ICT integration to include their lack of technology knowledge and personal self-efficacy, and/or viewed technology as a low belief-goal hierarchy. External barriers such as technology support (M=3), state standards (M=2.83), and money (M=2.83) were more of a hindrance and the study suggested these award-winning teachers often found a way to work around the external barriers.

Teacher change will take place when they have the belief that technology integration is of value and the self-efficacy to integrate. Ottenbreit-Leftwich et al. (2010) surveyed eight technology award winning educators who integrated technology in their school settings. The study identified the educators' belief systems for technology integration including when and why integration took place. Though the study does pose some limits on its generalizability due to the size and make-up of the sample (a majority of the eight women became technology teachers/coordinators or media specialists), the study provided a view into how, when, and why

technology was successfully incorporated into a learning environment. Educators effectively integrated technology when they believed (a) they targeted specific learning goals and met students' needs by customizing instructional materials and promoted higher-level thinking; (b) the technology used supported student engagement and motivation; (c) skills learned were relevant and transferrable to other content areas and applications; (d) the technology supported comprehension of complex concepts through access to more and new information; and (e) the learning environment was authentic, students used technology as a means for learning engagement rather than a tool to just get a task done (Ottenbreit-Leftwich et al., 2010, pp. 1327-1330).

Strategies for addressing self-efficacy issues and supporting teacher change. To change current instructional practices necessitates educators believe they have the self-efficacy to implement technology in a way that will benefit students and address their needs (Ertmer, 2005; Ertmer & Ottenbreit-Leftwich, 2010; Hughes, 2005; Hutchison & Reinking, 2011). A number of strategies have been recommended to overcome self-efficacy and belief barriers, and facilitate technology integration (Ertmer, 2005; Hew & Brush, 2007; Hughes, 2005). Hughes (2005) employed a cognitive constructivist lens to study four English language arts teachers as they integrated technology with content. The study's purpose was to examine how a teacher's prior knowledge and experience with technology affected technology integration. The goal was to understand how some teachers learn to effectively embed technology with content and produce significant change while others adopted technology with little or no significant change in student learning or instruction. The analysis indicated experienced teachers were more likely to develop technological pedagogical content knowledge (TPACK) and integrate technology with instruction when they have deep understanding of content and pedagogy and belief that

technology is relevant. The latter belief was shaped by personal experiences with and accumulated knowledge of technology. The challenge is the pool of experienced teachers who are early adopters of technology is small (Hughes, 2005; Hughes & Scharber, 2008). Teachers' TPACK and integration of technology in learning opportunities can develop through the introduction of new content that is inextricably tied to technology (Hughes & Scharber, 2008). This takes advantage of educators existing content and pedagogy knowledge and allows them to become more meta-cognitively aware of how, why, and when technology can be integrated; allows them to develop their technological pedagogical knowledge.

Hew and Brush (2007) offered the following recommendations. They are based on the reciprocal relationship found to exist between educators' attitudes and beliefs and their pedagogical knowledge and skills:

- Provide institutional supports such as ongoing professional development and professional learning communities that focus on technological knowledge and technological pedagogical knowledge (TK and TPK).
- Provide hands-on opportunities for educators to explore, learn and share new knowledge about technology integration with content (TK and TPK).
- Provide novice teachers access to active learning experiences that support TPACK development; novice teachers observe and work with expert teachers to integrate technology with content-specific learning (pp. 233-234).

The recommendations provide all levels of expertise authentic learning opportunities to integrate technology such as eBooks with content learning like literacy instruction in order to develop attitudes and beliefs about eBooks pedagogies while gaining technological knowledge and skills.

Ertmer's (2005) literature review of the relationship between teachers' pedagogical beliefs and technology integration offered insight on how to change teachers' beliefs about ITC integration. By drawing upon prior research on the role pedagogical beliefs have on context specific classroom practices and the premise that "beliefs are grounded in experience and authority" (Ertmer, 2005, p. 32), Ertmer recommended three change promotion strategies:

1. Provide teachers with the opportunity to personally explore new practices supported by different beliefs. Then utilize the resulting success to build the self-confidence and self-efficacy needed to change current beliefs. This addresses the issue of educators who often adopt new technologies without changing their pedagogy because it is seen as being low in the belief-goal hierarchy; technology helps them to perform an existing task more efficiently.
2. Provide opportunities for teachers to observe vicarious ICT experiences and access multiple models of successful implementation so they can begin to build their own technology pedagogy. This can be done through classroom observations and professional development.
3. Take advantage of the affect social-cultural influences have on change and participate in professional learning communities and social networking (p. 35).

Beliefs towards the value of ICT integration such as eBooks with literacy instruction, will change when educators engage in hands on experience with eBook and participate in and observe/access a range of authentic eBook integrated literacy instruction.

Mueller, Wood, Willoughby, Ross, and Specht (2008) examined factors that impacted a group of randomly selected elementary and middle school educators' integration of technology. The results align with Ertmer's (2005) and Hew and Brush's (2007) recommendations.

Teachers' confidence and self-efficacy to take risks and integrate technology may change through a) positive experiences involving hands-on intentional practice in specific teaching context and/or b) through access to teachers experienced with technology integration by way of vicarious information communication technology (ICT) experiences and/or professional learning communities and social networking (Mueller et al., 2008).

In summary, the challenge of embedding ICT in the learning environment can be addressed when educators believe they have the self-efficacy to implement technology in a way that will benefit students and address their needs (Ertmer, 2005; Ertmer & Ottenbreit-Leftwich, 2010; Hughes, 2005; Hutchison & Reinking, 2011). To do so, educators need more than the technological knowledge to identify how technology can improve or enrich the way content is taught. They need the technological pedagogy to facilitate student-centered engagement and the knowledge they will be effective (Jones-Kavalier & Flannigan, 2008; Leu & Kinzer, 2000; Ottenbreit-Leftwich et al., 2010; Schmidt & Gurbo, 2008; Tucker & Courts, 2010). TPK involves developing the flexibility to adjust and repurpose technology in order to meet the needs of the students (M. Koehler & Mishra, 2010). TPK is employed when educators have a "deeper understanding of the constraints and affordances of technologies and the disciplinary contexts within which they function" (M. Koehler & Mishra, 2010, p. 17).

Change regarding eBook integration requires the understanding that the more self-efficacy educators have in integrating eBooks in literacy instruction, the stronger their belief is in the importance and relevancy of eBook integration (Ertmer, 2005; Hew & Brush, 2007). This in turn supports the building of pedagogical knowledge on effective ways to intentionally use eBooks and the willingness to engage with them; change to current instructional practices has begun Therefore, in order to change current instructional practices regarding digital text such as

eBooks, educators need to believe they have the self-efficacy to implement eBooks in a way that will benefit students and address their literacy development needs (Ertmer, 2005). They need more than the technological knowledge to identify how eBooks can improve or enrich the way literacy is taught (Hughes, 2005). They need the technological pedagogy knowledge to facilitate student-centered engagement with eBooks and the knowledge that eBooks will be an effective tool. Educators need positive experiences involving hands-on intentional practice specific to literacy instruction and access to educators experienced with eBook integration in order to develop the self-efficacy to engage all readers with digital text such as eBooks and the knowledge that they will be effective (Ertmer, 2005; Hew & Brush, 2007; Mueller et al., 2008).

Embedding eBooks in literacy instruction. eBooks have the potential to be effective literacy instruction tools for addressing beginning reading skills and adolescent literacy needs such as building reading motivation and comprehension strategies, fluency, while providing background knowledge for vocabulary development and access to multimodal information (International Literacy Association, 1999, 2012; L. C. Larson, 2015b). The adaptive features (changeable font size, text-to-speech features, embedded multimedia resources, etc.) can provide educators with the resources needed to support diverse learners' engagement in the reading process (Anderson-Inman & Horney, 2007; L. C. Larson, 2015b). The interactive dictionaries and access to ancillary materials expose students from low socioeconomic backgrounds and English language learners to new vocabulary and build the background knowledge needed to comprehend more complex text (Biancarosa & Griffiths, 2012; M. Gonzalez, 2014). Yet there is a lack of understanding how educators can engage these features during instruction (Anderson-Inman & Horney, 2007; Felvégi & Matthew, 2012; Roskos, 2013).

Proceeding forward. Much of the research on e-reading is inconclusive due to differences in methodology and subject populations, and a lack of rigor and a conceptual model (Biancarosa & Griffiths, 2012). There are pockets of robust eBook research such as the benefits of text-to-speech, use of adaptive features to support beginning literacy skills and provide feedback to struggling readers but no large-scale body of evidence that identifies a specific pedagogy (Biancarosa & Griffiths, 2012; M. Gonzalez, 2014). The conclusions and recommendations of researchers are essentially the same. Educators will implement eBooks when they believe they have the pedagogical knowledge to use it intentionally to benefit students' learning, address students' needs (Anderson-Inman & Horney, 2007; Biancarosa & Griffiths, 2012; L. C. Larson, 2008, 2012). Educators will implement eBooks when they understand their uses. Effective teaching requires educators to integrate eBook technology and pedagogy knowledge of learning strategies with a wide and deep understanding of content in order to meet the learning needs of a diverse group of students (Mishra & Koehler, 2006). Thus, it is essential that educators be provided with effective evidence-based practices, the technological pedagogical knowledge showing how, when, and why eBooks can be integrated into literacy instruction (M. Koehler et al., 2013; Leu et al., 2010). Therefore, the purpose of this study is to address the perceived lack of effective evidence-based practices by examining the body of research on the use of eBooks in the K-6 school setting. The goal is to identify effective pedagogical knowledge regarding when, how, and why to integrate eBooks into literacy instruction. Media specialists can then collaborate with educators to support students in developing the digital literacy skills and competencies needed to access and engage with eBooks (American Association of School Librarians, 2010; Duke & Keene, 2011).

Focusing on K-6 literacy instruction. This study elected to narrow the focus to K-6 literacy instruction. Current literacy research supports a positive correlation between academic achievement in early literacy and later school success (Hernandez, 2011; Strickland, 2013) such as described by the Matthew Effect (Stanovich, 2010); children who are progressing as readers continue this trend whereas children who lag behind in reading growth continue to fall further behind. A challenge facing educators is children from low socioeconomic homes begin their formal schooling with weak academic skills and continue to fall further behind as time goes on (Hernandez, 2011). For example, about 16 percent of third graders who were not proficient readers by year-end did not graduate from high school on time, a rate four times greater than that of proficient readers (Hernandez, 2011).

Reading is a complex process and many of the concurring cognitive skills are difficult to individually observe and/or tackle (Ruddell & Unrau, 2010a; Stanovich, 2010). One way to attend these issues is to address potential obstacles as early as possible (Stanovich, 2010) such as ensuring educators teach the instructional essentials, support reading with evidence-based techniques (Reutzel & Cooter Jr, 2015), and effectively aligning prekindergarten through third grade literacy programs with curriculum and standards (Strickland, 2013) such as the Common Core State Standards (CCSS). In order for students to achieve the CCSS,

> Teachers need to be equipped to promote and support foundational reading skills (letter knowledge, sounds, and word reading) and build meaning-based skills (comprehension, conceptual knowledge, and vocabulary) in varied genres. They need 21st-century tools that invigorate instruction and strengthen its intensity on a daily basis so that children can truly achieve these standards (Roskos, 2013, p. 190).

Teachers can address potential obstacles to reading through the integration of 21st century tools such as eBooks with evidence-based practices during K-3 literacy instruction. They need to know how, when, and why.

D. Smeets and Bus (2013) established that eBooks provide an alternative resource for independent reading before the child is capable of reading conventional print text. Yet many educators view eBooks as a form of edutainment rather than an authentic learning resource. Therefore, the goal of this study was to:

- examine and synthesize the research pertaining to the integration of eBooks in K-6 literacy instruction in order to identify the technological instructional pedagogies and knowledge needed by educators to competently support students' development of digital literacy skills and competencies; and
- share the results so that media specialists and other literacy educators can best use their leadership role to provide students and educators with the technological pedagogy and resources needed to access and engage with eBooks.

The questions driving the QCA of the use of eBooks in the K-6 literacy are:

- According to the extant literature, what types of K-6 literacy practices and engagements with eBooks are identified?
- What does the body of research recommend as the technological instructional pedagogies and knowledge needed by educators to meet the diverse needs of K-6 students as they engage with eBooks to develop digital literacy skills and competencies?

Review of the Literature Summary

The study's rationale was based on the following assumptions. Embedding technology in the learning environment is a complex process (Ertmer et al., 2012; Hew & Brush, 2007). It requires addressing a number of impediments including intrinsic barriers regarding teachers' beliefs and attitudes towards technology, and the lack of pedagogical knowledge and skills (Hew & Brush, 2007). The goal of the study was to address the lack of pedagogical knowledge and skills by identifying when, how, and why to integrate eBooks into literacy. A reciprocal relationship exists between educators' attitudes and beliefs and their pedagogical knowledge and skills (Hew & Brush, 2007) and a teacher's perceived sense of self-efficacy either supports or hinders his/her ability to take on new challenges (Ertmer & Ottenbreit-Leftwich, 2010) such as integrating eBooks with literacy instruction. For example, teachers who lack self-efficacy in their ability to utilize technology for student learning and engagement show weak commitment to integrating technology and spend less time educating students (Ertmer & Ottenbreit-Leftwich, 2010). Also, teachers are hesitant to take on a new challenge and adopt technology in the classroom when they lack the technological knowledge (TK) and the technological pedagogical knowledge (TPK) to select, plan, and implement the most appropriate ICTs to support student engagement with subject specific concepts. Teacher change can take place when they have the belief that technology integration is of value and the self-efficacy to integrate; when they have the technological pedagogical knowledge to effectively integrate technology in the learning environment (Ertmer & Ottenbreit-Leftwich, 2010).

TPACK (Mishra & Koehler, 2006) and the TIM model (Allsopp et al., 2007) were the study's conceptual frameworks because they identified and explained the key factors to be studied and their presumed relationship (Miles & Huberman, 1994). TPACK provided the

rationale for curating research on eBook integration in literacy instruction in order to identify technological pedagogical knowledge (TPK) educators need to believe eBook integration is of value. The TIM model provided the lens to concretely identify when and how eBooks have been integrated into literacy instruction, the key factors to be studied. Together the two frameworks provided the study's methodology, qualitative content analysis, with the lens for examining a large body of data and funneling its focus to a specific objective; finding concrete data to address the research goal to:

- examine and synthesize the research pertaining to the integration of eBooks in K-6 literacy instruction in order to identify the technological instructional pedagogies and knowledge needed by educators to competently support students' development of digital literacy skills and competencies; and
- share the results so that media specialists and other literacy educators can best use their leadership role to provide students and educators with the technological pedagogy and resources needed to access and engage with eBooks.

The following chapter presents the study's methodology. Qualitative content analysis provided the rigor and structure for the researcher to utilize the research questions and the conceptual frameworks to narrow the field of research and select relevant text for analysis. As recommended by the International Literacy Association (2002), QCA provided the means to generate a body of research based K-6 literacy practices and engagements with eBooks and extract the technological pedagogical knowledge needed by educators to develop the belief that eBook integration is of value and they have the self-efficacy to integrate.

Chapter 3: Methodology

Introduction

The purpose of this qualitative content analysis (QCA) was to examine the body of research on the use of eBooks with K-6 literacy instruction in order to address a perceived lack of published effective evidence-based practices. The goal of the study was to "provide a convergence of evidence from a variety of study designs that is ultimately scientifically convincing" (International Literacy Association, 2002, p. 2) and identify effective pedagogical technological knowledge regarding when, how, and why to integrate eBooks into literacy instruction. With this knowledge, media specialists will then have the opportunity to collaborate with teachers to support students in developing the digital literacy skills and competencies needed to access and engage with eBooks (American Association of School Librarians, 2010; Duke & Keene, 2011).

The questions driving the QCA of the use of eBooks with K-6 literacy instruction were:

1. According to the extant literature, what types of K-6 literacy practices and engagements with eBooks are identified?
2. What does the body of research recommend as the technological instructional pedagogies and knowledge needed by educators to meet the diverse needs of K-6 students as they engage with eBooks to develop digital literacy skills and competencies?

This chapter described the study's methodology so that the research results reflect the standards of good measurement and the findings can be transferred to K-6 classrooms. The chapter began with an overview of QCA and the rationale for selecting QCA as the analytical

tool. The second section defined the researcher as an instrument because the researcher is part of the context. QCA is context-specific and reflexive; the researcher took an active role in determining the data (Schreier, 2012). The researcher also accessed her background experience as a media specialist and with technology when creating the coding frame and interpreting the data. The researcher's biases and assumptions are being acknowledged so as to minimize her effect on the study's degree of reliability and validity.

The third section focused on the selection of the data for analysis, referred to as units of analysis. QCA is a method of data analysis and not a method for collecting data/units of analysis or identifying the text population (Schreier, 2012). Selecting the units of analysis is a separate step within the research process and was implemented before QCA could begin.

The remainder of the Chapter 3 focused on qualitative content analysis and the construction and employment of the coding frame. QCA is a systematic method for describing and interpreting the meaning of the data in terms defined by the researcher, and is based on the construct that "meaning is not a given, but we must construct meaning" (Schreier, 2012, p. 2). Transparency was required throughout the methodology in order for the process and results to have a high degree of validity and reliability. Validity refers to the generalizability of the results to other settings (Neuendorf, 2002) and the degree to which the categories in the coding frame adequately represent the concepts in the research question (Schreier, 2012). Reliability refers to the ability of the methodology to be utilized by others consistently over time (Miles & Huberman, 1994; Neuendorf, 2002; Schreier, 2012) Chapter 3 concluded with a discussion about the rigor and validity of this research study.

Qualitative Content Analysis Overview

Qualitative content analysis (QCA) was chosen for addressing the current study's research goal. QCA methodology provided the rigor and structure for the researcher to utilize the research questions and the conceptual frameworks to narrow the field of research and select the body of text for analysis that best supports the goal of the study: to identify effective technology pedagogies so that an "analytical lens for studying the development of teacher knowledge about educational technology" (Mishra & Koehler, 2006, p. 1041) can be applied to the results. The questions driving the research of the integration of eBooks with K-6 literacy instruction were:

1. According to the extant literature, what types of K-6 literacy practices and engagements with eBooks are identified?
2. What technological instructional pedagogies and knowledge can be ascertained from the body of research and implemented by educators to meet the diverse needs of students as they engage with eBooks to develop digital literacy skills and competencies?

The purpose of this section was to focus on the selection of qualitative content analysis (QCA) as the analytical tool for examining and synthesizing research pertaining to the integration of eBooks in K-6 literacy instruction. The section begins with an overview of QCA's use in the field of educational research and then focus on its relevancy to this study.

QCA in research. QCA has been employed in educational research requiring some degree of interpretation (Schreier, 2012) such as to identify a range of pedagogical knowledge needed to support student engagement. Bender et al. (2015) utilized QCA to discover the pedagogical content knowledge (PCK) needed for teaching computer science at the secondary

school level. Interviews of 23 computer science experts were coded and analyzed. The results provided concrete subject-specific competency facets for measuring computer science educators' PCK. The analysis also brought to light concrete descriptions of the beliefs and motivational orientations that exist among the group of interviewees including the need for self-efficacy. QCA was selected because its methodology enabled the researchers to identify the PCK, the subject-specific competency facets, beliefs and motivational orientations computer science teachers should focus on for their professional development. Even though the Bender et al. (2015) study utilized primary data collection, there is a similarity to the current QCA; both studies selected QCA to identify a range of pedagogical knowledge needed to support student engagement.

Bones (2011) selected QCA methodology to answer the question "Are 21st century Newbery Award books valuable resources for use in character education?" (p. iii). QCA was specifically chosen because of its reflexive nature, recognizing and acknowledging the role the researcher and coders plays in co-producing the data (Schreier, 2012). In this case, QCA enabled the research team to tap into their personal insights and understanding to identify and describe examples of text from 11 Newbery Award novels that are applicable for use in character education. The coding process and ensuing discussions about the 11 novels analyzed enabled them to discover unexpected findings and provide rich data and narrative description for answering the research questions. The QCA process itself strengthened the researcher's understanding how to better train preservice teachers and other adults in the importance of taking the time to read thoughtfully to and with children.

Yanoff, LaDuke, and Lindner (2014) examined professional text through the lens of QCA in order to identify "how supplemental texts can inform the implementation of the CCS

[Common Core Standards] for diverse learners" (p. 8) in elementary schools. QCA assisted the study in narrowing the research focus to specific classification of students (above grade level readers, below grade level readers, and English learners), and provided the rationale to create flexible coding frameworks whose coding categories would be responsive to the varied nature of the text used. Their study concluded with reflections on the value of QCA: Qualitative content analysis

- allowed for the text to be methodically and purposefully examined as they worked on answering the research question;
- enabled the research question and coding frame to be built from the text, resulting in a more valid representation of the texts' content; and
- required narrowing the research question's focus, resulting in the identification of very specific references to specific learners (Yanoff et al., 2014, pp. 22-23).

In summary, QCA has been employed in educational research to identify pedagogical content knowledge (Bender et al., 2015), for employing the expertise of the researchers in developing the coding frame and to narrow the research focus (Bones, 2011), and as a tool to identify patterns across the data that answer specific research questions (Yanoff et al., 2014). QCA was employed for this study to narrow the research focus to the issue of the perceived lack of effective evidence-based practices pertaining to the integration of eBooks with K-6 literacy instruction. The study's goal was to share the results so that media specialists and other literacy educators can best use their leadership role to provide students and educators with the technological pedagogy and resources needed to access and engage with eBooks.

QCA constructs. QCA methodology is built on the constructs of emergent flexibility, the inductive nature of research, the role of a naturalistic approach to context, and the reflexivity of the researcher co-producing the data. QCA allows for emergent flexibility and is inductive in nature (Schreier, 2012). Emergent flexibility is based on the assumption that there is a constant interplay between the research question(s), strategy for collecting the data, and the analysis instrument rather than the linear process found in quantitative analysis. Emergent flexibility allows adaptation and change to take place as data is collected and initially analyzed, including changes to the research question, the breadth and depth of data collected, and/or the methods for analysis, the coding frame. The inductive nature of qualitative analysis supports the interplay by enabling change to occur as key categories and concepts emerge from the data. The inductive nature of QCA also permits the researcher to reduce the amount of data needed because the analysis is focused on selected aspects of the material that are relevant to the research question (Schreier, 2012). The two constructs provide the researcher with the ability to focus on identifying and describing the richness of the data and the inferences that can be drawn from the data rather than reporting the frequency of an occurrence (Krippendorff, 2013). It is these inferences, the patterns of relationships that are transferrable to the research questions.

QCA's naturalistic construct affects the type of interpretive lens the researcher uses, and meshes with the methodology's reflexive properties (Schreier, 2012). The naturalistic construct is based on the assumption that the data's real-life context makes the data rich and meaningful and must be taken into account. QCA requires the collection of as much context data as needed in order to understand the data. Context data comes into play when the interpretative lens is employed to recognize patterns and relationships across the data. Together they enable the emerging patterns and relationships to be connected to the research questions. Context data also

includes researcher information because of the reflexive nature of the methodology (Schreier, 2012). QCA recognizes the role the researcher's background, assumptions, and bias play in co-producing the data. Reflexivity is addressed through the transparent creation of coding frames and addresses consistency issues through the use of a flexible research process. The two constructs provide QCA with the lens to interpret the data and construct meaning based on the researcher's perception of the material and its context (Schreier, 2012).

In summary, the constructs of QCA such as emergent flexibility, the inductive nature of research, the role of a naturalistic approach to context, and the reflexivity of the researcher co-producing the data, enable QCA to bend and flow with the data collection process and the coding frame in order to discover the meanings and patterns of relationships within the data, to discover the inferences that are transferrable to the research question. For this study, QCA and its constructs enabled the researcher to delve into existing research on the integration of eBooks with literacy instruction and discover the pedagogical technological knowledge K-6 educators and media specialists need to begin integrating eBooks in their learning environment. The constructs provided the rationale to collect only the relevant data and the context needed to transfer the resulting inferences to the research questions and enabled the researcher to make adjustments to the coding frame as needed.

QCA coding frames. The coding frame is the heart of QCA (Schreier, 2012). Coding frames are a type of "structure, a kind of filter through which you view your material" (Schreier, 2012, p. 63) that are developed for identifying and describing the richness of the data. Its purpose is to provide the link from the data to specific key concepts and main categories needed for drawing inferences in regards to the research questions. The process of building and implementing a coding frame enabled the researcher to take a body of material and reduce it to a

manageable size by identifying relevant material from irrelevant. Its construction was driven by the research question(s) and the components (aspects) of the data being analyzed. The process of building the frame involved identifying the main categories (dimensions) so each category is unidimensional and captured one aspect of the data needed for analysis. The process also involved defining subsequent levels of subcategories. These describe what is being said about the dimensions and provided examples so that the coding frame is exhaustive and each level of categorization is mutually exclusive; every unit of data was assigned to at least one subcategory and a unit of data can only be assigned to only one subcategory within a given dimension.

The process began with the development of an *a priori* (deductive) coding framework to establish the initial coding categories and subcategories (Schreier, 2012). For this study, the initial categories were how, when, where, and why eBooks are integrated with literacy instruction. The categories were developed based on prior knowledge about balanced literacy instruction (Reutzel & Cooter Jr, 2015), the technology integration matrix model (Florida Center for Instructional Technology, 2013), and outcome analysis using the *Publication manual of the American Psychological Association* 2010).

Further development and refinement of the subcategories occurred through inductive (data-driven) coding during the trial coding and main coding processes. The inductive coding process refined the subcategories descriptions and definitions as new insights and understanding, key concepts and categories emerged from the data during the coding processes; emergent flexibility in action. The inductive coding process affected the study's reliability, the degree to which the coding frame yields data that is free of error (Schreier, 2012). Therefore, whenever inductive changes occurred, QCA's methodology required the researcher to follow sequential steps; go back and revisit earlier process stages and employ the new coding to the whole body of

data. Following the sequential steps when change occurred ensured a consistent application of clearly defined categories to the data, providing the rigor needed for reliability. This flexible and fluid process also enhanced the study's degree of robustness and its ability to capture a consistent body of relevant rich data. By being transparent about the interplay between the deductive coding, the inductive coding, and the trial coding processes, the methodology provided the rigor needed for validity. For QCA, the coding framework is considered valid to the degree that its categories and subcategories adequately represent the concepts in the research question (Schreier, 2012).

Finally, the construct of consistency was addressed through the requirement of double coding of the data by three other people (Schreier, 2012). Double coding helped insure others with similar cultural background and experiences would interpret the research similarly. Double coding also strengthened the reliability of the study when the results of different coders reached acceptable levels of intercoder reliability (Neuendorf, 2002).

In summary, the coding frame provided the researcher with a transparent systematic method for winnowing down the data to a body of relevant material. The process of building a coding frame required the researcher to identify and define the key aspects of the data using a blend of inductive and deductive coding. Sequential steps and double coding were implemented to provide the rigor needed for reliability. The coding frame also required the researcher to be transparent about her role, biases, and assumption because of the reflexivity of her involvement in co-producing the data (Schreier, 2012).

Researcher as an Instrument

QCA is reflexive; it recognizes the role the researcher had in co-producing data for the study and the findings (Schreier, 2012). QCA addresses possible validity and reliability issues due to bias by including the researcher as context data. Identifying biases brings to light the researcher's values and expectations that influenced the construction of the coding frame and the analysis (Maxwell, 2005; Schreier, 2012). The purpose of this section was to make transparent the biases that exist due to my experiences as a researcher, a media specialist and with technology, and minimize my effect on the study's degree of reliability and validity.

Researcher bias. QCA enabled me to tap into my experiences and expertise in the fields of library sciences, literacy, teaching, and technology. These experiences shaped the focus of the research, determined the *a priori* development of the coding frame, and influenced the selection of the studies collected for analysis. The focus of the research was narrowed to K-6th grades because a majority of my teaching experiences has been in high poverty elementary schools and the focus of the Ph.D. program was on education and social change ("Doctor of philosophy in education and social change,"). Personal and professional levels of engagement with eBooks strengthened my belief that eBooks are of value both as a tool to support students' development of basic and digital literacy skills and as a way to develop a lifelong love of reading. So too have the literacy courses taken during my Ph.D. program. My analytical lens was influenced by the combined experiences as an eBook reader, literacy and technology instructor, media specialist, School Library Media Science assistant professor, and technology purchaser. The analytical lens reflects my goal to address the needs of struggling and reluctant readers in K-6th grades.

I often heard educators and students share their belief that there is nothing like the feel, smell, and sound that emanates from a book as you turn the pages. There is some truth to this perspective. However, I believe eBooks have their place in our realm of literacy, as do print text, audio/multimedia books, and media formats yet to be developed. I also believe engaging with literature in all its formats and genres (i.e., stories, information from different perspectives) is critical to the development of a healthy society. The challenge we face is not everyone participates in such activities for a number of reasons. Some because they do not have the self-efficacy or willingness to be risk takers and try something new, change established reading habits. Others do not participate because they are reluctant or struggling readers. My attention has been on how to support change for elementary age students who come from environments that lack access to literature, lack knowledge of stories, lack the ability, or more importantly the interest to engage with literature. I believe eBooks can provide struggling readers and disengaged students with a modality that offers the scaffolding and choices to support their development of literacy skills and love of and for reading. My role as a media specialist and change agent is to support change in both the student and the teacher because change will not take place unless they believe they have the skills to engage with eBooks and see the value in them.

I used my skills as a researcher, teacher, and media specialist to curate units of analysis from the plethora of research available. Rich resources outside these parameters may provide additional examples and possibilities for eBook integration with literacy instruction (Cavanaugh, 2006a, 2015). This includes articles on topics such as reading motivation and literature circles for disengaged readers (Casey, 2008; Ciampa, 2012b; L. C. Larson, 2009; Morgan, 2013; Senn, 2012) and dissertations on the effects of eBooks on reading levels and reading comprehension

(Frye, 2014; M. R. Gonzalez, 2010). An analysis of such rich resources could be done at a later time.

My 18 years as a teacher and media specialist, graduate coursework in literacy, and the year as a School Library Media Science assistant professor became the foundations of my literacy knowledge, pedagogical content knowledge, and technological pedagogical knowledge. I used my knowledge of and experience with the balanced approach to literacy instruction (Reutzel & Cooter Jr, 2015) and with eBooks to define the coding framework dimensions that yielded when and how to integrate eBooks with literacy instruction, and identified relevant units of inquiry within the data. I used my experience with differentiated instruction and knowledge gained from graduate research on poverty and literacy to define the dimensions regarding where and why to integrate eBooks with literacy instruction. I tapped into my technology experiences and utilized the TPACK framework and TIM model to enhance the dimension regarding how to integrate eBooks with literacy instruction. I began developing self-efficacy and belief in the value of technology in the late 1970's writing programs using punch cards and FORTRAN and used my varied experiences to identify units of coding that could support students and teachers who are at a different competency level and/or have low self-efficacy in terms of integrating technology with learning.

Assumptions. The focus of the research was intentionally narrowed to identifying the pedagogical technological knowledge educators need to effectively integrate eBooks with K-6th grade literacy instruction. The decision was based on the following assumption: educators have access to well-established knowledge for literacy instruction and a plethora of published research on best practices for engaging students with print text, but the same cannot be said for digital text resources (Hutchison & Reinking, 2011; Kamil et al., 2011; "*Theoretical models"*, 2010).

Therefore, the assumption was made that the study's audience has the pedagogical content knowledge (PCK) (M. Koehler et al., 2013) for implementing effective literacy instruction; the knowledge and flexibility to interweave specific literacy instruction goals with best practices so that all students' learning needs are met. The assumption was also made that the best approach to effective literacy instruction is through a balanced approach to literacy instruction (Reutzel & Cooter Jr, 2015). Consequently, a section of the coding frame identified and defined the basic components of a balanced approach to literacy instruction in order to support educators' integration of technology with specific literacy instruction, to develop the technological pedagogical and content knowledge they need to effectively and confidently integrate eBooks with literacy instruction. The basic components are oral language development, early reading concepts, skills, and strategies; phonics and word recognition; reading fluency; reading vocabulary; reading comprehension; reading writing connection; reading motivation and engagement; academic literacy instruction; and differentiating instruction (Reutzel & Cooter Jr., 2015).

Managing researcher's bias. The purpose of this section was to identify the researcher's biases and assumptions. QCA recognizes the role I played in co-producing the data and analysis and thus required the inclusion of the researcher's context in the methods section in order to support the study's degree of validity and reliability (Schreier, 2012). All of these biases and assumptions are part of my context and thus affected the analytical lens employed in determining, describing, and interpreting the meaning of the data.

I further managed my biases by journaling changes throughout the methodology process and by employing three coders for piloting the coding frame. The final coding frame was applied to the units of coding at different times and percentage of agreement calculated. Changes made

to the coding frame were journaled as a way to capture my affect in co-producing the data and being transparent in regards to the study's emergent flexibility and reflexivity of the researcher (Schreier, 2012). I developed context summaries for each study and were utilized during the coding and analysis. QCA is situational and context affects both the coding and the interpretation of the data (Schreier, 2012). Journaling and context summaries also provided time to reflect on the process and check on the affect personal bias had on the changes made.

Researcher bias was managed through the use of three different coders. Each coder brought a different perspective to the study and had a familiarity with the central phenomenon of the study. Coder 1 brought his expertise in the areas of K-12 school librarianship including the coordination of library media services programs with curriculum development, and educational technology ("Director Library Media Services," 2016). Coder 2 presented the technology perspective. Coder 2 provides technology support for users of a distance learning module. Coder 3 and the researcher followed the same academic tract for their PhD program – literacy instruction, and participated with the researcher in a literacy instruction research project involving inter-coder reliability.

In summary, QCA enabled the researcher to tap into her experiences and expertise and at the same time set up procedures to identify and minimize the affect her bias has on the curation and analysis of the data collected.

Research Design

Qualitative content analysis (QCA) is a systematic method for describing and interpreting the meaning of the data in terms defined by the researcher, and constructed through the classification of materials with the coding frame (Schreier, 2012). Coding frameworks are the

tools for separating relevant data from irrelevant material and provide the link from the data to specific key concepts and main categories needed for drawing inferences in regards to the research questions.

The systematic and transparent process of building and implementing a coding frame enabled the researcher to take a body of material (units of analysis) pertaining to the integration of eBooks with K-6 literacy instruction, and reduce it to a manageable size of relevant data by identifying relevant material from irrelevant (Schreier, 2012). QCA refers to those units of relevant data as units of coding; segments within the units of analysis that provide the rich data to answer the questions when, how, where, and why to use eBooks during K-6 literacy instruction to foster student learning and engagement. It is the rich data within these segments that were assigned to sections in the coding frame.

QCA is context-specific and required the researcher to take in as much context data as needed because they provided clarity and enabled the analysis and identified patterns to be applied to the study's questions (Krippendorff, 2013; Schreier, 2012). For this study, context units included data about participant characteristics and type of literacy instruction being implemented which support the ability of educators to interpret and apply the findings to their context.

QCA is not a method for collecting data/units of analysis (Schreier, 2012). Data collection is a separate step within the research process and was implemented before QCA was completed. A sampling plan was developed and executed in order to address the issue of sampling bias and ensure an adequate sample size. The plan required explaining how the

relevant text population, the units of analysis collected on the integration of eBooks with K-6 literacy instruction, were identified and selected.

Data Collection and Units of Analysis

Quality content analysis is about finding and interpreting the latent, hidden meaning of the data as defined by the research question rather than comparing one unit to another, tracking occurrences (Schreier, 2012). The questions driving this study asked for evidence educators need to build the self-efficacy and belief, the technological pedagogical knowledge to effectively integrate eBooks with literacy instruction. It is the role of the researcher to define the units of analysis (Neuendorf, 2002) in such a way that the resulting body of data, the units of analysis provide the rich data to answer the questions.

The study utilized relevance sampling (Krippendorff, 2013) to ensure an adequate sample size required for robustness. Relevance sampling is a form of nonrandom sampling that involved the researcher making decisions regarding all units of analysis to collect (Krippendorff, 2013; Neuendorf, 2002). The resulting units of analysis do not represent a population of text but are the population of relevant text (Krippendorff, 2013). Relevance sampling allowed the researcher to:

- select research studies that have the potential to answer the research question;
- examine each study for its relevancy in a multistage process; and
- follow a conceptual hierarchy to systematically eliminate irrelevant studies and ensure an adequate sample size by setting boundaries, parameters.

Sampling plan. Sampling techniques for content analysis are purposeful; its goal is to focus on finding units of analysis that have the potential to answer the research questions rather

than fairly representing the population as is required when doing statistical analysis (Krippendorff, 2013; Schreier, 2012). This study implemented the following plan in order to identify rich research and address the need for a clear, transparent, and systematic process required for reliability and validity:

1. Develop a relevance screen (Cooper, Hedges, & Valentine, 2009) identifying the inclusion and exclusion criteria for the study (see Appendix A for the relevance screen).
2. Deductively develop a search term list based on the research questions and use the list to search databases within online EBSCOhost and ProQuest database services for peer-reviewed articles. Apply the list to both databases. (see Appendix B for more in-depth list of search terms).
3. Read the study's abstract as well as the subject headings to determine if the study could be eligible for further investigation and reading. Generate a list of eligible studies.
4. Adjust the search term list inductively by searching the study's subjects/descriptors fields for other possible search terms, and apply changes to both databases.
5. Continue searching the online databases and accumulate potential units of analysis until search results have reached saturation; no new bodies of research are found.
6. Apply the relevance screen to the search results. If the study received a 0 in any of the inclusion/exclusion criteria, eliminate it from the population of relevant text.

The relevance screen was created before the researcher utilized two database services EBSCOhost and ProQuest to search online databases such as Academic Search Complete and PsycINFO. The screen created a mindset to examine research for specific inclusion and exclusion criteria. A search term list was then compiled using natural-language terms to reflect the components of the coding frame (Cooper et al., 2009). Additional search terms were added

inductively based on the controlled vocabulary employed by the database and located in the abstract's subject index. An example is reading engagement and language acquisition terms to describe types of literacy instruction foci. The search term list was used for both database services. This step required going back and forth between the list and the two database services multiple times so that new search terms were applied to both services. See Appendix A for the relevance screen.

The assembled studies were logged into a spreadsheet and included the name of the database where the study was housed in order to support the study's degree of replication, the degree to which the process or the data can be reproduced (Krippendorff, 2013). Subscribers to database services such as EBSCOhost and ProQuest select the online databases available for access from the services purchased and thus not all database services provide access to the same online databases (" Products & Services," 2016). Including the database name supports the study's degree of replication, the ability of others to replicate the units of analysis.

Once the initial list of studies was created, duplicate titles were eliminated and the list was comprised of 85 studies. The next step was to apply the relevance screen and change the population of text to a population of relevant text.

The relevance screen. A relevance screen is a method for addressing sampling bias and replicability threats to validity (Cooper et al., 2009). Establishing inclusion/exclusion parameters provided the systematic process and the transparency needed to reduce the population of text to a population of relevant text while maintaining the study's degree of reliability (Cooper et al., 2009; Krippendorff, 2013; Schreier, 2012), the ability of the study to be error free. This included

curating text needed to ensure the study's context (i.e., the learning environment) is data rich and meaningful, a construct of QCA (Schreier, 2012).

A research study was included in the population of relevant text if it contained all the key parameters identified by the study's conceptual frameworks to address the research goal. A relevance screen was developed and contained the four key parameters needed to ascertain the technological pedagogical knowledge educators require to effectively integrate eBooks with K-6 literacy instruction, as well as the parameter of peer-reviewed literature. The four parameters are based on the constructs of the technology integration matrix (TIM) model (Apple Computer Inc., 1991; Arizona K12 Center, 2012) and the technological pedagogical content knowledge (TPACK) framework (M. Koehler & Mishra, 2010; M. Koehler et al., 2013):

- Evidence-based reading instruction research;
- level of technology integration used to operate eBooks;
- literacy objective for students' engagement with eBooks;
- context data for interpreting and transferring the rich data and inferences to the question including characteristics of the learning environment; and
- outcome analysis that may include research summary, recommendations, and the study's limitations.

Evidence-based reading instruction research parameter. The research collected for the analysis was selected based on their rigor and relevancy; peer reviewed articles and/or articles. The parameters were limited to peer reviewed articles and articles published in scholarly journals in order to support the International Literacy Association's call for use of evidence-based practices in the classrooms (International Literacy Association, 2002) and provide realistic

boundaries to the breadth and depth of the study. Peer reviewed articles are a subset of scholarly articles that have gone through a rigorous review process such as blind peer reviewed, editorial board peer review, or expert peer review ("ProQuest Research Library: Advanced search," 2016; "What are (scholarly) peer reviewed pubications?," 2014). The value of the review process is the recognition that the work is original, valid, and significant ("*Publication manual"*, 2010).

The search limited the evidence-based reading instruction research to peer-reviewed articles from online database services. Not all database services identify articles as having gone through the rigorous review process. EBSCOhost and ProQuest advance search tools provided the means to limit the search to peer-reviewed articles only ("ProQuest Research Library: Advanced search," 2016; "What are (scholarly) peer reviewed pubications?," 2014). The parameter rationale was based on the International Literacy Association (2002) definition of evidence-based reading instruction; the evidence is objective, valid, reliable, systematic, and refereed; approved for publication by a panel of independent reviewers (p. n.p.). Utilizing the peer-reviewed literature limiter advanced search tool enabled the units of analysis to be populated with evidence-based reading instructions, the pedagogy to support TPACK development.

Level of technology integration used to operate eBooks parameter. Studies were included if the following parameters were met. The study was explicit in how eBooks were used to support student engagement with or learning of literacy and the type of technology selected matched Vassiliou's and Rowley's (2008) definition of an eBook.

1. An e-book is a digital object with textual and/or other content, which arises as a result of integrating the familiar concept of a book with features that can be provided in an electronic environment.
2. E-books, typically have in-use features such [as] search and cross reference functions, hypertext links, bookmarks, annotations, highlights, multimedia objects, and interactive tools (Vassiliou & Rowley, 2008, p. 363).

Level of technology integration is a key construct of the TIM model (Florida Center for Instructional Technology, 2013) and identified how eBooks were integrated.

Literacy objective for student engagement with eBooks. The relevance screen incorporated the components of a balanced literacy program in the K-6 classroom (Reutzel & Cooter Jr., 2015) to provide content and context information pertaining to when eBooks were being utilized. A study was included in the relevancy sample if the objective for student engagement with eBooks comprised at least one component of the balanced literacy program. The text *Teaching Children to Read: The Teacher Makes the Difference* (Reutzel & Cooter Jr., 2015) was chosen as the foundation for the inclusion/exclusion criteria because it identified the research based pedagogy needed for effective literacy instruction: oral language development; early reading concepts, skills, and strategies; phonics and word identification; reading fluency; reading vocabulary; reading comprehension; reading writing connection; reading motivation and engagement; differentiating instruction; and academic literacy instruction. The rationale for the inclusion/exclusion is it supports teachers' ability to know when and how to promote and support foundational reading skills daily through the use of 21st century tools (Roskos, 2013) such as eBooks.

Context parameter. Context data influences the study's interpretation and the ability to transfer the rich data and inferences to the questions (Schreier, 2012). A study was included in the population of relevant text if data was evident about where the study took place; specifically, the grade level or age group of student population involved in the study. A study was included if the grade level or age of students was in the K-6th grade range or within the age range of 5 to 12 years old. A study was excluded if the grade range began to blend over into upper or lower grades and a majority, 50 percent or more of the students were outside the selected age/grade range.

Outcome analysis parameter. The study supported collection of a broad range of peer-reviewed research studies such as qualitative, quantitative, and quasi-experimental in order to examine a wide range of eBook experiences and possibilities for relevant data. The outcome analysis parameter was used as a screen to include only studies containing the components of outcome analysis such as the research results and discussion of the findings and/or its limitations; standard components of scientific writing and reporting ("*Publication manual"*, 2010). Rich data from the sections provided insight into the effectiveness of eBook integration with K-6 literacy instruction, possible limitations to eBook integration, and further research possibilities, data pertaining to why or why not integrate eBooks with literacy instruction.

In summary, a relevance screen was designed to systematically amass research studies that reflect best practices both in the area of research and literacy instruction. The screen's inclusion/exclusion criteria were based on a number of parameters that reflect the components of the study's conceptual frameworks, the TIM model (Florida Center for Instructional Technology, 2013) and TPACK framework (Mishra & Koehler, 2006). The evidence-based reading instruction parameter identified the study's literacy instruction focus as being a component of a

balanced literacy program as recommended in K-6 classrooms (Reutzel & Cooter Jr., 2015). The level of technology integration parameter ensured data was generated about how eBooks were integrated with literacy instruction, a component of the TIM model (Florida Center for Instructional Technology, 2013). Literacy objective for student engagement with eBooks parameter garnered studies with data on when eBooks were utilized. The context parameter kept the data relevant to K-6 classrooms. Finally, the outcome analysis parameter yielded data on why or why not to integrate eBooks with K-6 literacy instruction. Following a conceptual hierarchy systematically eliminated irrelevant studies and ensured an adequate sample size (Krippendorff, 2013). A study was excluded from the population of relevant studies if it lacked one or more of the identified criteria. See Appendix A for the relevance screen.

Sampling plan results. The sampling plan involved following five steps. The process began with the development of the relevance screen and a mindset for searching the database systems EBSCOhost and ProQuest for possible units of analysis. The initial list of natural-language terms (Cooper et al., 2009) was based on the components of the relevance screen and knowledge about database searching such as the need to combine the term electronic books with the search term reading comprehension. Controlled vocabulary (Cooper et al., 2009) terms joined the list inductively as a result of appearing in an article's subjects/descriptors field. For example, at-risk students and storybook reading were terms found in the study's subjects field. The search term list consisted of 64 different terms and was applied to both database systems. Each search included the term electronic books plus one from the list, and were limited to scholarly (peer reviewed) journals. Terms such as electronic books and academic literacy, and schema, and phonemic awareness netted zero results.

The process ended when no new articles were observed or articles appeared in both database systems. The initial curation of data for units of analysis netted 84 articles. The relevance screen process winnowed down the units of analysis to a viable set of 37 relevant text. Articles were eliminated for the following reasons: issues with balanced literacy instruction focus (24), type of technology being integrated (11), context such as age group (14), outcome analysis (4), articles with different titles reported the same research study (2), and one article was not in English. The 38 relevant articles appeared in the following eight databases: Academic Search Complete; Education Database; ERIC; Library, Information Science & Technology Abstracts; MasterFILE Premier; Professional Development Collection; PsychARTICLES; and PsychINFO.

In summary, the process of curating the units of analysis followed a prescribed process to support the study's replicability and validity of the results. The process began with the creation of the Relevancy Screen and list of search terms. Two database services, EBSCOhost and ProQuest were selected because its advanced search capabilities narrowed the focus to scholarly reviewed articles. The search terms were applied to both database services resulting in 84 potential units of analysis. The relevancy screen winnowed the pool of potential data to 37 units of analysis for analysis. The next step was to begin the process of analyzing the data using qualitative content analysis.

Qualitative Content Analysis

Once the units of analysis were collected, qualitative content analysis (QCA) was implemented. The study followed specific procedures in order for the methodology to have a high degree of validity and reliability (Schreier, 2012). The procedure began with the

construction of the coding frame through deductive reasoning, based on what is already known. Once the frame was developed and the dimensions initially defined, the second step involved dividing a couple units of analysis into segments called units of coding.

The researcher utilized the thematic criterion strategy for segmentation because the units of analysis lacked an inherent structure (Schreier, 2012). Thematic criterion allowed the researcher to divide the units of analysis into segments that corresponded to one theme or topic. The segmentation process drew upon the constructs of emergent flexibility and inductive reasoning because the coding frame became the reference point, the thematic criterion for segmenting the units of analysis into relevant units of coding. As subcategories, definitions, and examples emerged during the process of segmenting the units of analysis into units of coding, inductive changes to the coding frame occurred as a way to address aspects of the coding frame potentially excluded due to the researcher's preconceptions and potential biases. The process of dividing units of analysis into segments continued until the researcher felt the coding frame fairly represented the units of coding and was ready for the pilot phase. For this study, the initial phase involved segmenting 12 units of analysis, around 1/3 of the research collected for analysis.

During the segmentation process, the researcher also generated context units in order to capture portions of the surrounding material needed to give meaning to the unit of coding. Context data provides the background information others need in order to make sense of the findings (Krippendorff, 2013; Schreier, 2012). It is the responsibility of the researcher to be explicit in defining the context so that the units are "as large as is meaningful (adding to their validity) and as small as feasible (adding to their reliability)" (Krippendorff, 2013, p. 102). For this study, the researcher defined context units as the relevant material needed to support an educator's ability to meet the diverse needs of students as they engage with eBooks to develop

digital literacy skills and competencies. Context data such as grade level, educational performance level of the participants, and demographic information were segmented into units of coding for two reasons (Cooper et al., 2009). Data on grade level and educational performance may be of value to educators to know the characteristics of the participants for the transference of the analysis to their context. It may also be of value to researchers and media specialists to identify areas where peer-reviewed research has not been published, where the holes in the pedagogical knowledge exist. Other context data was retained with the units of coding so that meaning of the original text could be reconstructed.

The third step, the pilot phase involved testing the frame for consistency (Schreier, 2012). During this time, three outside coders were employed to test the fitness of the coding frame on the same units of coding. There is no one formula for deciding how much material to include in the coding frame pilot phase (Schreier, 2012). The goal was to find a balance between variability and practicability. For this study, the researcher chose the following three studies because each brought a different perspective to the process. One study, a dissertation, offered a wealth of information in the discussion section and the prospect to fine tune the Why dimension. The second research study was from a group of researchers with published peer reviewed articles on the use of eBooks with immigrant children from low socioeconomic households. This study brought focus to the Where dimension. The third study represented an example of research from a group of researchers who developed eBooks specifically for early literacy development. This provided the opportunity to refine the How dimension subcategories and definitions. The second and third studies were selected for another reason. The two research groups authored 19 of the 38 studies collected for this QCA.

Once the coding frame was set, it was applied to all the units of coding. The outcome was a body of coded units of coding to analyze through the lens of the research questions. Journaling was employed to keep track of all changes and provided evidence to support the methodology's emergent flexibility, the continual interplay between data collected and theory (Babbie, 2010) and reflexivity, the role of the researcher in co-producing the data (Schreier, 2012). See Figure 4 for the flow of the methodology.

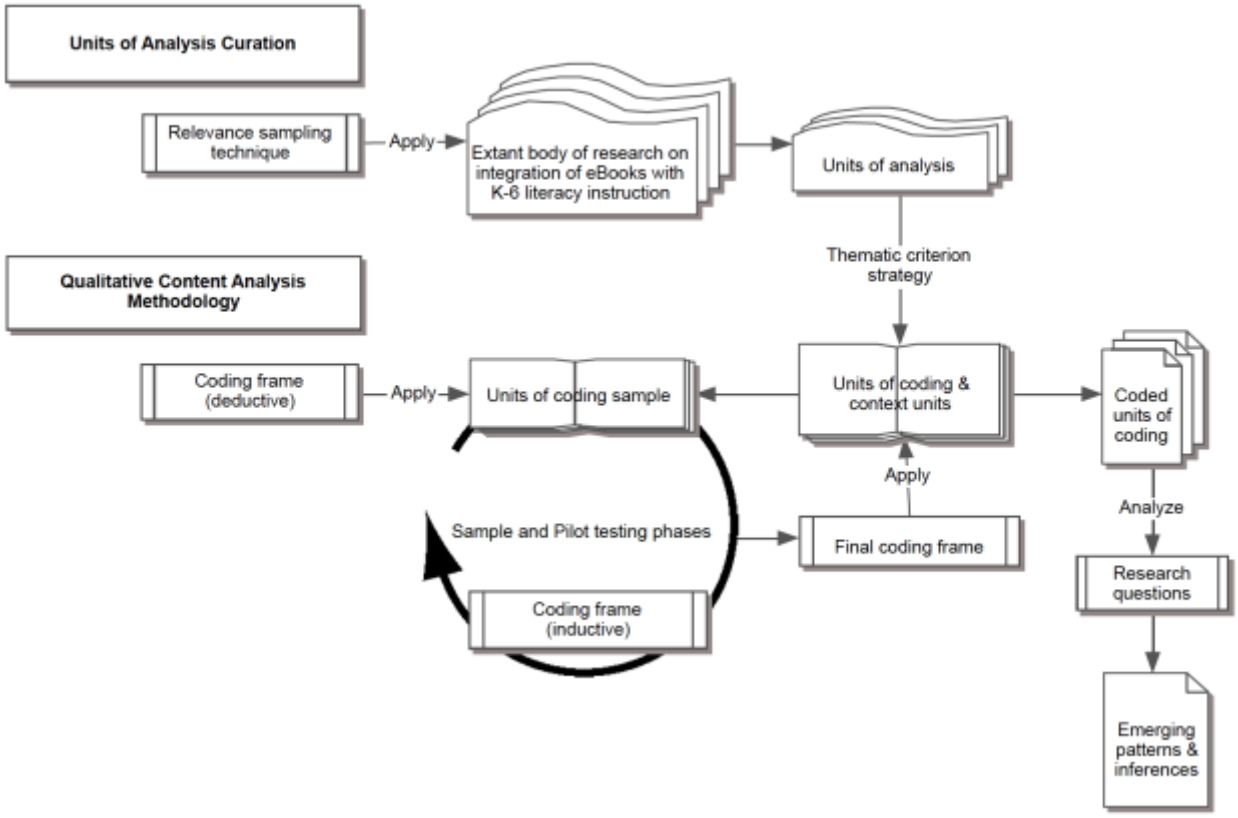

Figure 4. Flow of the study's methodology. Adapted from "Qualitative content analysis in practice" by M. Schreier, 2012. Copyright 2012 by Sage; Los Angeles, CA.

Coding Frame. The study's coding frame was built using the combination of concept-driven (deductive) strategies and data-driven (inductive) strategies in order for the frame to be exhaustive; each unit of coding was assigned to at least one subcategory (Schreier, 2012). The concept-driven (deductive) strategy enabled the dimensions and subcategories to reflect what is

already known (Schreier, 2012), a prior research and knowledge including the researcher's experience with and knowledge of technology, literacy, and the components of the conceptual framework the technology integration (TIM) model (Allsopp et al., 2007), and the balanced approach to literacy instruction (Reutzel & Cooter Jr., 2015). The data-driven (inductive) strategy was embedded throughout the process to address validity issues due to any preconceptions and potential biases of the researcher (Schreier, 2012).

The data-driven subcategories were inductively refined during the sampling process and pilot testing phases (Schreier, 2012). New key concepts and examples emerged from the units of coding during sampling segmentation and presented subcategories labels and definitions in clearer terms so others can understand what the categories mean and can use them consistently, a construct of reliability and validity. Changes made to the coding frame were journaled as a way to capture the researcher's affect in co-producing the data and being transparent in regards to the study's emergent flexibility and reflexivity of the researcher.

The study's eight dimensions reflect the goal of the study, to generate data pertaining to the integration of eBooks in K-6 literacy instruction in order to identify the technological instructional pedagogies and knowledge needed by educators to competently support students' development of digital literacy skills and competencies. The eight dimensions were designed to yield data describing when, how, where, and why eBooks have been integrated with literacy instruction. For example, the balanced approach to literacy instruction dimension (Reutzel & Cooter Jr., 2015) identified when eBooks were integrated with literacy instruction. The grade range of participants, performance levels, and demographic information dimensions provided context data about where the integration took place. Two dimensions, levels of technology integration and learning environment characteristics identified how eBooks were used; the two

constructs of the technology integration matrix model (Allsopp et al., 2007). Finally, the literacy growth and the research analysis and discussion dimensions provided the data to identify why eBooks should be integrated with K-6 literacy instruction. See Figure 5 for a diagram of the eight dimensions.

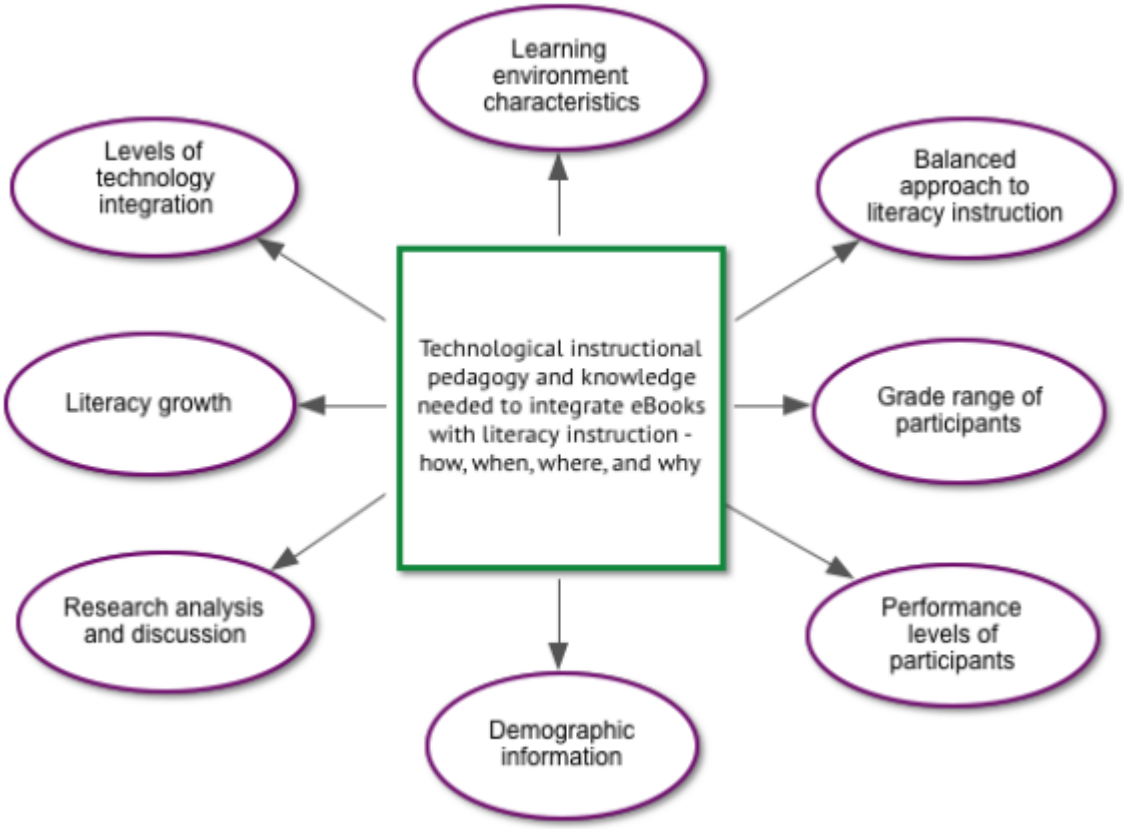

Figure 5. Diagram of the coding frame's eight dimensions. Shapes are used to differentiate the different levels of categories. The square represents the focus of the study. Ovals are the first level, the dimensions.

Also, each dimension has at least two subcategories that identify the elements of importance to the study. For example, the dimension level of technology integration contains the five subcategories that identify types of classroom settings conducive to student engagement (Allsopp et al., 2007); entry, adoption, adaptation, infusion, and transformation (see Figure 6).

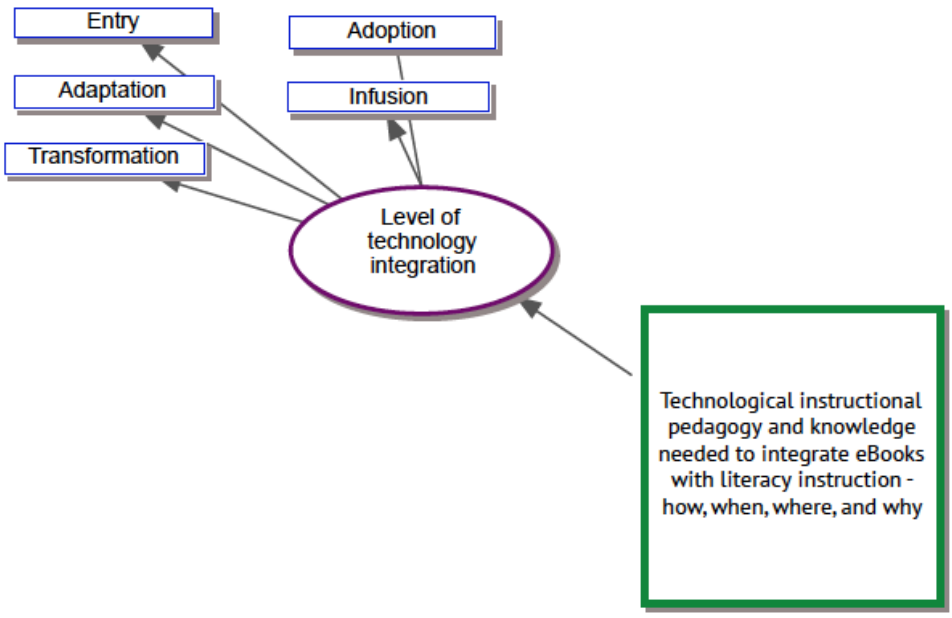

Figure 6. Diagram of the coding frame's levels of technology integration dimension. Shapes are used to differentiate the different levels of categories. The square represents the focus of the study. Ovals represent the first level, the dimension. The rectangles identify the 2nd level, the subcategories.

Concept-driven strategy. This study's eight coding frame dimensions and corresponding subcategories reflect the components of the Technological Pedagogical Content Knowledge (TPACK) model (M. Koehler et al., 2013) needed to effectively integrate eBooks with literacy instruction and the context data that gives meaning to the results (see Figure 7). The dimensions identified the specific aspects how, when, where, and why eBooks can be integrated with literacy instruction. Subcategories described the dimensions and were used to collect the data for analysis, the units of coding.

The levels of technology integration and learning environment characteristics dimensions yielded data pertaining to how eBooks were integrated in the classroom and are built on the components of the Technology Integration Matrix (TIM) model (Florida Center for Instructional Technology, 2013), the Apple Classrooms of Tomorrow (ACOT) levels of technology integration and Jonassen's constructivist learning environments (see Table 2). The levels of

technology integration dimension was defined by the five stages of progression teachers and students go through as they develop their technology knowledge (TK) and self-efficacy, and begin to transition to more authentic technology integration (Allsopp et al., 2007). The learning environment characteristics dimension mirrored Jonassen's constructivist theory that students learn best when they are engaged in active, authentic, constructive, collaborative, and goal directed learning activities (Allsopp et al., 2007; Ertmer & Ottenbreit-Leftwich, 2013). Neither dimension contains a residual category as recommended for the frame to meet the definition of exhaustiveness because the studies were vetted during the sampling plan (Schreier, 2012). Details pertaining to how eBooks were integrated was a requirement for inclusion in the sampling plan.

The balanced approach to literacy instruction dimension is based on the constructs of best practices identified by Reutzel and Cooter Jr. (2015) (see Table 3). Ten of the subcategories mirrored the literacy instruction foci of a balanced literacy program (Reutzel & Cooter Jr., 2015): oral language development; early reading concepts, skills, and strategies; phonics and word identification; reading fluency; reading vocabulary; reading comprehension; reading writing connection; reading motivation and engagement; differentiating instruction; and academic literacy instruction. The eleventh subcategory, multiple approaches to literacy instruction was added to fulfill the exhaustiveness construct and captured examples of literacy instruction that integrated two or more foci of a balanced literacy program

The balanced approach to literacy instruction dimension enabled the researcher to link the identified patterns and analysis to the research goal; connect identified technological pedagogical knowledge regarding eBooks integration with specific literacy instruction. This connection may help educators build their self-efficacy and recognize the value of engaging students with

eBooks. The dimension's ability to connect the analysis to the goal is based on the assumption that educators have the pedagogical content knowledge (PCK) (M. Koehler et al., 2013) needed for effective literacy instruction.

The context data dimension amassed data regarding the participants' grade range, performance levels, and demographic information, characteristics of the learning environment (see Table 4). Their construction was based on the researcher's prior knowledge of literacy, K-6 education, and variables that affect differentiation of instruction such as the educational performance level of the participants. The three dimensions identified information often reported in scholarly writing that assisted the transfer of the study's findings to other literacy instruction situations (Schreier, 2012). The next hierarchy level, the subcategories broke down the three dimensions into meaningful information for the transference of the results. Grade range dimension identified whether the participants fall into a range of grades or ages, or are a specific grade or age. Educational levels range from students with learning disabilities to gifted and talented students. Demographic information includes school setting and socioeconomic information. The latter two dimensions contain categories such as *no data reported* and *no level reported*. Details pertaining to a lack of knowledge in certain performance level of participants and demographic area may be of use for future research foci by identifying areas that lack coverage (Schreier, 2012).

The literacy growth and research analysis and discussion dimensions tagged rich data that identified the effectiveness of eBook integration with K-6 literacy instruction, insights into possible limitations to eBook integration, and further research possibilities (see Table 5). The two dimensions were constructed from the researcher's prior knowledge of scholarly writing based on the American Psychological Association publication manual ("*Publication manual"*,

2010), and pertinent data located in research results and discussion sections. Data from the research results provided access and insight to other possible methods for integrating eBooks with literacy instruction, potential issues, and study limitations. The literacy growth dimension contains a subcategory *no change reported* because some of the research collected were qualitative in nature and did not employ statistical analysis.

Data-driven strategies. Data-driven strategies for creating and defining subcategories helped foster reliability and validity (Schreier, 2012). QCA allowed for the use of inductive strategies to capture aspects of the study potentially excluded from the coding frame due to the researcher's preconceptions and potential biases. The following inductive strategies were implemented for this study. The coding frame went through a pilot testing stage. The frame was tested using a third of the units of coding from the study's unit of analysis. After adjustments were made, the coding frame and the units of coding from three specific studies were given to three outside coders. This step provided the insights and feedback needed to support the coding frame's validity and reliability. Once the coding frame was set, the rest of the units of coding were coded.

One challenge in developing the coding frame was creating definitions and examples that are clear enough for others to use consistently without being so detailed that the frame becomes cumbersome and ignored (Schreier, 2012). The inductive strategy for creating and defining the subcategories enabled the researcher to address this challenge. For example, adoption and adaptation, subcategories I within the level of technology integration dimension, differ in the degree to which the teacher has control over the eBooks selected and tools utilized. The examples selected from the units of coding to define and differentiate the two subcategories enabled the researcher to clearly articulate the differences. For adoption, the example given in

the coding frame is: students had limited choice to use tools/functions. The adaptation example is: students selected what tools/functions to use and when.

The mutual exclusiveness construct of QCA states a unit of data cannot be coded twice within the same subcategory level (Schreier, 2012). The balanced approach to literacy instruction descriptor began with ten subcategories. The 11th subcategory, multiple approaches to literacy instruction, was added during this phase to capture units of coding whose literacy focus encompassed more than one foci. For example, one study's literacy focus included both reading motivation and reading comprehension, two separate foci. Adding this description enabled this unit of coding to be collected for analysis without violating the mutual exclusiveness construct.

The literacy growth dimension began with three subcategory I descriptions, statistically significant positive change, statistically significant negative change, and no statistically significant change was reported. During the piloting stage the researcher concluded that having two distinct statistically significant change categories was cumbersome because there were very few units of coding that identified statistically significant negative change. To simplify the coding frame and account for both significant changes, the researcher combined them into one subcategory I description – statistically significant change.

The initial coding frame identified and defined three educational performance levels of participants; below grade level, on grade level, and gifted or talented. As a result of segmentation, three subcategories were added to better represent educational performance level of participant(s) in the research question; three emergent reading behavior levels based on the use of the Sulzby (1991) assessment instrument in studies with kindergarten participants (de

Jong & Bus, 2002, 2004). Prior to segmentation, the researcher had never heard of the Sulzby (1991) assessment instrument tool and thus had not included it in the coding frame.

A final example pertains to the same dimension. Initially there was no subcategory for curating data on students using eBooks to learn a second language. The initial alteration identified the subcategory as ELL, English language learners, a preconception based on the experience of the researcher. But that description did not accurately define the participants in studies where the second language was Hebrew or Turkish. Thus, the second alteration changed the subcategory to SLL, second language learners.

Units of coding. Units of coding are segments from the units of analysis that were analyzed and interpreted for evidence of the technological pedagogical knowledge educators need to develop the self-efficacy and belief that eBook integration with literacy is of value (Schreier, 2012). Segmenting the material into units of coding was important for three reasons. The process of segmenting ensured all the material was examined in terms of its relevancy to the coding frame and not eliminated due to researcher biases. Segmentation required dividing the material into units that fit into one subcategory of the frame, requiring the frame to be explicit in its objectives. Finally, it enabled outside coders to double-code the same text and thus provide the degree of coding consistency needed for validity and reliability of the results.

Units of coding were segmented based on thematic criterion, looking for changes of topic to signal the end of a unit and the beginning of another (Schreier, 2012). Segmenting by theme enabled the researcher to reduce the amount of data needed through the selection of specific statements and excerpts that have a common point of reference, “those parts of the units of analysis that can be interpreted in a meaningful way with respect to your categories and that fit

within one subcategory of your coding frame*"* (Schreier, 2012, p. 130). As stated earlier, QCA allowed for emergent flexibility and inductive construction of the coding frame (Schreier, 2012). As shown in the earlier examples, a constant interplay occurred between the coding frame and the process of segmenting the units of coding because what was considered a suitable unit of coding depended upon how the dimension and subcategories were identified and defined. Any adjustment made to the coding frame required its reapplication to existing units of coding in order to provide the rigor needed for both instruments to be reliable and valid, the ability of the categories to adequately represent the concepts in the research question and to yield data that is free of error.

An Excel spreadsheet aided the curation of the coding results and corresponding page number references. (see Appendix C). Following the segmentation process, the outside coders and researcher utilized the spreadsheet for the pilot coding process. The Excel spreadsheet facilitated the detection of repetitions in the material (Schreier, 2012). Repetitions of aspects within one study were eliminated. The study's focus was on developing a range of technological pedagogical knowledge, consequently duplications of an aspect within a study were deemed irrelevant. Repetitions among different studies were not eliminated as often there was a difference in study context. Finally, the spreadsheet search and sort features supported the researcher in identifying patterns within the coded units of coding.

Context units. Qualitative content analysis is situational (Schreier, 2012); in order to connect the analysis to the questions at hand and support its relevancy outside the study, the research process needed to collect context data. Context refers to the situation in which the data resides, the surrounding material that gives meaning to the unit of coding. Therefore, QCA required the researcher to take a naturalistic approach when gathering units of coding; the

researcher explicitly needed to accrue context data surrounding the units of coding so as to preserve the latter's meaning (Krippendorff, 2013; Schreier, 2012). For this study, the data resided in the context of specific K-6th grade literacy instructional settings. QCA does not require the context data assembled to be included in the units of coding (Schreier, 2012). The researcher chose to include context data with the units of coding in order to provide educators and media specialists with rich data that supports the study's relevancy to them and their context.

Selection of outside coders. The selection of outside coders is a critical step for aiding the study's degree of reliability (Krippendorff, 2013). Selecting coders with familiarity of the study's aspects provided the researcher with perspectives that understood the rules for coding and the vernacular to identify misconceptions and offer subjective feedback. For this study, the researcher selected three outside coders with different backgrounds relevant to the central phenomenon of the study. Coder 1 is the Library Media Services Director for a large public school district in which the researcher is employed. This coder provided the media specialist's perspective and earned his Ed.D. in Educational Leadership and Organizational Development. Coder 1 brings to the discussion his expertise in the areas of K-12 public school librarianship including the coordination of library media services programs with curriculum development, and educational technology ("Director Library Media Services," 2016). Coder 2 presented the technology perspective. She provides technology support for the users of the distance learning module utilized by the private university where the researcher is attending, has her Masters' degree in library sciences and her Ph.D. dissertation examined the relationship between online and hybrid courses in terms of quality and teacher/student relationships. Coder 3 provided the literacy perspective. He received his Doctor of Philosophy in education and social change and is the English as a second language Academic Program Consultant for the same public school

district. His Ph.D. coursework was grounded in literacy and his dissertation focused on English language literacy proficiency growth rates for English language learners. Coder 3 and the researcher followed the same academic track for their doctoral program (literacy instruction), and participated with the researcher in a literacy instruction research project involving inter-coder reliability. Coder 3 brings to the study experience with ELL students.

Test piloting the coding frame. There are two ways to assess the reliability of a coding frame, comparisons across persons and across points in time (Schreier, 2012). This study selected comparisons across persons, also known as blind coding, and the pilot phase. The process began with coder training (Schreier, 2012); familiarizing each coder with the study's goals, the conceptual theories supporting the research, the rationale for selecting qualitative content analysis as the analytical tool, and the coding framework. Time was spent trying out the framework and directions given to record any questions and comments concerning the clearness of the framework and/or examples given, and any problems that arose. The three outside coders then worked sequentially with the same three sets of units of coding. Following the coding sessions, discussions ensued between the coder and researcher. Agreement of coding was defined as both coders assigned the same subcategory or subcategories to the unit of coding. Areas of disagreement were discussed and journaled so as to identify the rationale for the differences and any subsequent changes made and for use during the interpretation of the coefficient of agreement (Schreier, 2012).

There are a number of ways to assess the reliability of the coding frame. This study selected to calculate the coefficient of agreement and interpret the data to determine the degree to which the coding framework is reliable beyond the point of coincidence (Schreier, 2012). The assessment was done with the assumption that interpretation of the coefficient of agreement

should not be done in isolation but through the lens of the discussion between the coders and the researcher, and the reasons for the coding decisions (Schreier, 2012). It is not the calculation that identifies what needs to be changed or left alone but the discussion in providing the rationale for the coding decisions. Thus, journaling ensued during the discussions.

This study assessed the coding frame using the percentage of agreement calculation (Schreier, 2012, p. 170) as the coefficient of agreement for each of the eight dimensions because the dimensions were not complex. A majority of the dimensions range from two to six subcategories. The balanced approach to literacy instruction dimension has 11 subcategories that are fairly standardized.

$$\text{Percentage of agreement} = 100 \times \frac{\text{Number of units of coding on which the codes agree}}{\text{Total number of units of coding}}$$

For this study, the researcher chose to calculate and assess the coefficient of agreement for the second and third round of pilot testing. The first round of the pilot phase resulted in low percent of agreement in three of the dimensions, how, when, and why. Interpretation of the results identified the need to make substantive inductive changes to coding frame. Subcategories and definitions were flushed out where these shortcomings occurred. The second and third coder used the same adjusted coding frame and sets of units of coding to test the frame for intersubjectivity; the extent to which the coding frame results apply across people (Schreier, 2012). The minimum level of acceptance was set at 67 percent agreement within each dimension; two out of three coders were in agreement. Journaling of the discussions provided the lens for interpreting the calculations in light of the results. Below is a chart showing the degree to which the three rounds of the pilot phase met inter-rater reliability.

Percentage of agreement

Dimension	Coder 1	Coder 2	Coder 3
Levels of technology integration	24%	84%	84%
Learning environment characteristics	33%	87%	89%
Balanced approach to literacy instruction	26%	93%	77%
Grade range of participants	33%	100%	100%
Performance levels of participants	50%	100%	100%
Demographic information	100%	100%	100%
Literacy growth	50%	90%	100%
Research analysis and discussion	34%	91%	96%

The ensuing discussions resulted in the collapse of two research analysis subcategories (reporting of data and discussion of data and results) into one (research analysis and discussion) because the process of separating units of coding for the unidimensional construct resulted in the removal of context data that gave meaning to a number of units of coding. Percentage of agreement for the second and third coders were high in all categories. Differences in coding occurred when some of the units of coding were tagged twice and when it came to light that the coder lacked some of the context needed to differentiate between some of the subcategories. For example, future recommendations (a subcategory of research analysis and discussion) often identified when and how eBooks should be integrated with different literacy instruction. Thus,

the unit of coding was tagged twice. An agreement was reached with the acknowledgement that the discrepancies were unsubstantial and the analysis of the data would identify the future recommendations in terms of when and how eBooks can be integrated with literacy instruction. Providing context data not embedded in the units of coding enabled the third coder and researcher to come to agreement on a couple of discrepancies.

Main coding of data. Once the coding frame was established, it was applied to the remaining units of coding (Schreier, 2012). The process involved double-coding segments of the data over a three-week time interval because the researcher was coding on her own. A spreadsheet was used to keep track of the results with each line corresponding to one unit of coding and font color to identify coding changes over time. This enabled the researcher to keep track of the changes and final decisions. Coding consistency was calculated using the same percentage of agreement used during the pilot testing phase:

Percentage of agreement

Dimension	Results
Levels of technology integration	90%
Learning environment characteristics	95%
Balanced approach to literacy instruction	100%
Grade range of participants	100%
Performance levels of participants	100%
Demographic information	100%

Literacy growth	100%
Research analysis and discussion	100%

Coding frame summary. The goal of the coding frame was to provide the researcher with a valid and reliable tool that separated relevant from irrelevant material (Schreier, 2012). Transparent steps were followed to support the frame's degree of reliability and validity. The study's coding frame was built using both concept-driven and data-driven strategies (Schreier, 2012). A data-driven coding frame's validity is often measured by its face value; how units of coding are assigned to residual categories. For this study, no units of coding were captured by residual categories, a sign that the subcategories sufficiently defined the coding frame's dimensions. Content validity is often used to measure the validity of a concept-driven coding frame because content validity requires calculating the agreement between the researcher and another coder. This study's coding frame can be considered valid because three outside coders test piloted the frame while inductive reasoning provided the vehicle for addressing potential researcher bias and clarity in the descriptions.

The process for assessing the frame's degree of reliability involved calculating the percentage of agreement (Schreier, 2012). The percentage of agreement between the researcher and outside coders two and three was calculated and fell within the minimum level of acceptance set at 67 percent agreement within each dimension. Discussions among the coders and researcher were journaled to identify differences and rationale for changes to the coding frame. The data was interpreted with the assumption that interpretation of the coefficient should not be

done in isolation but through the lens of the discussion between the coders and the researcher and the reasons for the coding decisions (Schreier, 2012).

QCA's Rigor and Validity Measurements.

Qualitative content analysis (QCA) is a valid methodology because its systematic nature provided checks and balances to uphold the standards of good measurement: reliability, validity, accuracy, and precision (Neuendorf, 2002; Schreier, 2012). This researcher relied upon the standards of good measurement set forth in Miles and Huberman (1994); Neuendorf (2002); Schreier (2012) and identified the corresponding checks and balances embedded in the study's methodology as evidence.

Reliability. "An instrument is called reliable to the extent that it yields data that is free of error" (Schreier, 2012, p. 167). Reliability pertains to the coding framework and its ability to be used consistently by others and/or over time (Miles & Huberman, 1994; Neuendorf, 2002; Schreier, 2012). Reliability was affected by the researcher's role and status within the study (Miles & Huberman, 1994). The methodology required transparency and the researcher addressed it by identifying her biases and assumptions in the methods section.

The employment of coders with different perspectives supported the study's reliability to the extent that the results were intersubjective, they fell above the minimum level of acceptability across coders (Schreier, 2012). For this study, the minimum level of acceptability was set to 67 percent across coders two and three and the coding frame met the conditions. Testing for reliability helped identify flaws in the coding frame; ill-defined categories were addressed and new subcategories added so that each was mutually exclusive (Neuendorf, 2002).

Journaling was employed to ensure transparency in regard to the changes made during the pilot coding phase (Schreier, 2012). Journaling of the discussions between coders' and researcher's disagreements took place as a tool to prevent potential conflict during interpretation of results and/or prevent transferability of the data to other settings. Journaling of the discussions provided the lens for assessing the coding frame's degree of reliability.

Validity: external and internal. Some researchers make a distinction between external and internal validity with external validity referring to the generalizability of the results to other settings (Neuendorf, 2002) and internal validity determined by the degree to which the categories in the coding frame adequately represent the concepts in the research question (Schreier, 2012). Miles and Huberman (1994) posted some queries to help determine the degree to which a study upholds external validity:

1. Are all procedures reported in full detail to permit adequate comparisons with others in terms of sample selection, constructs, coding frames, etc.?
2. Is the sampling theoretically diverse enough to support broader application?
3. Do the findings include enough rich data that the readers can assess the potential transferability and appropriateness to their setting (p. 279)?

For this study, the methodology upholds the measurement of external validity by fully reporting all procedures to ensure replicability (Neuendorf, 2002) including procedures for selecting the research for analysis, the units of analysis, and the process for selecting units of coding. The study's sample was derived using relevance sampling and followed a clear, transparent, and systematic process. The relevance screen eliminated irrelevant data enabling a body of rich data to emerge, a population of relevant text.

For the study to have an acceptable degree of internal validity, it needed to adequately represent the concepts in the research question using both deductive and inductive reasoning (Schreier, 2012). Internal validity measurements are multifaceted and can be examined through the following types of validity: criterion, construct, content, and face value. Criterion and construct validities come into play if the inferences are to be validated beyond the scope of the study. Content and face value validities deal with inductive and deductive coding. This study utilized both types of coding in building the coding frame.

Criterion and construct validity. Criterion validity refers to the extent to which a measure taps into an established external standard and construct validity is defined as "the extent to which a measure is related to other measures in a way consistent with hypotheses derived from theory" (Neuendorf, 2002, p. 117). For this study, both measurements are not considered important measurements of validity because the goal of this study does not include validating inferences that go beyond the description of the material (Schreier, 2012).

Content validity. Content validity was assessed when the coding frame was built with deductive, concept-driven coding, making use of information already known without looking at the data (Schreier, 2012). This study utilized deductive coding because its goal is to identify technological instructional pedagogies and knowledge from the body of research and implemented by educators to support K-6 students' development of digital literacy skills and competencies needed to engage with eBooks. In order to do so, the dimensions and subcategories were identified and defined based on the two conceptual theories framing this study, the technological pedagogical and content knowledge (TPACK) framework (M. Koehler et al., 2013) and the technology integration matrix (TIM) model (Allsopp et al., 2007).

Face value validity. Face value validity required the coding frame to be built with inductive, data-driven coding (Schreier, 2012). Indicators of low face validity include "high coding frequencies for residual categories; high coding frequencies for one subcategory compared to the other subcategories on a given dimension; and under-differentiated abstract categories" (Schreier, 2012, p. 189). This study utilized data-driven coding following the initial development of the coding framework. It provided the opportunity for the researcher to catch pertinent concepts, subcategories not identified during the deductive phase of construction thus eliminating the need to have residual categories. QCA supported this emergent flexibility because its methodology involves "a continuing interplay between the data collected and theory…. in order to discover underlining meaning and patterns of relationships" (Babbie, 2010, p. 394). Pilot testing also provided the opportunity to examine the coding frame's face value. The caveat with any inductive change to the coding frame required the researcher to revisit earlier process stages and apply the change to the coding frame. A high degree of face value validity was obtained because the categories and subcategories demonstrate unidimensionality, mutual exclusiveness, exhaustiveness, and saturation (Schreier, 2012), QCA coding frame constructs.

Coding Frame Constructs. The following QCA constructs were embedded in the coding frame to ensure the results are valid in terms of unidimensionality, mutual exclusiveness, saturation, and exhaustiveness (Schreier, 2012).

1. The categories are **hierarchical in nature**; the dimensions are identified as being first level and subcategories are considered lower levels. There must be at least two levels of hierarchy. For this study, the coding frame consists of eight dimensions with one to two levels of subcategories (see Figure 7).

2. **Unidimensionality** was met. For this study, the eight dimensions identify how, when, where, and why eBooks were integrated with K-6 literacy instruction; capturing only one aspect of the material.
3. Subcategories within a dimension/category are **mutually exclusive**. A unit of coding was assigned to only one of the subcategories that describe a dimension. Being mutually exclusive did allow units of coding to be assigned to more than one dimension. For example, units of coding such as "In this case, the meaning-making process emerged as Cameron integrated the animated and textual clues in a personal way" (Brown, 2016, p. 52) was coded for level of technology integration (transformation), learning environment characteristics (authentic), and balanced approach to literacy instruction (reading comprehension).
4. **Exhaustiveness** was supported because each unit of coding was assigned to at least one subcategory (Schreier, 2012). The deductive process of developing the coding frame supported making inductive adjustments in order to capture all of the data required for answering the research questions. This step addressed the issue of exhaustiveness. The initial coding frame embedded residual subcategories to capture unanticipated relevant information, but none occurred and so they were removed from the final frame.
5. A coding frame has reached **saturation** when each and every subcategory is used at least one time. The criterion for saturation is automatically met for data-driven coding frames through its definition. Data-driven coding frames are created based on the data within the units of inquiry. The criterion for saturation does not apply to concept-driven coding frames. Content-driven categories have the potential for a subcategory to remain empty because the categories are part of the framework before coding is started. An empty

subcategory may indicate an important finding but that can only occur if the category exists to begin with. For example, if this study does not find evidence of eBooks being integrated during academic literacy instruction, this is an important finding for future research. If the subcategory academic literacy instruction were eliminated to uphold saturation, then that important finding would be unnoticed.

In summary, the study's coding frame was reliable and valid. The frame was built following specific and transparent procedures. The criteria for exhaustiveness and saturation were met. The study's residual categories did not capture any data that was not eligible for inclusion in any of the subcategories. The saturation construct was not applicable because the frame was built using a concept-driven strategy (Schreier, 2012). A lack of data in a subcategory is relevant to the research questions. It may indicate a lack of eBook TPK for a particular literacy instruction setting or identify an area for further research.

Chapter 4: Results

The purpose of this qualitative content analysis (QCA) was to examine the body of research on the use of eBooks in the K-6 school setting in order to address the perceived lack of effective evidence-based practices. The goal of the study was to identify effective pedagogical knowledge regarding when, how, and why to integrate eBooks into literacy instruction so that media specialists can then collaborate with educators to support students developing the digital literacy skills and competencies needed to access and engage with eBooks (American Association of School Librarians, 2010; Duke & Keene, 2011).

Chapter four reports the results from applying the QCA coding frame to the units of coding. The findings identify the evidence based practices that emanated from the body of data, advocating when, how, and why to integrate eBooks with literacy instruction. A series of examples emerged from the data to answer the following research questions:

1. According to the extant literature, what types of K-6 literacy practices and engagements with eBooks are identified?
2. What does the body of research recommend as the technological instructional pedagogies and knowledge needed by educators to meet the diverse needs of K-6 students as they engage with eBooks to develop digital literacy skills and competencies?

This chapter began with an examination of the units of coding relevant to the first question; identify the types of K-6 literacy practices and engagements with eBooks found within the body of research collected. The examples were organized to reflect the components of a balanced approach to literacy instruction (Reutzel & Cooter Jr., 2015). The examples included

context data pertaining to the students and insight into how eBooks changed instructional practices to support students' development of digital literacy skills and competencies.

The second section described the units of coding relevant to the different levels of eBook integration; the level of technology integration utilized and information regarding the type of learning environment so that the results of the analysis can be replicated in other classrooms. The second segment's format was structured using the ten components of the Technology Integration Matrix model (TIM) (Arizona K12 Center, 2012) because a positive correlation exists between technology integration and student engagement (Barbour, 2015). The examples provide the type of technological pedagogical knowledge educators may need to meet the diverse needs of K-6 students as they engage with eBooks to develop digital literacy skills and competencies.

The final section focused on why eBooks should be integrated with literacy instruction. To change current instructional practices necessitates educators believe they have the self-efficacy to implement technology in a way that will benefit students and address their needs (Ertmer, 2005; Ertmer & Ottenbreit-Leftwich, 2010; Hughes, 2005; Hutchison & Reinking, 2011). The last section provided the rationale for educators to begin understanding the value of integrating eBooks with literacy instruction. The analysis revealed three related themes that emerged from the data analysis. eBooks had a positive effect on building and sustaining reading motivation and engagement. Increased motivation and engagement lead to literacy growth and development. The catalysts for changing reading motivation, engagement, and literacy growth and development were the interactive tools and features embedded within the eBooks. The examples throughout this chapter identify how interactive tools and features such as embedded dictionaries and narration options, and electronic notes and highlights, supported reading motivation and engagement.

Types of literacy practices and engagements

The setup of this segment reflected the components of a balanced approach to literacy instruction (Reutzel & Cooter Jr., 2015). The purpose of this section was to identify when and how eBooks were integrated with specific components of a balanced approach to literacy instruction so that K-6 teachers can develop their self-efficacy to integrate eBooks with literacy instruction. A caveat to keep in mind when considering the analysis is "Reading is a complex developmental challenge that we know to be intertwined with many other developmental accomplishments: attention, memory, language, and motivation, for example" (Snow, Burns, Griffin, Council, & Education, 1998, p. 15). Although the section divides the analysis into categories, the categories and analysis are interrelated.

Early reading instruction. Early reading is "a developmental process that requires intentional, systematic, and explicit instruction by a knowledgeable teacher" (Reutzel & Cooter Jr., 2015, p. 93). This requires educators to integrate the components of word recognition processes (concepts of print, letter knowledge, phonological/phonemic awareness, phonics, and fluent word reading) with comprehension processes (oral language vocabulary development, comprehension strategies used in listening to text read aloud and used in text reading, and reading vocabulary development).

The results of this study indicate eBooks have been used to support early reading instruction processes such as concepts of print, phonological/phonemic awareness, comprehension, and reading vocabulary development. The context often occurred in kindergarten classes with students from low socioeconomic households, at risk for learning disabilities, who are second language learners, or diagnosed with severe language impairments

(O Korat & Shamir, 2008). What emanated from the research is the importance of intentionally selecting technology that meets the needs of the students and of the targeted literacy goal. Below are some examples showing when eBooks supported early reading instruction.

Phadung, Surachai, Kaewprapan, and Howland (2013) utilized the eBook with an interactive whiteboard to support early literacy development with second language learners. The targeted skills were word recognition, story comprehension, and story application. Using the whole language approach to literacy instruction and an interactive whiteboard, the students manipulated an infrared pointer to interact with the story broadcasted onto the interactive whiteboard. This included turning pages and activating hot spots. The hotspots provided access to the 20 targeted vocabulary words. A translation button was available to support story understanding in both languages, mother tongue and second language being used in school. The replay option was used as often as needed to ensure students understood the story.

D. J. H. Smeets, van Dijken, and Bus (2014) researched the effect of electronic books on the word learning of children with severe language impairments (SLI). A group of kindergarteners listened to four different eBooks, two in a static format and two in a video format with embedded music and sound. This study indicated that eBooks are an effective way for SLI students to gain expressive vocabulary even without adult support. The study also found that the greatest gains occurred with the static eBook that is in contrast to typically developing students and SLL students. They found the music and sound interfered with processing the oral text of the story.

A number of studies by the team of Korat and Shamir (2008; 2009; 2007; 2012; 2011) focused on the effect eBooks had on developing early reading skills of kindergarten students

from low socioeconomic households or students at risk of learning disabilities. Those skills included letter name, phonological awareness, word meaning, and text tracking. The team developed eBooks that contained an oral reading of the text, embedded dynamic visuals to dramatize the story scenes and word meanings, dictionaries, music and film effects, and hot spots that focused on story comprehension and phonological awareness. The hot spots automatically activated after the child engaged with the text via reading and/or listening. The dynamic visuals were limited to those that supported story comprehension. After an initial demonstration of the tools, the students engaged with the eBook independent of the teacher, and at their own pace. They turned the pages forward and back, and reactivated the dictionary and hot spots as needed. Examining the group of studies also provides this study's results with examples of instruction for a range of students.

Shamir and Korat (2007) investigated the effect of pair reading in conjunction with an educational eBook on the emergent literacy skills phonological awareness, emergent writing, and emergent reading of students from low socioeconomic households. The students participated in three 30 minute sessions, each time reading the eBook from beginning to end. Students reread some pages as needed. This option provided the readers with a more meaningful context to develop word recognition, emergent writing, and phonological awareness than by drill and practice model of learning. The study concluded that paired peer reading with an eBook is an effective remedial tool to promote higher emergent literacy skills for children from low SES households.

Shamir (2009) researched the effect paired reading with eBooks had on developing phonological awareness and word meaning skills with students from low SES households. As with the earlier study, paired students worked together during three 35-minute sessions to turn

pages, reread, activate hot spots and the dictionary as needed. They reported a statistically significant correlation between dictionary activations and post-intervention word meaning scores ($p<.05$). The study observed the collaborative talk among paired kindergarten students and found evidence of a high degree of collaborative knowledge construction and a positive correlation between collaborative talk and increased scores for sub-syllabic phonological awareness. Students also engaged in developing phonological awareness through repeating the narrator's pronunciation of the text. The study also found a negative correlation between activation of picture hotspots and word meaning performance. The significance of this observation is pictures and hotspots that are embedded to amuse and have no relevance to the story, should be minimized if not excluded (Shamir, 2009, p. 93).

Shamir and others (2011) observed kindergarteners at risk of learning disabilities (ALD) independently work with the eBook for six 20 to 35 minute sessions. The focus of the intervention was supported vocabulary development and story comprehension. The targeted words embedded in the page appeared automatically after the entire page had been narrated. The dictionary hot spot included the word's pronunciation and supporting illustrations. Students reactivated the dictionary hotspots as needed. The intervention showed growth in vocabulary. The recommendation made was engaging ALD students with eBooks and interactive dictionaries that support emergent literacy skills, can be an effective strategy for building their vocabulary skills and abilities.

Another study analyzed the effect of independent eBook reading on concepts about print (CAP) (Shamir et al., 2012). CAP skills were supported through eBook features such as text highlighting as the story was narrated, modeling what happens during a read aloud, and page numbers were displayed. The forward and back buttons simulated page turning motions. The

conclusion was educational eBooks can support CAP development because there are a number of similarities between the eBook's and print's features.

Ofra Korat, Segal-Drori, and Klien (2009) studied the effect adult support had on promoting emergent literacy skills growth for kindergarteners from low SES households. Adult support was given during and after the pairs of children activated the text narration and animations as they read the eBook. Adult supported activities promoted emergent literacy skills such as sounding out the ten focal words into their syllables and sub-syllables during the reading session and with cards afterwards. The effect of the eBook with adult support on students' growth in phonological awareness and emergent word reading was more significant than students who received adult support with print books ($p < 0.05$) (Ofra Korat et al., 2009, p. 464).

In conclusion, the research establishes the importance of intentionally selecting technology that meets the needs of the students and of the targeted literacy goal. Purposefully incorporated interactive features have been found to motivate low SES kindergarteners while targeting emergent literacy skills and language development (Shamir, Korat, & Barbi, 2008). It is also important to examine where interactive hot spots occur as well as their relevance to the story. Inappropriate hot spots can become a distraction, turning the reading experience into a game. I recommend kindergarten and preschool educators examine Korat and Shamir's body of research to develop a broader understanding when and how eBooks and technology can bridge the early reading concepts gap that exists for children from low socioeconomic households or are second language learners.

Reading comprehension instruction. This section provided the findings when eBooks supported reading comprehension. Reading comprehension is a complex mental process; it is

dependent upon the reader having the schema, background knowledge to construct meaning from the text and then the ability to integrate the ideas that emerged, to prior knowledge (Reutzel & Cooter Jr., 2015). Effective reading comprehension instruction embeds the following strategies along with active dialogue; activate prior knowledge, promote questioning, analyze text structure, create mental pictures, and summarize.

The findings from this study indicate eBooks have been used to address comprehension issues for students who come from low socioeconomic households, are at risk for learning disabilities, read below grade level, and/or are second language learners. Shamir (2009) studied pairs of kindergartners from low socioeconomic neighborhoods interacting with an eBook designed for researching emergent literacy development. The eBook had dynamic visuals that dramatized the story's events, and embedded dictionary and phonological awareness features that followed the reading of the digital text by an actor. Students turned the pages forward and backward as needed, activated the embedded features, and participated in collaborative discussions. One observation noted the following domino effect - the more the partners discussed the interactive features, the more they listened to each other. That lead to their willingness to initiate actions and ideas, engage more with the reading process that deepened their understanding of the story.

Brown (2016) utilized eBooks in a year-long study to examine the effect multimodal picture eBooks had on a group of culturally and linguistically diverse second graders at a Title I urban school. The group included eleven second language learners. Twice a week small groups of students participated in digital reading workshops that met their specific instructional needs. The 20 to 25-minute workshop began with a literacy-focused mini-lesson. Students used the e-readers and eBooks to practice their developing literacy skills. For example, students re-listened

and/or reread portions of the digital text as comprehension needs dictated. They each listened to their digital copy of the same title while engaging the other in active dialogue with shared insights and clarity questions. These actions became the scaffold to support engagement with more complex text and their ability to comprehend and make inferences.

An implication from the Brown (2016) study is time must be spent teaching students how to engage with the eBooks and tools, and their relevancy to the reading process. For example, "Being able to use language in meaningful ways to discuss a multimodal book is essential for comprehension as well as expanding one's understanding of the world by listening to the ideas of others" (Brown, 2016, p. 53). Teachers need to be intentional about supporting the blending of technology with active dialogue in order to facilitate the reading process for young students.

Mrs. Miles, from the L. C. Larson (2010) study on eBook reading and response, provided two second grade girls with diverse cultural backgrounds and reading levels, the opportunity to buddy read and respond to *Friendship According to Humphrey* by Betty G. Birney (2006). Each day the two students spent 40 minutes together reading and discussing the book. They engaged with various eBook tools and features that supported comprehension. They highlighted key passages and vocabulary, used the built-in dictionary, and activated the text-to-speech option to address difficult words. Annotated responses to passages using built-in notepad tool supported meaning making processes. Close examination of their notes provided insight into each child's understanding of the story, text-to-self connections, and the questions that bubbled up, strategies that are part of effective reading comprehension instruction.

Ertem (2010) examined the effect of different types of animated eBooks on fourth graders reading at least one or two years below their current grade level. Their basic decoding

skills were at the second or third grade level and they struggled to comprehend fourth grade content. The study found that storybooks with animated visualizations and playing options provided support for reading comprehension. Students selected either the read to me option or let me play. Students were able to go forward or backwards with the latter option. The animation offered scaffolding in constructing meaning from the narrative, activating background knowledge, and making inferences about story events. The interview data showed that the students were enthusiastic about reading the eBooks and data analysis reported higher levels of reading comprehension scores for reading eBooks with animation condition than from the traditionally print storybooks condition ($p < 0.05$) (Ertem, 2010, p. 149).

Ortlieb, Sargent, and Moreland (2014) utilized two digital reading environments in their study on the effect eBooks have as an intervention tool. The study took place at a reading clinic and involved fourth graders from low socioeconomic metropolitan elementary schools. One tutoring environment consisted of the reading platform myON (Capstone Inc., 2017) and the other was a hybrid of myON with printed texts. Online digital eBook platforms like myON provide access to additional tools and support for integrating eBooks with literacy instruction. Such tools and support include a range of fictional and informational eBooks, integrated formative and summative assessment tools, and features such as embedded dictionaries, highlighters, and electronic post-it notes.

The one-to-one intervention sessions focused on six comprehension skills with a gradual release of responsibility – prediction, think aloud, questions/questioning, visual representations of text, summarization, and text structures (Ortlieb et al., 2014). The intervention involved students reading, reviewing, rating, and sharing their opinions on books via social media tools such as embedded book reviews. Students activated eBook features such as text-to-speech,

dictionary, and highlighting. Progress was monitored through the use of the myON reader's integrated assessment tests and reports. Students could move up to the next level of independent reading once they successfully completed five eBooks on their current level of comprehension. As students progressed, they selected new Books that matched their independent reading levels.

In conclusion, eBooks have been used effectively to support reading comprehension for students from low socioeconomic households, who are second language learners and/or read below grade level. eBooks offered the type of scaffolding to support collaborative discussions which deepened comprehension. Interactive tools and features enabled students to engage text at or above their independent reading level. Such interactive tools include highlighting text and activating built-in or text-to-speech dictionaries. Other tools were text narration and annotated response to passages.

Motivation and engagement. The focus of this section is to identify when eBooks have been integrated with literacy instruction to promote motivation and engagement. Motivation and engagement constitute one of the pillars of effective reading instruction (Reutzel & Cooter Jr., 2015). Reading motivation and reading amount are correlated; reading amount is a predictor of text comprehension (Guthrie, Wigfield, Metsala, & Cox, 2010). Reading motivation is comprised of eleven interrelated social and emotional constructs, "aspects" (Wigfield, 1997, p. 63) which influence the student's reading frequency and performance:

- reading efficacy: has perceived belief that "I can read";
- reading challenge: is willing to try difficult, hard books;
- reading curiosity: has desire to gain new knowledge through reading;
- reading involvement: is actively engaged with story, a personal choice;

- importance of reading: has developed personal sense of worth or value as a reader;
- competition in reading: strives to be the best;
- reading recognition: reads for external gratification;
- reading for grades: works towards a specific goal;
- social reasons for reading: perceives reading as a type of social interaction;
- reading compliance: reads to avoid negative recognition, applies minimal effort; and
- reading work avoidance: avoids difficult tasks (Guthrie et al., 2010; Wigfield, 1997).

The findings from this study indicate that a majority of the studies curated reported changes in the students' motivation to read, their engagement with literature, and the positive effect the interactive tools and features had on reading comprehension and self-efficacy. For example, the Ciampa (2012a) study provided a window into how eBooks were used as an intervention tool to motivate and engage readers, and why they were effective. Having a voice and choice in selecting the title to read was high in importance, in making reading relevant and engaging. Below are some examples including Ciampa (2012a).

Coyne, Pisha, Dalton, Zeph, and Smith (2012) implemented scaffold eBooks literacy instruction for students with significant intellectual disabilities. The study demonstrated how teachers fostered reading motivation through reading efficacy, reading involvement, and providing social reasons for reading. The teachers began the intervention by modeling how to use the embedded supports. Over time, control was gradually released and the students engaged with the stories independently. Literacy scaffolding for comprehension, phonemic awareness, phonics instruction, vocabulary, and fluency were built into the four universally designed digital storybooks created by the authors. Two online eBook platforms were included in the intervention. The eBooks' features provided the students with multiple means of engagement,

action and expression, and access to multiple representations of ideas through embedded tools. Students clicked on words to animate its onset rhyme and sound out blending. Prompts to echo-read and partner read were selected and they accessed the hyper-linked glossary to sites with videos. Student engagement rose, they became the technology experts. An anecdotal note was, "They're interacting more, they're enjoying it, they're having fun with it. And they're learning from it. They don't realize…They love to use the software and don't realize they're learning" (Coyne et al., 2012, p. 167).

Ciampa (2012a) investigated the effect of eBooks on eight first graders' reading motivation, word recognition, and reading comprehension. Three of the students had been identified by their teachers as being struggling readers with attention-deficit/hyperactivity problems, and were receiving additional literacy instruction support. The study selected a reading platform/online site that contained a wide range of eBooks and the tools/digital features to support word recognition and listening comprehension, early literacy skills that supported reading comprehension. The eBook platform allowed students a range of personal choices. Students individually and independently selected the eBook to read during each ten 25-minute sessions, enabling them to tap into their personal interests. Students also accessed the website and eBooks during free-choice time. To support CAP skills, students selected which eBook pages would be highlighted during narration, and had access to both next and previous page buttons. The differentiated activities embedded within the eBook enabled students to independently select and participate in activities that provided them positive outcomes. Post-reading comprehension questions followed each book completion, providing immediate feedback and the chance to self-correct. Scaffolding such as the highlighted text and narration supported

students' engagement with challenging text. Animations within the digital story and the post-reading questions fostered the process of constructing meaning.

Brown (2016) found self-efficacy development among the students involved in a digital literacy workshop. The interactive features within the eBooks supported their ability to tailor learning to fit their needs. For example, Jin, a second-grade second language learner (SLL), often engaged with eBooks independently. Her repeated listening to digital stories provided scaffold for her English vocabulary and fluency development, and learning became more meaningful. For others, the interactive features garnered their attention and resulted in increased time on task and comprehension. Lupita was reading an informational book about dinosaurs. The multimodal features of the text captured her attention and engagement. This enthusiasm transferred to the next day when she was asked her preference for reading with someone or independently. Her response reflected her willingness to read on her own, and she did with much success. Multimodal engagement also fostered conversation among the SLL group and the chance to be active in the reading process. As students explored interactive pictures and text, new experiences emerged and were shared.

Hess (2014) reported on a collaborative effort between a group of fourth grade teachers, the school's literacy specialist, and the media specialist. Their goal was to study the long-term effects of using e-readers and eBooks in the classroom, their effect on reading for enjoyment and engagement. The eBooks were primarily used as a replacement for print titles during daily guided reading groups of two to four students, and for sustained silent reading. The teachers regularly used the eReader for class read aloud. The analysis found students engaged with eBooks because there was a "cool" factor to using technology in school. The ability to add more titles provided students with a voice and choice in what was read during reading groups.

Students were not the only ones to show an increase in motivation and engagement. Teachers looked forward to working towards a one-to-one ration of device to students so that eReaders could be used during independent reading. And they continued to find ways to engage students with eReaders and eBooks efficiently and effectively.

In conclusion, the studies selected demonstrate a number of ways eBooks supported reading motivation. Students had a voice and choice in what eBook to read, an example of reading involvement. A SLL student activated the narration option to engage with challenging books while another student found the dinosaur eBook stimulated her curiosity. A class selected eBooks for guided reading groups, a form of social interaction.

Vocabulary instruction. Vocabulary instruction provides students with the tools to find out what a word means based on word parts and context clues, and word meaning learning strategies when clues are unavailable (Reutzel & Cooter Jr., 2015). Vocabulary is built through repeated exposure in various context including incidentally through listening, and conversations and explicitly through planned vocabulary instruction. The findings from this study indicate that eBooks have been used extensively for vocabulary instruction because many have a built-in dictionary, providing students access to definitions with two clicks. Here are some examples of such practices from the research collected for this study.

Shamir and others (2011) studied the effectiveness of using an eBook for literacy instruction with kindergarteners at risk of learning disabilities (ALD) and typically developing (TD) kindergarteners. Students worked with the eBook six times. The targeted words and definitions automatically appeared after the entire page had been narrated. The dictionary embedded within the researcher designed eBook, promoted multi-sensory learning; it provided

oral explanations and visual illustrations. Students also had the option to reactivate the dictionary at will, offering repetitive exposure. The same process was available for the hot spots that provided dialogue between the main characters and voice/sound effects. The study found the dictionary supported vocabulary growth for both groups of students. The interactivity inherent in the tasks kept students engaged in learning.

Verhallen and Bus (2010) ascertained that the following intervention program fostered expressive vocabulary growth in inner city immigrant kindergarteners (SLL) from low SES households. Individual student worked with an educator for four six-minute sessions. Each session began with the student listening to the narrated eBook and watching the animated characters. The teacher controlled the technology. The analysis found the multimedia components of the eBooks sustained the students' attention throughout the four sessions. The visuals helped the SLL students make sense of the story line and they began to connect visuals to words, build their vocabulary skills and abilities. "When children understand more of the story, they are better equipped to derive the meaning of unknown words and sentences and more able to extract this new knowledge from memory afterward" (Verhallen & Bus, 2010, p. 59).

Higgins and Hess (1999) examined the effectiveness of a supplemental vocabulary-building exercise on a group of third grade students from a suburban elementary school. The intervention involved adult support and utilized animated clues to scaffold target words embedded within the eBook pages. Students began the process by listening to the digital poem being narrated. The target word was then animated and the child asked to define the word. If the task was successful, the child moved onto the next word. If the student gave the wrong response or too general a response, the student went back to the animation. If that did not work, the adult working with the child, provided supplemental instruction that helped connect the word to prior

knowledge. The study highlights the potential this type of supplemental exercise has as a resource for differentiated instruction. The conversation between the student and adult was not difficult to implement, occurred simultaneously with other classroom activities, and was straightforward enough that the adult required minimal training.

In conclusion, eBooks with interactive features and tools can help students develop their vocabulary skills. Multimedia components helped SLL connect visuals to words. Students actively engaged with the built-in dictionaries at will. And other students engaged with eBooks for vocabulary intervention.

Supporting reading and writing integration. A balanced approach to literacy instruction integrates writing with reading for a number of reasons (Reutzel & Cooter Jr., 2009). Reading and writing share a number of reciprocal processes (Shanahan, 2006) and "children's understanding of what they read is deepened and cemented when they can write about it" (Reutzel & Cooter Jr., 2009, p. 6). The findings from this study indicate eBooks provide opportunities to support writing integration as students are exposed to new words and stories, and respond through writing whether its learning how to spell to using electronic note taking and journaling tools. Below are some examples demonstrating how eBooks can support reading and writing integration.

Ofra Korat, Shamir, and Arbiv (2011) explored the effect eBooks had on kindergartener's emergent word writing, letter knowledge and phonological awareness when provided adult support. The group of students in the study came from low SES households. The intervention consisted of pairs of students working together for four sessions, each session lasting about 15 – 20 minutes. The eBooks used were designed by the researchers to specifically support early

literacy skills development. The first and third sessions consisted of the students activating the "read to story" mode and then writing down the 10 focal words from the text. In the second session, the students activated the "read and play" mode that was followed by playing phonological awareness games with the ten focal words and the adult. The fourth session started with the students activating the "read and play" mode. Then they were presented with pictures of the book (without the text) and were given adult support as they responded to the story in writing. The study found that the groups of students who received adult support exhibited greater progress than those without adult support. The significance of the study is adult supported literacy activities can provide the type of environment students from low SES households need to develop emergent writing skills. The results implied that "reading an eBook might not be enough for achieving good levels of progress in emergent literacy in general, and emergent writing in particular" (Ofra Korat et al., 2011, p. 312). The type of eBook used does not limit the value of the study in terms of building technological pedagogical knowledge because the instructional procedure can be applied with any eBook.

Larson's (2010) researched digital reading and response with two second graders with reading writing integration. Following an initial demonstration of the eBook's basic functions, two culturally diverse students participated in a buddy read and used the note tool to respond to the story. The two students were on different reading levels and had different personalities; the lower level reader was social, outgoing, and funny. The higher-level reader spoke English as her second language and was described as calm, quiet, and serious. This tool enabled them to capture their voice and mood while recording their depth of understanding, text-to-self connections, questions that arise, etc. The lower level reader's notes identified comprehension and text feature issues that were later addressed through direct instruction. The higher-level

reader's notes offered the teacher a window into her sense of humor and personality. This enabled the teacher to recommend future reads to broaden the student's exposure to literature and encouraged the student to share her sense of humor with her peers. Larson (2010) offered the following recommendations that support reading writing integration:

- Use the devices and tools to support literature circles and independent reading, and establish class expectations regarding note taking and other read and respond opportunities.
- Discuss rules regarding reading another students' notes if devices are shared. Consider allowing students to respond to another's notes and comments.
- Finally, teachers can review the notes as a form of formative assessment and plan instruction accordingly (p. 21).

Ortlieb and others (2014) combined reading comprehension instruction with writing during a one-on-one weekly intervention program for struggling fourth grade readers. Students used an online digital reading environment (Capstone Inc., 2017) to select a relevant book to read and write a book review. While the focus of the study was on building reading comprehension skills, writing was embedded as a way for students to demonstrate their understanding of the story and express/share their opinion.

In conclusion, eBooks support reading and writing integration throughout K-6 grades. Kindergarteners worked with eBooks to develop emergent writing skills. Second grade students activated the electronic notes tool and fourth grade students wrote book reviews for an online digital reading environment. Finally, teachers can use students' writing as a form of formative assessment.

Differentiation of instruction. Differentiating instruction enables educators to meet the diverse learning needs of all children (Reutzel & Cooter Jr., 2015). It occurs when reading instruction has been adapted to address an individual child's specific literacy needs. This is critical for second language learners (SLL) and students who come to school with a learning deficit. Differentiated instruction includes making use of multiple instructional strategies and a range of organizational and classroom management techniques. Differentiated instruction also supports students working in pairs to promote dialogue and cultural sensitivity among the participants. The findings from this study indicate eBooks have been used to support differentiated instruction in a number of ways, for implementing vocabulary intervention to kindergarteners from low SES households (Shamir et al., 2011) to buddy reading activities with two culturally diverse students (L. C. Larson, 2010). Below is another example how eBooks support differentiated instruction

The L. C. Larson (2015a) study demonstrated how eBooks were integrated by a teacher with little technology pedagogy and its positive effect on both students and the teacher. It provided a model of successful implementation, one of the three change promotion strategies recommended to address and promote teacher's self-efficacy issues (Hew & Brush, 2007). L. C. Larson (2015a) collaborated with a sixth-grade teacher to expand his teaching and reading instructional strategies in order to meet the needs of his students and the district's focus on implementing the Common Core State Standards. The focus of the collaboration was on integrating digital text with audio to create a combined reading/listening experience. The first whole class session began with an overview of the eBook's basic tools. The subsequent eleven sessions began with a conversation about the book selected for the class read. This was followed by a mini-lesson on a reading strategy or technology-related topic. Students were given a daily

reading assignment and time in class to read and/or listen to the story with a partner, or read independently. Students were encouraged to complete the assignment at home or reread assigned chapters as needed. Sessions 13 – 17 used a similar framework except the students were put into two groups based on reading abilities and interests. Students were encouraged to use the embedded tools and features as needed and some did; 65 percent highlighted words/passages, 88 percent of the students used the pop-up dictionary (with pronunciation support), and 100 percent inserted electronic notes. A visually impaired student took advantage of adjusting font size, enabling him to engage with the same texts as his peers. Electronic notes became formative assessments for comprehension and vocabulary understanding. There was also a shift in the class's social dynamics; the students developed high levels of expertise with the technology and became the teacher, sharing their new skills with the others. As a result, the students began to experiment with the different tools to find their best learning mode. The experience also changed the way the teacher taught reading. Instead of using a round-robin approach to reading stories from the language arts textbook, the teacher began implementing flexible groupings and targeted mini-lessons.

In conclusion, eBooks are an effective tool for differentiation of instruction. In some ways, all of the examples given in the above categories of literary instruction provide ways for educators to differentiate instruction. I recommend the L. C. Larson (2015a) study be read by educators and media specialists because it demonstrates how eBooks were integrated by a teacher with little technology pedagogy and its positive effect on both students and the teacher. It provided a model of successful implementation, one of the three change promotion strategies recommended to address and promote teacher's self-efficacy issues (Hew & Brush, 2007).

In summary, the studies collected provided insight into many ways eBooks have been authentically integrated with literacy instruction. The examples provided a range of student context and components of a balanced approach to literacy instruction. Now educators can begin to develop a sense of self-efficacy because they can take advantage of existing content and pedagogy knowledge and become more meta-cognitively aware of when eBooks can be integrated; allows them to develop their technological pedagogical knowledge.

How eBooks were integrated with literacy instruction

This section of the analysis was structured around the components of the technology integration matrix (TIM) model (Florida Center for Instructional Technology, 2013). The TIM model incorporates the five interdependent characteristics of a meaningful learning environment with five levels of technology integration. The purpose of this section was to provide examples how eBooks were integrated with literacy instruction so that teachers can identify their level of technology integration with eBooks and adjust as needed to support student engagement. These findings present the type of technological pedagogical knowledge educators need to meet the diverse needs of K-6 students as they engage with eBooks to develop digital literacy skills and competencies. Like the analysis section above, the following analysis sections are interrelated. For example, two kindergarteners worked collaboratively to activate the dictionary hot spot (Shamir, 2009) is an example of an adoption level of technology integration in an active learning environment. They used the hot spot in a conventional way while actively engaging with the computer.

Entry level of technology integration. At this stage, students' engagement with eBooks reflected a high degree of teacher control (Florida Center for Instructional Technology, 2013).

This study found entry level engagement occurred often during the beginning of an eBook engagement as a form of scaffolding. During familiarization sessions, teachers demonstrated to students, particularly kindergarteners, how to navigate the eBook and activate embedded supports like the dictionary and electronic notes (Ciampa, 2012a; de Jong & Bus, 2002; O Korat & Shamir, 2008; Pearman, 2008). Entry-level engagement also occurred at the beginning of the literacy by design sequence for students with significant intellectual disabilities (Coyne et al., 2012). The teachers decided which component of the eBooks would be utilized and then, along with the assistants, worked one-on-one with the students. Within two to three months, the students began to navigate the eBooks, eventually moving into the adoption level of integration.

Adoption level of technology integration. eBook integration with literacy instruction is considered at the adoption level when students use eBooks in conventional ways (Florida Center for Instructional Technology, 2013). The adoption level descriptors include students have the opportunity to use eBook tools in conventional ways and teachers have a degree of control, regulates the activities. The findings from this study found students engaged with eBooks on an adoption level during repetitive type literacy activities. Below are some examples when eBooks were integrated at the adoption level.

Shamir, Korat and colleagues. (2012; 2011) regulated the number of times a group of kindergarteners were exposed to the same title in their study. The rationale was based on their prior research indicating that the motivation to work with the same eBook decreases significantly after the sixth experience. Their research also reported that eBooks may be an appropriate tool for developing early literacy skills that require repetitive exposure such as vocabulary acquisition (Shamir et al., 2011).

Brown's (2016) study provided an example of eBook integration at the adoption level. The researcher was interested in in identifying the pedagogies needed for a classroom to support multimodal literacies and for students to become digitally literate. One of the study's guiding questions was "How does interacting with multimodal picture books on a digital device contribute to the reading process for diverse learners" (p. 45)? The insights gleaned are from analyzing data from student interview transcripts and open-ended interviews. The students used their e-readers to practice the skills taught during the mini-lessons. They listened to story's narration prior to students' independent reading. They participated in group discussions about their reactions to passages, asked questions about unknown words, and helped each other make meaning of the text. The analysis saw an increase in time on task and attention to reading, and engagement in conversations around reading and the storyline. Students preferred to talk to each other about their reactions rather than use technology to record their thoughts and insights. The study also saw a growth in students' sense of control of their learning process and possibly a shift from the adoption level of technology integration into adaptation. For example, two of the SLL students preferred to listen to the story narration than read the text. One student began to independently navigate through the story, self-differentiating his approach to reading.

The researcher (Brown, 2016) recommended that e-readers be introduced in the early childhood classrooms since time is needed to move students through the initial stages of technology integration. Also, e-readers and eBooks can address the literacy challenges facing SLL. SLLs need opportunities to engage with rich interactive eBooks because the interactive features and tools provide multiple paths to understanding the new language through various formats.

The Matthew (1997) study, though a bit dated in terms of the type of technology used, provided some advice for teachers just beginning to adopt eBooks into the classroom. To benefit from reading eBooks, students must be electronically literate. They need specific instruction in and practice with the interactive tools and features so they have the skills to determine when and how to use the tools to support comprehension. They need time to develop the self-efficacy that they can be successful with the eBook. Some of the students remarked that they saw the potential eBooks have with struggling readers. In short, students need to spend time in the adoption level of technology before they can move into the adaptation level. They need intentional guidance from teachers so that the stories do not become computer games as they activate the different interactive tools and features (Matthew, 1997, p. 271).

In conclusion, eBooks have been used in conventional ways including as a replacement for print, and to practice skills taught during instruction. The analysis identified some recommendations to enhance student engagement at the adoption level. Introduce eBooks in the preschool learning environment because it takes time to work through the initial stages of technology integration. Intentional guidance and engagement will support growth in their self-efficacy and may prevent interactive stories from becoming a game.

Adaptation level of technology integration. This stage is marked by the teacher encouraging students to decide how and when to use eBooks and their embedded tools and features (Florida Center for Instructional Technology, 2013). One indicator that differentiates adaptation from adoption is the independence students have in using eBook tools and understanding what the tools can do to support learning. This section provides two examples when students engaged with eBooks at the adaptation level. What the findings found in both studies was a positive correlation between degree of independence and increase in motivation

and reading engagement. When students had a voice and choice in the eBooks to read, and tools to use, their motivation to engage in reading increased.

The Ciampa (2016) case study offers insights on how to help children decide how and when to use eBooks. The focus of the study was to examine the effect eBooks had on first graders' curiosity, choice, and ability to overcome challenges, aspects of intrinsic motivation. Initially the researcher provided guidance while students selected eBooks to match their reading levels. Students independently read the book during free time and during regularly scheduled literacy blocks. Analysis of the data collected revealed that students preferred eBooks to print because it provided them a voice and choice in titles to read, met their personal reading interests. The narration and corresponding highlighted text made it easier to read and follow along, eliminating their need to decode and instead focus on making meaning from the text. These tools also supported them as they took on more challenging text. Students learned in a happenstance fashion that they could zoom in and out and with a tap of their finger, the dictionary popped up. This tool stimulated their sensory curiosity. An interesting observation was that all of the children "persisted in answering the embedded eBook comprehension questions regardless of the difficulty level or question type" (Ciampa, 2016, p. 685).

The L. C. Larson (2010) case study of two second-grade students buddy reading reflects the characteristics of the adaptation level of technology integration. The classroom teacher had been advocating technology integration by encouraging her students to read online text and use social media to share their reading experiences such as blogs. What she had not explored were digital readers/eBooks and wanted to support students' engagement with this new technology. Therefore, when she started two girls, Amy and Winnie on an eBook adventure, she was not able to provide a lot of initial support. Over the next three weeks the girls figured out how to

physically interact with the text and decided which tools to use when. They also used the annotations/note tool to respond to the story. The students were not concerned with grammar and other proper writing conventions and mechanics. They selected the tool to meet their needs to record thoughts, questions, and emerging insights. The two girls consistently accessed the built-in dictionary and activated the text-to-speech features to meet their learning needs. As a result of the experience, there was a change in Amy's disposition. Her attitude towards reading changed as she gained confidence in herself as a reader. Winnie, an avid reader, engaged with eBooks because she could take notes and mark up the text, something she could not do with a print book. The teacher also gained insight into ways she can differentiate her reading instruction.

In conclusion, when students have the ability and opportunity to adapt an eBook to meet their needs, they are more motivated to engage with reading. It occurs when teachers provide guidance and support with gradual release of responsibilities. The result is a change in the reader's attitude and an increase in reading engagement.

Infusion level of technology integration. The infusion level is characterized by the use of eBooks throughout the day and across subject areas (Florida Center for Instructional Technology, 2013). Infusion occurs when the instructional focus is on student learning and the use of technology is self-directed; students are able to select eBooks for specific purposes outside of literacy instruction. There were not many examples that modeled an infusion level of technology integration due to the narrow focus of the study – integration of eBooks with literacy instruction in the K-6 school setting.

Transformation level of technology integration. The transformation level of technology integration is characterized by students engaging with literacy in ways not possible without eBooks (Florida Center for Instructional Technology, 2013). It occurs when the reader has the knowledge and understanding of eBooks and its tools to be creative and flexible and results in learning outcomes not possible without the technology. This analysis found a number of examples because the eBook's interactive tools and features impacted the ways students engaged with literacy in ways not possible without them. For example, the built-in dictionary and text-to-speech options allowed struggling readers and second language learners (SLL) to interact with text above their independent reading levels (Ciampa, 2012a). The multisensory experience offered through the text, voice, pictures, and animations, created the type of active learning situation that increased student focus and engagement (Shamir et al., 2011; D. J. H. Smeets & Bus, 2012). Findings from the L. C. Larson (2010) case study suggested that the use of digital reading devices promoted new literacy practices, extended connections between reader and text made possible by the interactive tools and features, and put the reader in greater control of the learning process than when reading printed text.

A transformative learning environment was also created when the researcher(s) designed and developed an eBook that met specific literacy skills (O Korat & Shamir, 2008; Phadung et al., 2013; Shamir, 2009; Shamir & Korat, 2007; Shamir et al., 2012; Shamir et al., 2011). Below is an example of the type of eBook developed by the team of Korat and Shamir (2008; 2009; 2007; 2012; 2011)

> Three different modes, activated separately, were offered by the e-book: (1) read story only, (2) read story with dictionary, and (3) read story and play. An actor reads aloud the printed text in all three modes. Each word of the written text is highlighted so that the

> children can follow the text word by word. The e-book also contains automatic dynamic visuals that dramatize story details and the complete story scene; additional music and film effects are included. To further motivate children's reading and involvement, each e-book screen includes a forward button (a colored arrow pointing to the right) and a backward button (an arrow pointing to the left) to allow children to returning to previous screens or to continue on to the next screen (Shamir, 2009, p. 85).

The outcomes for the various studies were targeted intervention with positive growth greater than the same situation sans the eBook; "One can conclude that the improvement in children's phonological awareness from pre- to post-intervention was due to their activity in the read and play mode, which included interactive operations of hotspots designed for phonological awareness" (Shamir & Korat, 2007).

The L. C. Larson (2015a) case study of a sixth-grade teacher and classroom of 26 students offers examples of what a transformative classroom looks like and the affect it may potentially have on student engagement. A student with visual impairment participated in a book group by increasing the font size. Another student completed his reading assignment on the way home from soccer practice at night, in the dark. Some of the tools provided the scaffolding to support student reading engagement are not available with print text. For example, the use of audiobooks with eBooks helped some to envision the characters in the story while others found the narrator's voice set the mood. In both cases, the tools stimulated their imagination and curiosity in ways that print could not. Students' reading stamina grew because the audio support helped them focus on the storyline rather than decode and define an unknown word. The students were not the only ones to be affected by the type of technology integration. The teacher assessed students' progress quickly and easily by clicking on the Notes button

display on the devices. It allowed him to see any and all marks and notes inserted into the eBook. Also, the teacher's understanding of eBooks and audio books gave him the knowledge and self-efficacy to transform how he taught literacy. He moved from following a rigid plan to implementing student-centered instructional learning opportunities.

In summary, transformative integration can take place when the eBook interactive tools and features meet the needs of the readers. Also, transformative classrooms may occur when the students develop technological knowledge of eBook's interactive features and tools. When students engaged with dynamic dictionaries, they activated multiple learning modalities which resulted in deeper word learning (Reutzel & Cooter Jr., 2015). I recommend educators read the L. C. Larson (2015a) study because it may provide the evidence reluctant teachers need to integrate eBooks, one of the three change strategies recommended by Ertmer (2005).

Active learning environment characteristics. Active learning involves students actively engaging with eBooks as a tool for learning (Florida Center for Instructional Technology, 2013). Active learning describes a majority of the engagement reported in the research collected because students were using eBooks to build their literacy skills through engagement with eBooks. Perhaps the least active use of eBooks occurred during familiarization sessions and when an eBook was integrated with an interactive whiteboard for whole class instruction (Phadung et al., 2013). One student at a time, turned pages or activated a hot spot; the rest were passive.

What the findings indicate is, when given a choice between engaging with print books or eBooks, students seem to be more actively engaged with eBooks than their print counterpart (Chaudhry, 2014; L. C. Larson, 2015a; Pearman, 2008; Wright, Fugett, & Caputa, 2013).

Wright, Fugett, and Caputa (2013) studied three second graders' engagement with the multimodal options available in eBooks that supported developing reading skills: thesaurus, dictionary, and text-to-speech capabilities. The study compared two reading methods, reading a story using a print book with access to print thesaurus and dictionary and reading an eBook and using the multimodal options. The results showed the students appeared to be more actively engaged with the multimodal options in comparison to the print options.

The analysis also found increases in engagement, motivation, and in literacy growth. Much of the change can be attributed to the students' active engagement with the interactive tools and features and the teacher's understanding that "the shift from print to digital text is often gradual and should be expected to take time" (L. C. Larson, 2015b, p. 172).

Collaborative/cooperative learning environment characteristics. Collaborative/ cooperative learning is described by the degree to which students use eBooks and/or its tools to collaborate with others (Florida Center for Instructional Technology, 2013). This study's findings identified a range of collaborative/cooperative learning environments, from the teacher directing kindergarteners to share an eBook (Shamir et al., 2008) to a sixth-grade teacher collaborating with a researcher and a classroom of students to learn how to bring eBooks and audiobooks into the classroom and engage students with relevant literacy experiences (L. C. Larson, 2015a). Other examples of collaborative learning have been mentioned earlier such as the Brown (2016) yearlong study of second-graders interacting with each other about digital picture books and the L. C. Larson (2010) case study of two second grade girls with diverse reading levels and ethnic/linguistic backgrounds buddy reading with eBooks. Below are two more examples.

Shamir and others (2008) studied the effect paired peer learning had on emergent literacy skill when kindergarteners from low SES neighborhood engaged with eBooks. One partner was randomly selected to be the tutor and shown how to turn pages, activate hot spots, etc. The students participated in two 30-minute sessions with the tutor assisting the tutee who controlled the computer mouse. The results showed the tutors experienced the greatest improvement in overall emergent reading growth followed by the tutees and then students who worked individually with the eBooks. Their recommendation is kindergarteners can benefit from paired peer learning with high quality eBooks.

Segal-Drori, Korat, and Shamir (2014) examined the effect adult support had on paired peer learning groups' emergent reading skills, phonological awareness, CAP, and word reading. Participants were kindergarteners from low SES households and the adult support given during and after the sessions focused on emergent reading skills. Activities included dividing the ten focal words from the text into syllables and sub-syllables. The results showed the paired peer group with adult support had the greatest progress in all three emergent reading skills in comparison to paired peer learning with print and adult support. The researchers implied that kindergarteners need some type of adult support when engaging with eBooks to foster emergent reading skills.

The findings indicated a common theme appeared in many of the studies; the role dialogue played in deepening student engagement and comprehension. The L. C. Larson (2015a) case study provided insight into the positive effect collaborative learning has on reading engagement for sixth graders. This study is relevant to intermediate literacy instruction because students' attitude towards reading drops considerably between sixth and eighth grade (McKenna, Conradi, Lawrence, Jang, & Meyer, 2012). Developing confident eBook readers via a

collaborative learning environment might provide a solution to this downwards trend. This is a consideration for future research.

Constructive learning environment characteristics. Constructive learning occurs when students use eBooks to build new knowledge/meaning for themselves and possibly others rather than simply receiving information (Florida Center for Instructional Technology, 2013). In other words, they select and use eBook tools to help construct meaning from the text.

While analyzing the data for themes and ideas, the following observation emerged: the eBook's interactive tools and features provided critical scaffolding for the reader to construct meaning from the text for themselves and others. Brown's (2016) qualitative study identified a number of ways constructive learning took place in a classroom of second graders from a Title I school. The context of the study includes 21 students of which eleven were receiving daily services to support English language acquisition, second language learners (SLL). Each student had her own e-reader. One group of students was engaged with the same book and were struggling with the word lumpia. They collaboratively solved the issue by activating the audio narration of the word a couple of times and then used the text and illustrations to construct the meaning of the word in its context. Some of the SLL students preferred to listen to the story because of language barriers. Cameron used the animated images to construct meaning of a particular passage about a rabbit wondering what it would be like to be green in color. Jin, a SLL student chose to build her vocabulary bank and improve her fluency by repeated listening and mimicking the words spoken.

Pearman (2008) studied a group of second-grade students from a rural school district to determine the effect a multisensory reading experience had on reading comprehension. The

analysis of the data revealed that the electronic text format was found to be engaging for the four students identified as having attention-deficit hyperactivity disorder. The study concluded that it is possible that the music and animations, part of the story's multisensory features, provided a focus for the students' attention. Struggling readers benefitted from having the story narrated and unknown words pronounced thereby decreasing their focus on decoding and increasing the time spent on meaning making and comprehension. In short, the eBook's interactivity provided the scaffold struggling readers needed to construct new knowledge and meaning from the text.

Some of the quantitative research designed studies involved comparing two groups engaged with the same activity; the experimental group worked with the eBook and the control group with the print version. The increases in comprehension were often attributed to the interactive tools and features. For example, in the Matthew (1997) study, third graders read three books either in print or digitally. Reading comprehension scores as measured by retelling, showed a statistically significant difference between the experimental group and the control group. The effect size was +0.5. The difference was attributed to the "multisensory learning experience that enables students to literally interact with the text and illustrations and to actively process the text, both of which lead to a personal understanding of the text" (Matthew, 1997, p. 269). This finding points to the need for teachers and media specialists to examine eBooks' features and select those that provide the scaffolding students need to construct meaning.

The Ertem (2010) study of fourth graders reading a year or two below their grade level, tested the effect of eBooks on reading comprehension using three groups; eBooks with animation, eBooks without animation, and printed version of the story. Statistically significant differences were found between the electronic storybooks with animation and the traditionally printed book ($p < 0.05$). The conclusion: "In addition to improving comprehension, animation

may be beneficial when struggling readers read narrative texts. Therefore, having animation and playing options on electronic storybooks can be helpful for struggling readers to construct meaning from narrative reading materials" (Ertem, 2010, p. 150).

In conclusion, the eBook interactive tools were crucial to students' ability to construct meaning from the text. Audio narration and animated visuals were the scaffolding for constructing meaning from unknown words and comprehending passages in a new language. The multisensory features provided a focus for students with identified attention-deficit-hyperactivity disorder. Students who were disengaged appear motivated to engage.

Authentic learning environment characteristics. Authentic learning takes place when eBooks are used to complete tasks that are meaningful rather than for artificial assignments (Florida Center for Instructional Technology, 2013). It is characterized by the learning activity having a high degree of relevance to the student and its ability to tap into his/her intrinsic motivation. This research identified two authentic learning environment examples that may provide different perspectives for teachers developing their self-efficacy. The first example, Ortlieb and others (2014) can easily be replicated in other context. The second example, Larson and others (2015a) showed authentic learning from both the teacher's and the student's perspective.

The Ortlieb and others (2014) study is an example of integrating an authentic assignment with eBooks to support reading comprehension. The method for instruction took advantage of fourth grade students' interest in social media and digital text. Struggling readers were assigned to construct a book review for an online website. Students used an online eBook platform to select digital text based on their interests and reading level rather than have it assigned by the

teacher, and received one-on-one explicit instruction on comprehension strategies. Their written reviews were posted on the eBook platform's website, promoting 21st century digital literacy skills.

The L. C. Larson (2015a) study provided a perspective of an authentic learning environment. The teacher began his exploration of eBooks and audiobooks with an authentic purpose – how can he update his "limited repertoire of instructional strategies for teaching reading and his unfamiliarity with technology" (L. C. Larson, 2015a, p. 170). What followed was the opportunity for his sixth-grade students and himself to engage with literature in an authentic way. For example, students decided when and how to use eBook and audiobook tools that was most meaningful to the task at hand (Florida Center for Instructional Technology, 2013). When students discovered a new eBook or audiobook tool, they became the expert and helped others master the tool. Students' engagement with literature increased because their desire to listen and read at the same time helped them build their stamina (L. C. Larson, 2015a, p. 174). These experiences afforded the teacher new possibilities for engaging students with literature in a manner that was authentic to their interests and needs. He began to see himself as a facilitator of learning rather than the sole source of knowledge.

In summary, authentic learning took place when teachers intentionally integrate eBooks with activities relevant to the students. Utilizing social media to write book reviews gave struggling readers an authentic purpose for reading. Other students took on a leadership role when they mastered a new tool and demonstrated it to others.

Goal directed learning environment characteristics. Goal directive learning takes place when students use eBooks to set goals, plan activities, monitor progress, and evaluate

results (Florida Center for Instructional Technology, 2013). The purpose of goal directed learning is the student determines, plans, and monitors an activity, a goal involving eBooks in some manner. This study did not yield any research that provided an example of goal directed learning. This is a consideration for future research.

In summary, qualitative content analysis enabled the researcher to select a body of research relevant to the study's goal and extract data based on the technology integration matrix (TIM) model, the study's conceptual model. TIM provided a framework for identifying how teachers and media specialists can modify current practices and support students' development of digital literacy skills and competencies. This study's findings found evidence for nine of the ten components of the TIM model. The study did not curate data pertaining to the goal directed learning environment possibly due to the narrow focus of the study – eBook integration with K-6 literacy instruction. The next step is to identify the relevance of integrating eBooks to student achievement; why eBooks should be integrated with literacy instruction.

Why eBooks should be integrated with literacy instruction

The purpose of this section was to share the results why teachers and media specialists should integrate eBooks with literacy instruction. The process of examining and analyzing the data was done with the assumption that having knowledge of evidence-based practices does not guarantee teachers will integrate technology in the classroom (Bandura, 1993). Educators with a strong sense of perceived self-efficacy in utilizing technology are more likely to set high goals for technology integration and remain committed to them (Bandura, 1993; Wozney et al., 2006). To change current instructional practices, educators need the self-efficacy to implement technology in a way that will benefit student learning and address their needs (Ertmer, 2005;

Ertmer & Ottenbreit-Leftwich, 2010; Hughes, 2005; Hutchison & Reinking, 2011). Therefore, the focus of this section was to look at the data in terms of identifying how students' literacy needs were met and the benefits that occurred when eBooks were integrated with literacy instruction and provide the evidence to support the results.

What emerged from the process were three connected themes that emanated from over a majority of the studies. First, eBooks have a positive effect in building and sustaining reading motivation and engagement. Second, this leads to literacy growth and development. Third, the catalyst for much of the change that took place was the interactive tools and features embedded within the eBooks. It is not surprising that these are the three threads that weave the data together because reading motivation and reading amount are correlated at .64 ($p < .001$) and reading amount is a predictor of reading comprehension (Guthrie et al., 2010). For example, the Hess (2014) yearlong study examined the effect e-readers had on student achievement and motivation towards reading. The reading motivation survey given showed an overall increase in the students' willingness and eagerness to read eBooks and the teacher to engage students with eBooks during independent reading time. The standardized reading test given showed a significant change from fourth to fifth grade with the control group measuring a 5.44-point increase while the control group increased by 1.68. The analysis also identified the scaffolding role interactive tools and features provided for many of the studies' participants as they developed a range of literacy skills while engaged with eBooks. Below is the evidence to support these results.

Reading motivation. Reading motivation emerged as one of the connected themes because many of the studies reported changes in students' attitude and behavior towards reading. The significance of this is reading motivation and reading amount are correlated, and reading

amount is a predictor of text comprehension (Guthrie et al., 2010). The Ciampa (2012a) case study on eBooks and reading motivation illustrates the effect eBooks have on motivation. For example, the participants in the study reported placing "a higher value and importance on learning to read well by the end of their computer program involvement" (p. 122). They liked having a voice and choice in what they read. This enabled some students to self-differentiate their reading strategies in ways that met their reading needs. A student tapped into her fascination with computers to support her willingness, her self-efficacy to engage with eBooks. Finally, the researcher shared that the three students who had reading and behavioral difficulties, began to shift their sense of self-worth as a reader from being not in control to positive self-talk; a shift in self-efficacy (Ciampa, 2012a, p. 126).

Opportunities for control and choice regarding which title to read and what tools to manipulate helped students work through their eBook at their own pace (Brown, 2016; Ciampa, 2016; Ertem, 2010; L. C. Larson, 2015a). Students reported an increase in the number of books read and the time spent reading. The resulting cascading effect was students requesting more books by their new favorite authors (Brown, 2016) and others chose to read eBooks at home and during independent reading times (Ciampa, 2012a). One anecdotal report from a study involving students with significant intellectual difficulties disclosed that the students were having so much fun that they did not realize they were learning (Coyne et al., 2012). Students were not the only ones to experience increased motivation to engage with eBooks. Teachers experienced increased motivation to engage with eBooks.

Two case studies showed the change that occurred with teachers as they learned how to integrate eBooks with student engagement. For example, a teacher (L. C. Larson, 2015a) found the success of the project improved his perceived self-efficacy. This resulted in his taking a

student-centered approach to instruction and became more proactive in embedding technology throughout classroom learning. The classroom teachers in the Hess (2014) study shared their excitement to bring eBooks into the classroom. eBooks enabled them to differentiate reading groups with new and current title, and provide multiple copies of titles students requested.

Literacy growth and development. One of the characteristics of effective instruction is knowing about the processes students employ when reading eBooks in order to assess their progress towards being literate and differentiate instruction as needed (Reutzel & Cooter Jr., 2015). Effective teachers need to think about the materials available and how to best manage them. In this case, the materials are not so much a particular literature genre but the components of eBooks and the processes students engage in when interacting with an eBook. Therefore, this section of the analysis describes the type of reading growth and development that took place and why and the "materials" available to support literacy growth and development.

The team of Korat and Shamir has published extensively on the effect eBooks have on the development of emergent literacy skills for a range of kindergarteners (Ofra Korat, 2010; Ofra Korat, Levin, Ben-Shabt, Shneor, & Bokovza, 2014; Ofra Korat et al., 2009; O. Korat & Shamir, 2007; O Korat & Shamir, 2008; Ofra Korat et al., 2011; Segal-Drori, Korat, Shamir, & Klein, 2010; Shamir, 2009; Shamir & Korat, 2007; Shamir et al., 2008; Shamir et al., 2012; Shamir et al., 2011; Shamir & Shlafer, 2011). Collectively their findings show significant progress in emergent literacy skills, especially for children from low socioeconomic status homes. Much of the credit is given to the design elements of the eBook including the placement of hot spots and highlighting of words and embedded dictionary option (Shamir, 2009; Shamir et al., 2008). This body of research indicates that carefully designed eBooks and motivating

activities could stop students at risk of learning difficulties from falling further behind (O Korat & Shamir, 2008; Shamir & Shlafer, 2011).

In a case study by Larson (2015a) there was an increase in the sixth graders' stamina over a five-week span as a result of the integration of the eBook with an audiobook. From the teacher's perspective, the boost in stamina was due to an overall increase in motivation and interest in reading. The Ciampa (2012a) study reported growth in reading fluency rates and word recognition skills for all the first-grade participants, including three students identified as struggling readers. For example, a struggling student moved from being a nonreader to reading and understanding high-frequency words, and made self-corrections in two school terms. Also, the students reported feeling positive about digital reading. Finally, the three struggling readers were able to stay engaged and completed reading activities using technology without adult assistance. A key factor for their engagement were the eBook's interactive tools and features, and the ability to self-select what they read.

Interactive tools and features. Interactive tools and features provided the scaffolding to support reading growth and development for all types of readers (Ertem, 2010; L. C. Larson, 2010). Interactive modalities engaged different cognitive facilities (Shamir et al., 2012). Korat and others (2014) noticed a synergetic effect occurred when the multimedia effects were in close proximity to the text; special cognitive processes were activated and provided strong scaffolding for learning new words and languages. The multisensory learning experienced by students enabled them to "literally interact with the text and illustrations and to actively process the text, both of which lead to a personal understanding of the text" (Matthew, 1997, p. 269). For example, the embedded music foreshadowed a change was occurring on the next page and thus

the child's attention was engaged (Pearman, 2008). Experiences like this musical prelude provided rich context to the storyline (Grimshaw, Dungworth, McKnight, & Morris, 2007).

The narration tools and features enabled struggling readers to shift their efforts on decoding to listening and constructing meaning from the text (Ertem, 2010; Pearman, 2008). The narrated text removed the issue of decoding for struggling readers and second language learners, and allowed them to focus on constructing meaning from the text (Ciampa, 2012a; Pearman, 2008). Therefore, students stayed on task, increased the amount of time spent reading, and engaged in conversations with others about the book resulting in an increase in enthusiasm to read and the confidence to do so (Shamir et al., 2012).

The embedded dictionary was probably the most effective tool for supporting reading growth and development. The ease of accessing the eBook's dictionary made it easier for students to integrate the dictionary with the reading process, especially children at risk for learning disabilities (Grimshaw et al., 2007; Shamir et al., 2011). Another study by Shamir (2009) showed that similar kindergarteners' improvement in word meaning skills was significantly associated with the overall number of dictionary activations.

Interactive tools and features provided the scaffolding to support student engagement and increased self-efficacy (Kao, Tsai, Liu, & Yang, 2016). Tools such as animated pictures and narrated text caught the readers' attention and stimulated their sense of curiosity (Brown, 2016; Ciampa, 2016). The effect was students stayed on task, increased the amount of time spent reading, and engaged in conversations with others about the book. (Brown, 2016). The outcome was increased enthusiasm to read and the confidence to do so. Finally, the interactive tools enabled students to perform tasks that may present a challenge with print text such as highlight

words and passages and post electronic notes that can be retrieved electronically and not damage the book or fall out (L. C. Larson, 2015a). Text-to-speech and built-in dictionary supported the student's ability to independently decode new words and build reading self-efficacy.

In summary, the purpose of this chapter was to identify the research based practices that emanated from the body of data, advocating when, how, and why to integrate eBooks with literacy instruction. The chapter's structure reflected the components of a balanced approach to literacy instruction and the constructs of the technology integration matrix (TIM) model so that educators will then have the opportunity to use the TIM constructs to identify their level of technology integration and adjust as needed to support student engagement. This is the type of technological pedagogical knowledge educators need to meet the diverse needs of K-6 students as they engage with eBooks to develop digital literacy skills and competencies. The chapter concluded with a set of findings supporting why eBook integration is of value. The set of findings are three connected themes: eBooks have a positive effect in building and sustaining motivation and engagement which lead to literacy growth and development. The catalysts for changing reading motivation, engagement, and literacy growth and development were the interactive tools and features embedded within the eBooks.

Chapter 5: Conclusion and Recommendations

Chapter five contains the following components: summary of the findings and the answers to the research questions; implications of the findings for media specialists; limitations to the study; and recommendations for future research in the area of eBook integration with literacy instruction.

Summary

The purpose of this study was to examine the body of research on the use of eBooks in the K-6 school setting in order to address the perceived lack of effective evidence-based practices. The goal was to identify effective pedagogical knowledge regarding when, how, and why to integrate eBooks into literacy instruction so that media specialists can then collaborate with educators to support students in developing the digital literacy skills and competencies needed to access and engage with eBooks (American Association of School Librarians, 2010; Duke & Keene, 2011).

This goal was accomplished by employing two conceptual frameworks, the technological pedagogical content knowledge framework (M. Koehler et al., 2013) and the technology integration matrix (TIM) model (Arizona K12 Center, 2012) with qualitative content methodology to address the following questions regarding integration of eBooks with K-6 literacy instruction:

1. According to the extant literature, what types of K-6 literacy practices and engagements with eBooks are identified?
2. What does the body of research recommend as the technological instructional pedagogies and knowledge needed by educators to meet the diverse needs of K-6

students as they engage with eBooks to develop digital literacy skills and competencies?

The research process collected 37 peer-reviewed articles on K-6 literacy practices that integrated eBooks. To identify the types of K-6 literacy practices and engagements with eBooks found in this body of relevant data, the study utilized the technological pedagogical content knowledge (TPACK) framework as the rationale for employing the components of a balanced approach to literacy instruction (Reutzel & Cooter Jr., 2015), the content knowledge this study assumed educators already possessed. Evidence of literacy instruction with eBooks was collected for seven of the ten components of a balanced approach to literacy instruction. The seven components were early reading concepts, skills, and strategies combined with phonics and word identification; reading vocabulary; reading comprehension; reading and writing connection; reading motivation and engagement; and differentiated instruction. Research studies and resulting units of coding did not yield information regarding eBook integration with oral language development, reading fluency, or academic literacy instruction. It could be a result of parameters that defined the narrow range of research – peer reviewed research regarding the integration of eBooks with K-6 literacy instruction. For example, research on oral language development often involved pre-kindergarten age children and was eliminated due to the age range parameter. Academic literacy instruction is often taught in the context of middle and high school core content curriculum and eliminated due to the age range parameter. I was surprised no research was found on the integration of eBooks with fluency instruction.

The second question of the study asked for the identification of the technological instructional pedagogies and knowledge needed by educators to meet the diverse needs of K-6 students as they engage with eBooks to develop digital literacy skills and competencies. This

knowledge is the technological pedagogical knowledge (TPK) the TPACK framework recommends educators have to effectively engage students with eBooks during literacy instruction. The question was answered by applying the technology integration matrix model (TIM) (Arizona K12 Center, 2012) to the body of data collected. The TIM model provided the tools to identify the TPK some educators lacked, exactly how and when eBooks were integrated with literacy instruction. The outcome was a number of examples for nine of the ten constructs; entry, adoption, adaptation, infusion, and transformation levels of eBook integration; and active, collaborative constructive, and authentic learning environment characteristics. No research nor data was found to demonstrate literacy instruction in a goal directive learning environment.

The TIM model was embedded in the coding frame and analysis because a positive correlation exists between technology integration and student engagement (Barbour, 2015). By providing teachers with examples of eBook integration in terms of the TIM model, this study can support teachers building their TPK. They now have access to tools to assess their current literacy practices such as the TIM model and then use the examples collected to adjust eBook integration as needed to meet the diverse needs of K-6 students.

The final component of the summary highlights the findings regarding why eBooks should be integrated with literacy instruction. To transform current instructional practices, educators need to believe they have the self-efficacy to implement technology in ways that will benefit students and address their literacy needs (Ertmer, 2005; Ertmer & Ottenbreit-Leftwich, 2010; Hughes, 2005; Hutchison & Reinking, 2011). What emerged from the analysis process were three connected themes. eBooks have a positive effect in building and sustaining reading motivation and engagement. This leads to literacy growth and development. The catalysts for the change in reading motivation and engagement, and literacy growth and development were the

interactive tools and features embedded within the eBooks. It is these interactive tools and features that transformed reading print or its static pdf version into an engagement with text that was multimodal and multisensory, activating different components of the brain while scaffolding students' development of their self-efficacy as readers.

The effect of interactive tools and features on reading motivation, engagement and literacy growth and development is an important finding for K-6 teachers, literacy leaders, and media specialists, especially those working with children from low socioeconomic homes who often begin their formal schooling with weak academic skills (Hernandez, 2011). As stated earlier, current literacy research supports a positive correlation between academic achievement in early literacy and later school success (Hernandez, 2011; Strickland, 2013) such as described by the Matthew Effect (Stanovich, 2010); children who are progressing as readers continue this trend whereas children who lag behind in reading growth continue to fall further behind. This study identified that eBooks with appropriate interactive tools and features, have been and can be used by struggling K-6 readers to address their lack of literacy skills. eBooks can be used as a tool to address the Matthew Effect by providing students an opportunity to engage with literacy and promote reading growth and development in a way print does not.

The significance of this study is eBooks can be an effective tool for supporting students' growth in literacy when teachers and media specialists have the technological pedagogical knowledge (M. Koehler et al., 2013), the understanding how eBooks can change literacy instruction. eBooks can be an effective tool because students are motivated to read eBooks when interactive tools and features provide the support needed to successfully engage with reading. Below are some examples demonstrating the interplay between motivation, literacy growth and development, and eBook interactive tools and features. The examples provide instructional

practices educators may use to develop their perceived sense of self-efficacy and belief that eBooks can meet the diverse literacy needs of K-6 students.

eBooks with embedded audio files and dynamic visuals enabled kindergarteners from low socioeconomic households to develop early reading skills independent of the teacher and at their own pace (Shamir et al., 2012; Shamir et al., 2011), enabled students to be involved with reading and build their reading efficacy, two aspects of motivation (Wigfield, 1997). Paired peer reading with audio files and dynamic visuals supported collaborative knowledge construction (Shamir, 2009); supported motivation's social reasons for reading (Wigfield, 1997) and resulted in increased scores for sub-syllabic phonological awareness.

During digital reading workshops and read and response engagements, second grade students re-listened and/or reread portions of their digital text as comprehension needs dictated (Brown, 2016; L. C. Larson, 2010). Their digital literacy skills and engagement with active dialogue became the scaffold to support engagement with more complex text; provided them the opportunity to develop their motivation to take on a reading challenge (Wigfield, 1997). During one-on-one intervention, eBooks platforms provided fourth grade students social reasons for reading (Wigfield, 1997) while building comprehension skills (Ortlieb et al., 2014). Students read, reviewed, rated, and shared their opinions on the eBook via embedded book reviews. For others, eBooks fostered reading curiosity (Wigfield, 1997) through the multimodal features of the text (Brown, 2016). The multimodal features captured the student's attention and engagement and resulted in increased time on task and comprehension; the student became involved with reading (Wigfield, 1997).

Finally, eBooks are perceived to have a positive effect on students engaged with the reading work avoidance construct of motivation (Wigfield, 1997). First grade students who received additional services for reading, engaged with eBooks in ways that diverged from behaviors observed during regular reading instruction (Ciampa, 2012a). Students chose what story to read and decided when to activate narrated text or when to read. Improved focus and attention during online storybook reading and computer-based activities were noted (reading involvement) along with changes in reading efficacy (Wigfield, 1997). A student initially attributed her reading success to external factors but began to develop reading efficacy (Wigfield, 1997) that enabled her to take on the challenge of reading difficult text and persevere through mistakes. The effect was an increase in their reading fluency rate and word recognition and a decrease in off-task behaviors both during eBook engagement and class read-aloud.

In summary, eBooks can be an effective tool for supporting students' growth in literacy because students are motivated to read eBooks when interactive tools and features provide the support needed to successfully engage with reading. The next step will involve media specialists taking this knowledge, along with the study's range of evidence-based practices, and support teachers as they build their technological pedagogical knowledge regarding eBook integration with literacy instruction. Change will occur when educators believe they have the self-efficacy to implement technology in a way that will benefit students and address their needs (Ertmer, 2005; Ertmer & Ottenbreit-Leftwich, 2010; Hughes, 2005; Hutchison & Reinking, 2011).

Implications for Media Specialists

Below are some considerations regarding eBook technological features and literacy content knowledge that came to light during the research process. I am including them in the

study because they impact the media specialist's role as program administrator, information specialist, and instructional partner. Our responsibilities typically include identifying and purchasing appropriate resources and technology to support students' reading needs, their development of lifelong reading habits, as well as meet local, state, and national educational goals (American Library Association, 2013; "*Empowering learners"*, 2009). Yet "few schools have any kind of coordinated, school-wide plan for amassing eBook collections, and few schools have any systematic collaboration between teachers and libraries to incorporate eBooks into the curriculum " ("*Ebook usage"*, 2015, p. 7). The purpose of this section is to begin the process of developing plans for assembling eBook collections by identifying some considerations generated from the study so that we meet the reading needs of all our students. Other considerations may be found in the Sixth Annual Survey of eBook Usage in U.S. School (K-12) Libraries (2015).

eBook considerations. Results from this study can guide media specialists as they make decisions about eBook purchases to support students' motivation and engagement with digital literacy. Media specialists follow collection management procedures to ensure the selected resources meet specific quality standards (Library Media Services, 2014). Those same standards provide the foundation for selecting eBooks. The analysis from this study suggest that the process for purchasing eBooks include examining the technological features embedded in eBooks since they impact student motivation. Below are two considerations when purchasing eBooks for the K-6 school setting. These considerations are drawn from the units of coding synthesized for this study and include examining the eBooks for its tools and interactive features such as the dictionary's format and coverage, and the eBook's delivery system.

The team of Korat and Shamir (O Korat & Shamir, 2008; Shamir, 2009; 2007; Shamir et al., 2012; Shamir et al., 2011) developed eBooks for their research. Their studies provide insight

regarding the quality, quantity and location of the interactive tools and features. The goal is to match interactive tools and features to the instructional task at hand. For example, the type of dictionary embedded in the text matters depending upon the focus of the vocabulary instruction and reading level of the students. The needs of a kindergartener who is just developing phonemic awareness skills would benefit from a dictionary with audio capabilities whereas a fifth grader could benefit from a dictionary that is more context based. A SLL would benefit from a multimodal entry that would include a picture as well as its pronunciation.

Other considerations include the quality of the narration; it can support or confuse the reader if the diction is too fast or computer generated and location of activation hot spots. Hot spots that come after the text's narration are less likely to distract readers from making meaning from the story. For the older students, having digital note taking and highlighting capabilities not only provide students the chance to capture their thinking process immediately, but provides the teacher quick access to formative assessments which then drives instruction (L. C. Larson, 2010, 2015a). These are just a few considerations when selecting eBooks for purchase and use during literacy instruction. Further research could provide a more comprehensive and useful tool to aid in this decision-making process.

The Ciampa (2012a, 2016) and Ortlieb and others (2014) studies utilized online platforms that provided students access to a range of titles and differentiated activities embedded within the platform to support reading comprehension. Ciampa (2012a) utilized a free online eBook portal. Ciampa (2016) developed a website for K-2 readers for this study. It provided access to three different eBook portals and a large collection of fiction and non-fiction eBooks. As of this writing, the Ciampa website www.icanreadcanada.com no longer exists. The Ortlieb et al.

(2014) study utilized Capstone's myON eBook platform (Capstone Inc., 2017) which offered embedded assessments and comprehension-type activities.

I recommend media specialists read these studies and investigate different eBook delivery systems that are available, such as TumbleBooks ("TumbleBook Library," 2017), Follett Shelf or Destiny Discover ("Follett Shelf," 2017), and OverDrive ("OverDrive,"), before establishing their library eBook collection. Each delivery system offers different features and constraints and due diligence requires examining how well the features match up to the students' and teachers' needs compared to the cost of the constraints. Students may be turned off by eBooks when they have to juggle multiple vendors, passwords, etc. ("*Ebook usage",* 2015).

Professional development opportunities. The body of research pertaining to eBooks is growing but what is known has not been consistently disseminated in ways that support capacity building in terms of eBook integration with literacy instruction among teachers and media specialists (Duke & Keene, 2011; Felvégi & Matthew, 2012; International Literacy Association, 2009). Beliefs towards the value of eBooks integration with literacy instruction, will change when educators engage in hands on experience with eBook and participate in and observe/access a range of authentic eBook integrated literacy instruction (Ertmer, 2005). The issue of dissemination can be addressed when knowledgeable educators provide research based learning opportunities that focus on building teacher and media specialist capacity to integrate eBooks (Hew & Brush, 2007). Below are some examples when and how effective professional developments can take place to build librarians and educators capacity to develop their self-efficacy towards and belief in the value of eBooks to support student literacy development and growth.

Participating in professional development opportunities offer a way to bring our areas of expertise to the issue of eBook collection development and integration, and begin to establish a range of evidence-based practices that meet the diverse instructional needs and interests of the students (Hutchison & Reinking, 2011; International Literacy Association, 2002; Leu et al., 2010). Participating in such activities is also part of our responsibility as information specialists and instructional partners (American Association of School Librarians, 2010). The range of opportunities is vast. Locally, professional learning communities (PLCs) could be used to promote and provide learning opportunities to other media specialists on a smaller scale. Participating in face-to-face sessions at local and national conferences, and writing articles for professional library journals may disseminate eBook research to a broader audience.

While reflecting on the opportunity to share areas of expertise, I began to explore a personal insight garnered from the study. Selecting eBooks to meet patron's diverse needs taps into a media specialist's pedagogical content knowledge of general literacy and digital literacy instruction. Yet not all Masters' graduate programs in school librarianship require candidates to have a teaching certificate or undergraduate degree in reading or literacy instruction (American Association of School Librarians, 2017). I dwelled on this insight because not all media specialists have a strong background in literacy research and instructional practices yet their purchasing decisions may be affected by their level of expertise. One way to address this situation is for school districts and universities to provide ongoing research based professional development opportunities specifically targeted at building media specialists' literacy capacity. Memberships to professional organizations like the International Literacy Association (International Literacy Association, 2017) provide access to a range of research based literacy articles. This could also be the focus of a future study – the role of the media specialist's

pedagogical content knowledge of general and digital literacy instruction on the purchase of eBooks, and how they are integrated within the school setting.

Professional development within schools offers a two-way avenue for media specialists to support educators' capacity to build the pedagogy to engage with eBooks and for educators to support media specialists' building of literacy instruction knowledge. This type of capacity building may create a bridge between areas of expertise and weakness. The tools to scaffold the PD and capacity building are the TPACK framework and the TIM model. The TPACK identifies the key factors, the technological pedagogical knowledge educators need to effectively integrate eBooks and the literacy knowledge media specialists need to select and purchase relevant eBooks for literacy instruction. The TIM model provides both groups the tool to identify specific ways eBooks can be integrated. TIM provides the vehicle to examine the current type of learning environment and eBook integration, and the means to change either or both variables. TIM has been proven to be an effective self- evaluation tool with a positive correlation between student engagement and technology integration (Barbour, 2015).

In summary, the next step is to start supporting change among media specialists and educators if eBooks are to be integrated with literacy instruction in ways that foster students' reading motivation, engagement, and literacy growth and development. eBooks are an effective tool if educators know how to support student engagement and believe eBooks are of value. Effective professional development is a method to support such change.

Limitations to the Study

The main limitation of this study pertains to the selection of research for analysis. My parameters for selecting research studies narrowed the focus to scholarly peer reviewed research

regarding literacy instruction in order to identify evidence-based practices as recommended by educational standards such as the Common Core State Standards. The parameters excluded research and studies conducted but not peer reviewed. Cavanaugh (2006a, 2006b, 2015) has published three professional resources that support educators' integration of eBooks in the school setting including literature circles. Two of Larson's studies (2010, 2015a) were collected for this qualitative content analysis but others were excluded (2008, 2009; 2012). Another limitation is the study narrowed its context focus to the K-6 school setting. eBooks are being used throughout other learning environments including preservice teacher courses (L. C. Larson, 2012).

Due to the constructs of this study, limiting the curation of data to peer reviewed articles and focusing on literacy instruction in K-6 classrooms, not all aspects of a balanced approach to literacy instruction were captured by the coding frame. For example, fluent reading is characterized as the words within the text are decoded accurately and effortlessly, read with correct volume, phrasing, appropriate intonation, and at a reasonable rate (Reutzel & Cooter Jr., 2015). While some narrated eBooks could and do provide modeling for fluent reading, very little data was available on the effect of eBooks on reading fluency. Studying eBooks integration with fluency instruction should be a consideration for future research because fluency is an indicator that the student is engaged in making-meaning process (Kuhn & Stahl, 2010). eBooks can provide authentic modeling of fluent reading and, when used in conjunction with other technology (i.e., headphones with microphone and voice recording software/app), could provide students with the tools to track and monitor their fluency growth.

Much of the research was done in the context of students with reading challenges such as kindergarteners from low socioeconomic households, students at risk of learning disabilities, and second language learners. Some studies compared struggling and at risk readers with typically

developing readers (Shamir et al., 2011; Shamir & Shlafer, 2011) but very few studies examined advanced level students.

In summary, the limitations of this study pertain to the selection of research for the analysis. The effect is gaps exist in the technological pedagogical knowledge educators and media specialists could use to integrate eBooks across all aspects of a balanced approach to literacy instruction. The issue could be addressed through future research.

Recommendations for Future Research

The L. C. Larson (2015a) case study provided insight into the positive effect collaborative learning has on reading engagement for 6th graders. This study is relevant to intermediate literacy instruction because students' attitude towards reading drops considerably between sixth and eighth grade (McKenna et al., 2012). This brings up the question what would happen to reading engagement if students left elementary school with strong skill sets for engaging with eBooks in a collaborative/cooperative learning environment? Would their positive attitude towards eBooks reverse this downward trend?

Other considerations for future research include implementing longitudinal studies on the impact of eBooks to address a couple of limitations found in the research collected. Some of the studies reported novelty effects as a potential liability with motivation; students were more motivated to engage with the eBooks because of its newness (Chaudhry, 2014). Other studies were with small sample size and lasted only a few weeks (Brown, 2016; Ciampa, 2012a).

The coding frame pointed out a lack of research pertaining to eBook integration with specific components of a balanced approach to literacy instruction such as reading fluency and academic literacy instruction. Also, a majority of the research studies were conducted with

students from low SES households, at risk for learning difficulties, and/or second language learners. There was a dearth of research working within context of gifted and talented students/students reading above grade level. Studies to address these holes would help us meet the diverse needs of all K-6 students as they engage with eBooks to develop digital literacy skills and competencies.

Finally, research is needed to address the lack of technological knowledge regarding the impact specific interactive tools and features have on reader's engagement with the text. The need is relevant because eBooks can be an effective tool for literacy development and growth when interactive tools and features provide the support needed to successfully engage with reading. Knowledge regarding the location of hot spots, types of embedded dictionaries, and quality of the narration may affect eBook formats and designs to better meet students' diverse needs. For example, the meaning of a word is context dependent (Reutzel & Cooter Jr., 2015). Embedded dictionaries with definitions that reflect the context of the story may have a more positive impact on reading comprehension than a generic definition. Children from low socioeconomic households benefitted from embedded dictionaries that provided multisensory definitions such as narration and dynamic (moving) pictures (Ofra Korat et al., 2014). Whereas students with severe language impairment prefer static dictionaries because the background noise and action interrupt their ability to process the text (D. J. H. Smeets et al., 2014). Media specialists could use the findings to develop a coordinated plan and build an eBook collection that meets the reading needs of a diverse group of learners.

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Appendix A

Relevance Screen

Report Characteristics	Response
1. First Author (Last, First)	
2. Study's title	
3. Publication information (Periodical name, publication date and issue, pages)	
4. Database	
Inclusion/Exclusion Criteria*	
5. Evidence-based reading instruction research: study went through a peer-review process.	0. No 1. Yes
6. Level of technology integration (how) consists of: a. How eBooks were utilized to support student engagement with or learning of literacy; and b. Type of eBook used meets the study's eBook definition.	0. No 1. Yes
7. Literacy objective for students' engagement with eBooks (when) identifies at least one component of a balanced literacy program[a]: a. Oral language development b. Early reading concepts, skills, and strategies c. Phonics and word identification d. Reading fluency e. Reading vocabulary f. Reading comprehension g. Reading writing connection h. Reading motivation and engagement i. Differentiating Instruction j. Academic literacy instruction	0. No 1. Yes
8. Context (where): student engagement with eBooks takes place in K-6 classroom(s).	0. No 1. Yes
9. Outcome analysis (why). Outcome analysis includes: a. Research results and b. Discussion	0. No 1. Yes

Note: Adapted from [a]The list of literacy instruction is from "Teaching children to read: The teacher makes the difference" (7th ed.) by D.R. Reutzel and R.B. Cooter, Jr., 2015. Copyright 2015 by Pearson Education/Allyn & Bacon; Boston, MA.

*If the category's response to inclusion/exclusion criteria is a 0, a no, then the study is excluded.

Appendix B

Search terms used for curation of relevant units of analysis

electronic books +
academic literacy
academic vocabulary
at-risk students
automaticity
beginning reading
building schema
comprehension
comprehensive instruction (Reading)
computer assisted instruction
decoding words
developmental delays
differentiated instruction
early reading concepts
educational technology + elementary
elementary school students
emergent literacy
fluency
gifted and talented
instructional effectiveness
intervention + education
kindergarten
language acquisition
language impairments
learning disabilities
letter name recognition
letter-sound recognition
listening
literacy instruction
low income groups
meaning
oral language development
phonemic awareness

electronic books +
phonics
phonological awareness
primary students
print concept
printed materials
reading + elementary
reading achievement
reading attitudes
reading comprehension
reading concepts
reading difficulties
reading engagement
reading fluency
reading habits
reading improvement
reading instruction
reading motivation
reading strategies
reading vocabulary
reading writing connection
schema
self-efficacy OR self efficacy
speaking vocabulary
story comprehension
storybook reading
student attitude
teaching methods
vocabulary
vocabulary development
word identification
word recognition
written language

Appendix C

Unit of coding spreadsheet example

Page #	Study #	UofA ID#		1	2	3	4	5	6.1	6.2	7	8
	4		Ciampa - motivating grade 1 children to read: Exploring the role of choice, curiosity, and challenge in mobile eBooks (2016)									
671	4	1	This study was carried out in a low-to-middle income Catholic elementary school						2			
671	4	2	and a middle-to high income Catholic elementary school						2			
671	4	3	Both elementary schools were situated in suburban areas in southern Ontario.							3		
672	4	4	The final total sample consisted of 30 children (15 boys and 15 girls) aged 6–7 years				2					
672	4	5	Six (three male and three female) child participants from School 1 who were reading below grade level worked individually with a reading recovery teacher for approximately 30 minutes daily in their school library.					5				

Appendix D

Reprint permission to use the TIM chart in dissertation

Re: Reprint permission to use TIM chart in dissertation

Welsh, James <jwelsh@usf.edu>

Sat 6/18/2016 8:24 PM

To: Herdelin, Mary James <jherdelin01@bellarmine.edu>;

2 attachments (215 KB)

TIM_Matrix_for_Pub.pdf; ATT00001.htm;

Hi Jamey,
The Florida Center for Instructional Technology (FCIT) at the University of South Florida is pleased to grant you non-exclusive permission to reproduce the Technology Integration Matrix Table of Summary Indicators for the purposes described in your permission-request email (copied below). By accepting this permission, you agree to include the credit "The Florida Center for Instructional Technology, fcit.usf.edu" in all forms of publication/production.
To further support your efforts, I have included a higher resolution grayscale PDF version of the table that we typically use for print publications.
Good luck in your studies!

James L. Welsh, Ph.D.
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Director, FCIT
University of South Florida, College of Education
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Table 2

Level of Technology Integration and Learning Environment Characteristics Dimensions

Dimensions	Description Subcategory I	Example
Level of technology Integration (1.)	1. Entry: students' engagement with eBooks reflects a high degree of teacher control.	• eBook selected as a training tool to learn how to navigate the and use its tools. • eBook was selected for all to read • Child was monitored. • Researcher provided support via turned pages, selected tools/ functions
	2. Adoption: students' engagement with eBooks reflects a gradual release of control by the teacher. Students begin to use eBooks independently.	• Researcher guided student to match texts to reading levels. • Student had limited choice to use tools/functions • Technical support was available.
	3. Adaptation: students have the opportunity to engage with eBooks and/or modify the use of eBook tools in order to meet a specific task or purpose.	• Student selected what eBook to read. • Student selected what tools/ functions to use. • Student self-navigated through eBook • Student worked independently of teacher/ researcher.
	4. Infusion: throughout the day and across different learning opportunities, students select when and how to use eBooks.	• Selected e-readers for independent reading option.
	5. Transformation: students' engagement with the eBook makes possible learning in a way that would not possible if the eBook was not available.	• Researcher developed eBook to meet specific literacy instructional goals. • Interactive capabilities enabled students to evoke sensory curiosity. • eBooks allow students to engage with and explore different types of literature inside and outside of school.
Learning environment characteristics (2.)	1. Active: Students actively engage with eBooks as a learning tool. This goes beyond using eBooks in a passive manner such as teacher uses the eBook and student watches.	• Participant independently read or explored eBook. • Student used eBook tools in conventional ways. • LBD student worked 1-on-1 with teacher.
	2. Collaborative: Students use eBooks to collaborate with others rather than individually.	• Teacher support in terms of promoting literacy growth, given during and after eBook reading. • Each pair of students took turns in turning pages.

	3. Constructive: Students used eBooks to build new knowledge/meaning for themselves and possibly others rather than simply receiving information.	• ELL student used interactive tools to scaffold background knowledge needed for reading comprehension. • Annotations or notes were added to the text in response to what was read. • Adjusted reading rate to meet reader's needs
	4. Authentic: Students selected eBooks for authentic learning, solving real-world problems rather than for artificial assignments.	• Student self-selected eBooks to read, tools to use to solve authentic problems.
	5. Goal directive: Students selected eBooks as the tool to set and meet learning objectives, and evaluate results.	• Student utilizes eBook highlights, note taking, and dictionary capabilities to show growth in developing strategies for attaching unknown words. • Students were assigned chapters to read

Note: Adapted from "The Technology Integration Matrix" by Florida Center for Instructional Technology, 2013. Copyright 2013 by the University of South Florida, College of Education.

Table 3

Balanced Approach to Literacy Instruction Dimension

Description Subcategory I	Example
3.1. Oral language development: Focus is on listening and speaking vocabulary. This includes developing receptive and expressive vocabulary.	• eBook used to develop receptive and expressive vocabulary of L2 children.
3.2. Early reading concepts, skills, & strategies: Focus is on concepts about print, phonological awareness and phonemic awareness, and letter name recognition.	• eBook used to promote emergent word writing, letter knowledge, and phonological awareness.
3.3. Phonics & word identification: Focus is on letter-sound recognition, decoding words, and word recognition.	eBooks & tools used to: • Decode words and word recognition • Identify sight words, rhyming words, etc.
3.4. Reading fluency: Focus is on building student's ability to read smoothly and accurately enough that it sounds like a conversation. Key words include automaticity, speed, and correct text phrasing.	eBooks used: • To model fluent reading • To support reading practice • For choral reading activities.
3.5. Reading vocabulary: Focus is on Tier 1-3 vocabularies such as basic and elaborated speaking vocabularies and academic vocabulary.	• eBook tools used to identify and/or define unknown words. Video storybook used to support vocabulary acquisition in children.
3.6. Reading comprehension: Focus is on building schema and comprehension strategies such as activating prior knowledge, questioning, analyzing text structure, creating mental or visual images, and summarizing.	• Reading eBooks promotes story understanding of children who have begun to develop an awareness and understanding of stories in books. • Focus is on how device supports students' meaning-making processes as they read and respond to digital texts.
3.7. Reading writing connection: Focus is on the reciprocal processes between reading and writing; both processes must be taught together.	eBooks and tools used to: • Research for writing task • Analyze different writing genres • Respond to eBook readings
3.8. Reading motivation & engagement: Focus is on enriching and exposing students to a variety of books to boost interest and build background knowledge.	• To examine the effects of mobile eBooks reading on Grade 1 child participants' intrinsic reading motivation. For the purpose of reading multimedia picture books.
3.9. Differentiated Instruction: Focus is on providing each child with literacy instruction that is responsive to his/her unique needs.	• eBooks are utilized during small group instruction and/or during learning centers for independent practice.

3.10. Academic literacy instruction: Focus is on developing comprehension skills for subject matter texts in order to be literate in content areas such as math, science, and social studies.	Multimedia eBooks are utilized to provide: • Audio narration of above reading level material. • Access to embedded "concrete" learning experiences. • Note-taking strategies
3.11. Multiple approaches to literacy instruction: Focus is on two or more facets of a balanced approach to literacy instruction.	• Word recognition and reading comprehension. • Reading motivation and comprehension

Note: Adapted from "Teaching children to read: The teacher makes the difference" (7th ed.) by D.R. Reutzel and R.B. Cooter, Jr., 2015. Copyright 2015 by Pearson Education/Allyn & Bacon; Boston, MA.

Table 4

Context Data Dimension: Grade Range, Performance Level and Demographic Information of Participants

Dimension	Description Subcategory	Description Subcategory II	Example
Grade range of participants (4.)	1. Grade K: Age range 5-6		• Ages ranged from 4.3 years to 6.0 years (*M*=5.5 years).
	2. Grade 1: Age range 6-7		• Children in sample aged 6-7 years.
	3. Grade 2: Age range 7-8		• 2nd graders (ages 7 and 8)
	4. Grade 3: Age range 8-9		• 3rd grade children
	5. Grade 4: Age range 9-10		• 4th grade students
	6. Grade 5: Age range 10-11		• 5th grade students
	7. Grade 6: Age range 11-12		• 6th grade students
	8. Primary: Grades k–2; Age range 5-8		• Age range from 5 years to 7 years
	9. Intermediate: Grades 3-5		• Age range from 9 years 9 months to 11 years 2 months. • Age range between 8 and 10
	99. No grade or grade range given		
Educational performance level of participants (5.) *(Sulzby, 1991)	1.* Emergent reading behavior levels 1-2: Storytelling is pictured governed and disjointed, lacks connection across the pages.		Story retelling is marked by lack of connection between pages or response has no relevancy to the story.
	2.* Emergent reading behavior level 3-4: Initial stage of story comprehension. Child uses natural language and pictures to support dialogic storytelling but unable to tell the story completely and/or use story phrasing.		• Children responded with dialogic storytelling, monologic storytelling, and reading and storytelling mixed.
	3.* Emergent reading behavior levels 5-7: Retelling blends natural language with story syntax and vocabulary; sounds like reading.		• Story retelling includes specific story phrasing and flow of events parallel actual storyline.
	4. Learning disabled: Study's participants are identified as having a form of learning disabilities.		• Participants were diagnosed by an interdisciplinary team.
	5. Below grade level: Study's participants are identified as or at risk for performing below their grade level.		• Participants read below grade level. • Scored at or below the 50th percentile on a standardized language test for Kindergarteners.

			• Participant received additional support from the Reading Recovery school team. • Children at risk for lack of language proficiency • Students struggle with developing reading skills
	6. On grade level: Study's participants are identified as performing on or above their grade level.		• 7-year-old 2nd grader read at a beginning second-grade level.
	7. Gifted or talented: Participants are identified as being above their grade level on standardized tests.		• 8-year-old 2nd grader read independently at a fifth-grade level.
	8. SLL students: Second Language Learning students are students learning a new language.		• Approximately 52% of the participants were learning English as a new language. • Ethnic minority children will • improve their early literacy skills in second language learning.
	3.2.99. No educational performance level reported		
Demographic Information (6.)	1. Socioeconomic data -	3.3.1.1. At or below poverty level: Participants' family socioeconomic status is reported as at or below poverty level. Title I school.	• Low socioeconomic status. • Parents had only a few years of vocational training or performed unskilled labor. • Title I school.
		3.3.1.2. Above poverty level: Participants' family socioeconomic status is reported as above poverty level.	• Low-to-middle income; middle-to-high income
		3.3.1.99. No data given – no information pertaining to participants' socioeconomic status was given.	
	2. School setting	3.3.2.1. Rural: Participants reside in rural communities.	• Students came from a small town with about 30,000 inhabitants.
		3.3.2.2. Urban: Participants reside in urban or city dwellings.	• Inner city schools
		3.3.2.3. Suburban: Participants reside in suburban communities.	• Elementary school situated in suburban areas.
		3.3.2.99. No data was reported pertaining to school setting.	

Table 5

Literacy Growth and Research Analysis and Discussion Dimensions

Dimension	Description Subcategory I	Example
Literacy growth (7.)	1. Statistically significant change: Statistics and/or data analysis reports statistically significant change.	• Paired t-test revealed significant improvement in the child participants' reading levels from pre-test to post-test, $t(29) = -10.16$, $p = 0.00$
	2. Change was not statistically significant: Statistics and/or data analysis reports no significant change.	• Paired *t*-test results did not show a significant difference in participants' preferred reading format, $t(29) = 0.00$, $p = 1.00$.
	99. No statistical change was reported.	
Research Analysis and Discussion (8.)	1. Reporting and discussion of data and results: • Data including observations and changes that occurred as a result of integrating eBooks with literacy instruction. • The findings' interpretation(s) including conclusions, theoretical, and/or practical consequences that impact the integration of eBooks to support literacy instruction. • Includes instructional recommendations and/or insights.	• Reading time with eBooks was consistently longer compared to the print resource. • The results show that… • Students appear to be… • The questionnaire data corroborated the findings from previous research. With respect to eBook choice, the child enjoyed eBook reading because…. • It is recommended that… • Digital text show promise in supporting struggling readers through… • Several explanations may serve to explain these findings.
	2. Recommendations for future research: Identified unresolved problems, new problems, and situations that warrant further research.	• Why were more reading resources accessed with digital text? • Future research should examine the relationship between reading motivation and comprehension when eBooks are used. • From the findings, we cannot conclude that….
	3. Study limitations: Sources of potential bias and other threats to validity as well as other limitations or weaknesses. This includes implementation barriers.	• A limitation of the study was the reduced number of participants.

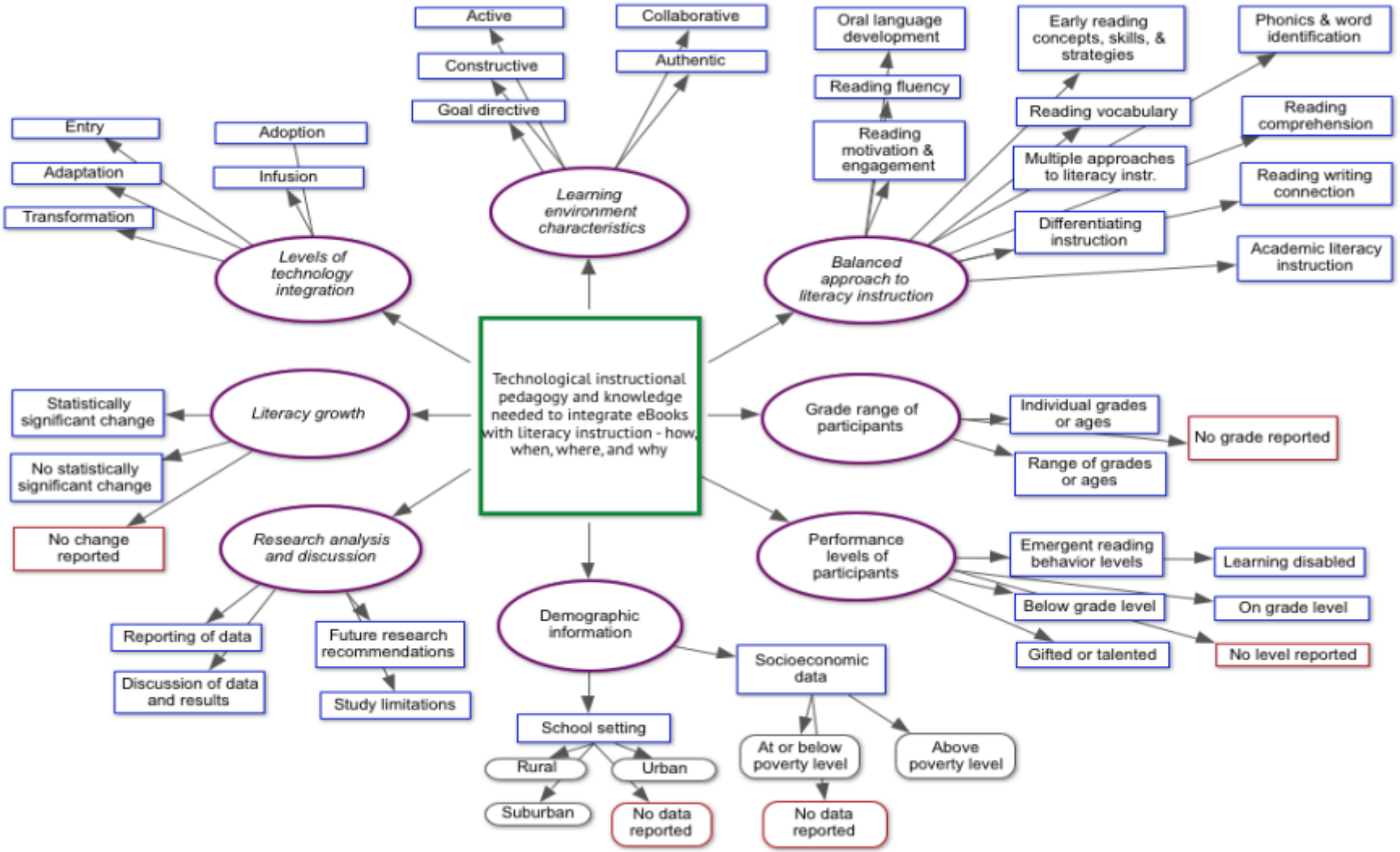

Figure 7. Diagram of the complete coding frame. Shapes are used to differentiate the different levels of categories. Squares are the first level, the dimensions. The ovals represent the 1st subcategory level and the rectangles identify the 2nd subcategory level. Rounded rectangles represent the 3rd subcategory level.