UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

NEW TEACHERS, NEW LITERACIES: EXAMINING TEACHER CANDIDATES' UNDERSTANDINGS, BELIEFS, AND IMPLEMENTATION OF DIGITAL AND MULTIMODAL LITERACIES

A DISSERTATION

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the

Degree of

DOCTOR OF PHILOSOPHY

By

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Norman, Oklahoma
2021

NEW TEACHERS, NEW LITERACIES: EXAMINING TEACHER CANDIDATES' UNDERSTANDINGS, BELIEFS, AND IMPLEMENTATION OF DIGITAL AND MULTIMODAL LITERACIES

A DISSERTATION APPROVED FOR THE DEPARTMENT OF
INSTRUCTIONAL LEADERSHIP AND ACADEMIC CURRICULUM

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Dedication

This dissertation is dedicated to the people I love. My grandparents who always supported me and made me believe nothing was out of my reach. No dreams were too grand. My parents and stepparents who shaped the woman I am today. My children, Jeremy, Sarah, Samuel, and my bonus daughter Cashe, you are my purpose. I am proud of you all and love you dearly. My husband who eagerly (most of time) encourages my wild endeavors. Avery and Sophia, who call me Granna, I hope you always have the courage to follow your dreams. My siblings, Craig, Christel, Shannon, and Mark who are my silent cheerleaders and most ardent defenders. And finally, my dear friends (you know who you are), you have inspired me, cried with me, encouraged me, and supported me through all life's ups and downs. Words cannot express the love and gratitude in my heart for each one of you.

Acknowledgements

The completion of this doctoral degree has been a long-time personal goal. Writing this dissertation, as with any substantial endeavor, was both challenging and rewarding. Life placed many obstacles in my path on this journey, but ultimately, I endured. This would not have been possible without the gracious help and support of so many. I am and will always be eternally grateful to you all.

Thank you to my doctoral advisor, Sally Beach, for your guidance and support. You offered me your research and literacy expertise, persistently supported me in my writing, and encouraged me to stretch and reshape my understandings. Ultimately, I am a better educator and researcher because of you. To my committee members, Priscilla Griffith, Jeffery Maiden, Aiyanna Henry, and Jiening Ruan who have shared their expertise and time as well as their support throughout this journey, I extend a heartfelt thanks.

To the three preservice teachers who willingly shared their time during an already busy and challenging internship semester, I am eternally grateful. Thank you for sharing your understandings, beliefs, and classroom experiences surrounding digital and multimodal literacies. Thank you to the elementary schools where these preservice teachers were completing their internships for graciously providing me a place to interview these preservice teachers.

Next, I want to thank my family for their unending support of every endeavor I undertake. My grandparents, who are no longer with us, Clifton and Donella Edwards (Papa and Grandma), you both provided me with abounding love and support from the day I arrived in this world. Papa, you inspired me to go to college and follow my dream

of becoming a teacher and, Grandma, you were my rock of support and encouragement. I know you would both be so proud.

To my parents, Norman and Jeanette Edwards and Chuck and Louise Hammersley, your unconditional love and support has guided me not only through this dissertation, but throughout my life. My sisters, Shannon and Christel, thank you for providing your support and always assuring me that I was more than capable of completing this undertaking. My brothers, Craig and Mark, I could not ask for more supportive brothers. Thanks for always having my back.

To my friends, you are my village. You kept encouraging me, even on days when all I wanted to do was quit, helped with my winery and family responsibilities, and kept me balanced; your help has been immeasurable. Thanks for patiently listening to frustrations and offering kind words of encouragement. Life would not be nearly as fun without you.

To my children, Jeremy, Sarah, and Samuel, thank you for being you and giving me wonderful distractions and much love along the way. Jeremy, my first born, your kind heart has provided much comfort for me. Samuel, my baby, thanks for our talks. I love the way your mind works; you are such a joy. And, Sarah, my darling daughter, I carry you in my heart. I miss your laughter and quick wit. You inspire me to spread love and goodness in this world. You are all my whole world, and my life would be incomplete without you.

Finally, to my husband, Rick, you have supported me since day one of this journey, and I am eternally grateful. Your unwavering support has sustained me through the most difficult times; to the point where your belief in me far exceeded my own. None

of this would have been possible without your love, encouragement, and companionship. Thank you.

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Abstract

This study sought to explore the understandings, beliefs, and implementation practices of preservice teachers during their internship surrounding the use of digital and multimodal literacies in the classroom. This research provides insights into what shapes the understandings and beliefs preservice teachers hold about the use of digital and multimodal literacies and factors that impact their implementation of these literacies into their instructional practices. The experiences of three preservice teachers in their internship semester were portrayed through individual case studies and collectively across cases. Data was collected through semi-structured interviews and lesson plans. The data analysis revealed these preservice teachers confused digital and multimodal literacies with technology integration. While they demonstrated positive attitudes surrounding the use of these literacies; their beliefs and implementation practices were affected by their lack of understanding about digital and multimodal literacies. This study contributes to the existing literature by highlighting the connection between preservice teachers' understandings and beliefs and their instructional practices. Thematic analysis offers richer and deeper insights into the experiences of preservice teachers surrounding digital and multimodal literacies in both their learning and teaching. Findings from this study indicated preservice teachers' understandings, beliefs, and implementation practices surrounding these literacies were impacted by their K12 school experiences, their teacher preparation courses, and their cooperating teachers. In addition, this study has implications for teacher education programs to include meaningful learning experiences in literacy methods courses that both help preservice teachers to develop deeper understandings and demonstrate connections for

implementation in elementary classrooms surrounding the use digital and multimodal literacies.

Keywords: digital literacies, digital and multimodal literacies, new literacies, media literacies, preservice teachers, teacher preparation, preservice teacher beliefs

Chapter 1: Introduction

In the words of Dr. Seuss, “The more you read, the more things you will know. The more you learn, the more places you will go.” This quote still rings true today, even as the traditional ideas about literacy continue to evolve as new technologies and digital literacies advancements are developed. Though we are seeing prolific changes in what constitutes literacy, being literate still remains the cornerstone of being a successful member of society. Most scholars agree that learning to read and write are the most fundamental concepts necessary for school and life success. Throughout history, literacy and literacy instruction have evolved as a result of changing societal contexts and the technologies prompted by such changes. Due to this, literacy should be thought of as a moving target, one that is continually changing in order to meet the expectations society places on being literate individuals. As societal expectations for literacy change, so too must definitions of literacy and methods for teaching keep pace with this moving target.

Readers are increasingly using electronic devices to engage in reading digital texts that allow for features such as hyperlinks and built-in dictionaries (Al-Hazza & Lucking, 2017). These digital texts also provide readers with access to information about what they are reading in other media forms, such as visual and audio, which may allow deeper understanding of the text. According to the U.S. Department of Education, National Center for Education Statistics (2018), 94% of children ages 3 to 18 had access to a computer at home with 61% of those children also having access to the internet at home. The same report found 41% of children ages 3 to 5 and 57% of children ages 6 to 11 had access to the internet at home. And, according to the U.S.

Census (2018), 60% of children ages 3 to 17 used the internet at home a rate nearly six times greater than reported in 1997. In 2019, the Pew Research Center found that 97% of young adults age 18-29 used the internet regularly and 28% of those accessed the internet exclusively on their smartphones at home. The Pew Research Center also reported between the years of 2014-2019, most people still read printed text. However, access to devices for digital reading is increasing according to Zickuhr and Rainie (2014). In 2014, 50% of adults indicated owning a tablet or other e-reader device. Undoubtedly, digital technologies impact readers in today's society.

Evolution of Defining Literacy

The term literacy has evolved and continues to evolve. Literacy can no longer be viewed as a fixed set of skills. While literacy has a set of expectations and social conventions, literacy is fluid. It changes and evolves as society changes and cannot be reduced to a specific skill set, text, or genre. The United Nations Education, Scientific and Cultural Organization's evolving definitions of literacy over the last several decades demonstrate the evolution of what constitutes literacy. In 1958, UNESCO defined literacy as, "A person is literate who can, with understanding, both read and write a short simple statement in his or her everyday life (p. 13)." In 1978, UNESCO updated their definition of literacy stating, "A person is functionally literate who can engage in his or her group and community and also for enabling him or her to continue to use reading, writing, and calculation for his or her own and the community's development (p. 183)." Then in 2005, UNESCO's definition evolved to state, "Literacy is the ability to identify, understand, interpret, create, communicate, and compute using printed and written materials associated with varying contexts. Literacy involves a continuum of learning in

enabling individuals to achieve his or her goals, develop his or her knowledge and potential, and participate fully in community and wider society (p. 21).” Though UNESCO has broadened their definition of literacy through the years, with the latest update occurring 15 years ago, UNESCO still views literacy as being more autonomous, or an independent act, as opposed to an ideological view of literacy where literacy is a social practice that varies from one context to another. Although they mention various contexts and participation in community and wider society, UNESCO does not give full credence to the sociocultural differences of literacy used in a global society where there are multiple types of Information and Communication Technologies (ICTs). Literacy is a social practice that is influenced by both context and culture (Williams, 2008). Being literate depends upon both the knowledge of social conventions and the ability to think critically and problem solve. Students engage in literate actions for both personal and social purposes, bringing together experiences of the world, school, and literacy. The basic foundational skills for becoming literate can no longer be summarized as the ability to decode printed text and write letters and words. Basic foundational skills of becoming literate involve the ability to plan, organize, revise, build and negotiate meaning, effectively use and adapt conventions, and understand the expectations of new discourses.

In the 21st century, one would be remiss to attempt to form an understanding of the term literacy without addressing the role that information and communication technologies have played and continue to play in transforming how we define literacy. Students of today need to be capable and competent users of both print and other multiple other forms of meaning made possible by ICTs. Due to the proliferation of ICTs,

meaning is often made in multimodal ways where linguistic modes interact with other modes of meaning, including, but not limited to visual, audio, gestural, tactile, and spatial patterns.

Defining digital and multimodal literacies can be a tricky proposition. Several terms have been used by experts for describing how technology and literacy interact and are changing the landscape of literacy in the 21st century. In 2013, Leu, Kinzer, Coiro, Castek, and Henry defined the term New Literacies as the skills, strategies and dispositions needed for communicating effectively for specific audiences with a variety of modalities and for a variety of purposes, encompassing the ability to use and adapt to rapidly changing technologies and contexts. These skills and strategies include locating information, critically evaluating information, and producing information. Other experts prefer the term Digital Literacies, which The American Library Association (2020) refers to as "the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills." Yet, others prefer the term multimodal or multiliteracies, defined by the International Literacy Association (2020) as "An instructional framework that supports an awareness of how new communications media are shaping the way we use language in a highly diverse and globally connected world." For the purposes of this study, I choose to use the term digital and multimodal literacies, which I define as the ability to exercise critical thinking when using digital and multimodal media in a variety of contexts to communicate and collaborate creatively, cross-culturally, and globally.

Statement of the Problem

Literacy today is deictic, meaning literacy changes as its context changes. This is

due to the rapidly changing ICTs that require new literacies skills. What once was considered literate in a print-based society may no longer be considered fully literate for the 21-century society as we engage with new and emerging technologies. And, how we define what will be considered literate for tomorrow will be shaped by new technologies, discourses, and social practices that have yet to be created. As such, literacy renews itself everyday of our lives (Leu, 2017). At the writing of this chapter, we were in the midst of the COVID-19 global pandemic, which necessitated the move to virtual learning for millions of American students of all ages. While literacy has always been shaped by social and cultural practices, in turn also playing a role in shaping these same practices, the challenges of educating and working virtually brought a heightened awareness to the new literacies skills required to effectively navigate and engage with the new ICTs utilized for online working and learning.

Although considerable research (Coiro, 2011b, 2012; Forzani & Leu, 2012; Hobbs & Coiro, 2016; Knobel & Lankshear, 2014) has been conducted concerning adolescents' habits of engaging with digital and multimodal literacies, there is little research regarding preservice teachers' or even college students' practices surrounding the use of digital and multimodal literacies (Wilber, 2008). While typical college students of today have grown up with technology being a normal part of their lives, they mainly engage with technology for personal use more than for academic purposes (Jones, 2003). Some studies (e.g., Cullen & Greene, 2011; Teo et al., 2008) have examined the attitudes and beliefs held by preservice teachers as they relate to integrating technology into their classrooms. However, there is limited research examining preservice teachers' understandings of digital and multimodal literacies and the role they play in classroom

instructional practices. Preservice teachers may engage in using ICTs for social purposes such as tweeting, texting, and chatting, but little is known about whether they have considered how to incorporate these or other ICTs into their teaching practices or curricula. Having the digital and multimodal literacies skills necessary to be a proficient user of ICTs does not automatically make one a proficient teacher of these skills and preservice teachers often experience frustration when asked to use ICTs in new ways (Schneider, 2015).

Clearly, students need to be taught the skills and strategies needed to effectively navigate the Internet and other ICTs for school, future employment, and personal purposes. For future employment, they need the skills to identify and solve problems, locate useful information, critically evaluate information, synthesize multiple sources of information, communicate information effectively, and monitor and evaluate the results of their work. Therefore, it is imperative that teachers are equipped to provide students with learning experiences that will teach these skills. It is also important to consider the impact learning these digital and multimodal literacies skills will have on their personal lives where they will use these skills to engage in things such as selecting a university to attend, medical and health related assistance, entertainment, making purchases, and advocating for social justice. An obvious way to address this need is by preparing preservice teachers to integrate digital and multimodal literacies into their instructional practices. Given the lack of research concerning preservice teachers' understandings of digital and multimodal literacies and how to integrate these literacies into their instruction, the challenge is two-fold. First, we must determine what preservice teachers' understandings, beliefs, and implementation practices are surrounding digital and

multimodal literacies. Second, we must learn what support and knowledge preservice teachers need in order to teach in a society where these literacies are increasingly necessary for successful participation.

Research Purpose and Questions

This study seeks to explore whether teacher candidates are implementing digital and multimodal literacies into classroom instructional practices. Specifically, the research questions are

1.) What are teacher candidates' understandings of digital and multimodal literacies?

2.) What are their beliefs surrounding the use of digital and multimodal literacies in the classroom?

3.) How are they implementing digital and multimodal literacies in their own teaching practices during their internship?

a.) What are the perceived limitations teacher candidates have for implementing digital and multimodal literacies into instructional practices?

b.) What supports are available for teacher candidates for implementing digital and multimodal literacies?

c.) What digital and multimodal literacies do teacher candidates observe other school personnel using during their internship?

d.) Do they plan to implement digital and multimodal literacies in their future teaching practices?

Theoretical Framework

This study was grounded in an epistemological stance of constructivism.

Constructivism posits a strong connection between an individual's experiences within the world and their meaning-making process (Elliot et al., 2000, p. 256). In this way, constructivism lends support to the sociocultural model of learning where cultural and context influence what constitutes learning (Street, 1997), and the sociocultural model of literacy where the meaning of text is dependent upon both the text and the social context in which it is embedded (Gee, 2012). Both traditional literacy skills and practices and digital and multimodal skills and practices can be thought of as situated within social contexts or cultural practices. The interpretative lenses that frame this study include the sociocultural theory of learning (Street, 1997; Vygotsky, 1978; Wood et al., 1996), sociocultural theory of literacy (Gee, 2012; Kress & van Leeuween, 1996; Leu et al., 2004; Luke & Freebody, 1997, 1999, 2003; New London Group, 1996; Rosenblatt, 1978; Serafini, 2012; Serafini & Ladd, 2008; Street, 1984, 2005), and the dual theory of new literacies (Coiro et al., 2008; Leu, 2011). Each of these theories guide how I view and interpret literacy and learning and underpin the framework for this study.

Literacy, for this study, is seen as an ever-changing process that reflects our societal and cultural beliefs and ideals. It is a process that starts at birth and continues to develop throughout one's lifetime. While there are social norms for what is considered to be proficient in literacy, it is uniquely different for all people in all situations. Not only does literacy evolve for each individual, the term literacy itself continues to evolve as do the expectations and societal norms about what constitutes literate individuals. In the 21st century, new ways of interpreting literacy are required. Literacy is deictic, or dependent upon context for meaning, and is rapidly and continually changing as new information and communication technologies appear and

new social practices for literacy emerge (Forzani & Leu, 2012). Being proficient in literacy in the 21st century involves the understanding that literacy is situated within a sociocultural context (Gee, 2003) and there are multiple literacies, all of which are dependent upon the ability to critically evaluate a variety of text types. As new types of information and communication technologies emerge, literacy in all its forms will continue to demand new and different sets of social practices.

Sociocultural View of Learning

In a sociocultural view of learning, how cultural and contextual issues impact the learner is the focus (Street, 1997). Knowledge and experiences in the classroom are influenced by culture as are the ideas about what constitutes learning. Vygotsky (1978) posited that learning is always socially constructed and culture shapes both learning and cognitive development, providing a lens by which the learner interprets and makes sense of the world. Thus, sociocultural learning is a social process driven by culture and context where the learning occurs. Children gradually acquire knowledge and skills through social experiences. Vygotsky (1978) referred to this process of learning as *internalization*. The *zone of proximal development* (ZPD), termed by Vygotsky (1978), is the difference that exists between what a child can do on his or her own and what a child can do with support. The ZPD represents the distance between the actual developmental level of a learner and the potential developmental level of a learner when provided with guidance and support from a more expert other within their learning community, meaning that with expert support the learner can often perform tasks they are not capable of completing on their own. This learning leads to further development, which in turn leads to further learning. Assistance provided to the learners within their

ZPD supports their developmental growth. Teachers identify the ZPD of learners to provide scaffolding (support) for the knowledge, skills, and understanding they have yet to develop (Wood et al., 1976). Scaffolding in a classroom refers to the support provided by a teacher or other expert for the learner during the learning process. Appropriate scaffolding is designed to meet the specific needs of learners to achieve their learning goals and objectives. Integrating digital and multimodal literacies in the classroom requires critical thinking, creativity, collaboration, and communication, all of which are situated in social practices. Scaffolding the reading of a printed text involves activating background knowledge through prereading activities, modeling and encouraging the reader to use reading strategies for monitoring comprehension, and the use of questioning to encourage critical thinking about the text. All these same practices work for scaffolding the reading of a digital text, but teachers must also be able to assist learners with efficiently and effectively searching the web for information, navigating hyperlinks, creating and sharing information using multiple modalities, and evaluating the credibility of information. Digital and multimodal literacies and their social practices require learners to navigate new ways of accessing, creating, and evaluating information.

Sociocultural View of Literacy

Literacy as a social practice has been widely influenced by the ideological model put forth by Street (2001). Prior to this model, literacy was primarily viewed as an autonomous skill, not reliant upon social context, but learned independent of outside influences. In Street's (2001) ideological view of literacy, however, context and culture are key to literacy practices as meaning is built around social practices and has multiple

modalities which vary according to context and/or cultural setting. The ideological cultural practices impact how literacy is learned and used and, as such, literacy must always be viewed as a social practice (Street, 2003). While many classrooms in the Western world still practice the autonomous model of literacy, the emergence of digital and multimodal literacies necessitates the need for viewing literacy proficiency as ideological, where literacy is constructed around social practices.

Social expectations of what constitutes becoming literate revolve around a set of social practices one must learn to become a proficient reader and writer. Proficiency as a reader and writer requires developing and sustaining culturally determined literacy practices. In the Four Resources Model developed by Luke and Freebody (1997, 1999) the act of reading is conceptualized in how proficient readers engage with a text, utilizing resources and taking on roles. This model situates reading and writing in authentic contexts and purposes, identifying a collection of practices necessary for proficiency in a culture (Luke & Freebody, 1999).

The Four Resource Model posits four roles utilized by proficient readers, including code breaker, text participant, text user, and text analyst. The code breaker practice involves deciphering or breaking the code of texts, both printed and visual, to attain or convey meaning. Text participants understand and construct meaning from printed, visual, and multimodal texts—the primary goal of reading print or multimodal texts (Kress & van Leeuwen, 1996). Text users read text for functional purposes within social and cultural contexts. Texts are created for differing functions which guide their structure and tone (Luke & Freebody, 1999). Finally, the text analyst critically analyzes texts, understanding that texts carry with them the ability to influence others as they are

constructed with underlying values, beliefs, and perspectives of both the author and the reader. Reading of a text carries both personal and culturally mediated meanings. In this sociocultural view, literacy is a social practice that involves the construction of meaning which takes into account in a social context and the inherent power relationships as well as the reader's identity and available means of social participation (Serafini, 2012).

The Four Resources Model (Luke & Freebody, 1997, 1999) has been revised and necessitates four different sets of social practices in addition to the ones identified by Luke and Freebody, shifting from a focus on the roles readers assume to a focus on resources or social practices readers employ to make sense of their environment (Serafini, 2012). Serafini's (2012) revised view of the Four Resources Model proposes the four social practices are reader/viewer as navigator, interpreter, designer, and interrogator. The social practice of navigator requires the reader to decode text as well as understand text orientation, structures including charts and diagrams, and the visual images encountered across multiple text formats (Serafini, 2012). Navigating text is increasingly more complicated as readers no longer have a preset or determined path they are required to follow while engaging with digital and multimodal texts (Kress, 2003). As readers engage with text, they actively select links, objects, and images that lead them down various pathways. Ultimately, it is the reader that determines the path. Readers construct meaning by drawing upon their own prior knowledge and experiences within their cultural context (Rosenblatt, 1978.) The reader as interpreter expands to include interpretations of both written text and visual images, focusing on the reader's ability to consider multiple perspectives when constructing meaning

(Serafini & Ladd, 2008.) Interpreting may seem centered on the individual reader's construction of knowledge, however, sociocultural contexts that influence the production and reception of various texts must also be taken into account (Serafini, 2012). Reader as designer designs texts to be read through the process of navigating and interpreting multimodal text. Through this process the reader actively constructs meanings as they navigate and interpret their way through multimodal texts where numerous reading paths are possible. These paths are not predetermined by the creator, it is the reader who chooses the path based on their interests, needs, and experiences. As the reader is the one who decides the *what* and *how* of the text navigation and interpretation, the reader is the designer of the text to be read (Serafini, 2012.) The final social practice, reader as interrogator, "involves the construction of meaning in a socially mediated context, the power relationships inherent in any given setting, and the reader's identity and available means of social participation" (Serafini, 2012, p. 159). This social practice requires readers to look beyond literal meanings and make inferences across texts and contexts to critically evaluate the text or image (Serafini, 2012). The focus on social practices rather than roles and resources represents integral connections between literacy and cultural context, social power, and capital (Street, 1984). Through the sociocultural lens, proficient reading is determined by work force demands and expectations of cultures and societies. The Four Resources Model (Luke & Freebody, 1997) originally focused primarily on printed text and written language, however later renditions (Serafini, 2012) of this model acknowledged text as multimodal in nature. As such, the framework of the Four Resources Model expanded to include not only printed text but also digital and multimodal texts.

In this view, literacy is a sociocultural act, rooted in and built upon the socio-cultural practices of a culture or community (Gee, 2003; Leu et al., 2004; New London Group, 1996; Street, 2005). Gee (2003) held that sociocultural theory implies a community's literacy practices exemplify a shared understanding that exists between its members. In the 21st century, community literacy practices are impacted by information and communication technologies (ICT's) that are being developed daily, requiring new literacies skills necessary for accessing, evaluating, and producing digital and multimodal forms of communication in a variety of media and contexts.

New Literacies View of Literacy

The New Literacies theory has emerged in an attempt to provide the collective understanding of these new forms of literacy. Uppercase New Literacies theory is the broader, more inclusive theory that is derived from the various dimensions of lower case new literacies research. Each new literacies study contributes to the continually evolving theory and adds to the more comprehensive understanding of New Literacies theory by exploring different genres, perspectives, or understandings of new literacies (Coiro et al., 2008; Leu, 2011). The dual theory allows us to explore all types of new literacies in order to increase the collective understanding of the New Literacies theory.

Today's readers and writers encounter a broad spectrum of digital and multimodal texts that include not only traditional texts but also other modes, such as visual images, graphics, media, and design elements. It is often challenging for novice or struggling readers and writers to construct meaning across these multiple types of text. The cognitive load required for decoding written language is now compounded by the fact that when readers encounter digital and multimodal texts there may not be a

clear, sequential path to follow. The reading path is determined by the reader as the reader navigates digital and multimodal texts by selecting from various hyperlinks that guide them through their unique path of understanding and interpretation. The hypertext, multimodal structures, and visual images readers encounter require an additional cognitive load to navigate and interpret. Readers are required to navigate vast amounts of information quickly, while at the same time critically evaluate the credibility and efficiently identify relevant information. Additionally, given the numerous options or paths that may be followed as one engages in reading multimodal texts, one might argue that the reader becomes the designer of what they are reading, drawing upon their own prior knowledge and experiences to construct meaning (Serafini, 2011). The meanings constructed are contextual and socially embedded in the reader's community experiences and knowledge.

These profound shifts in how we create and produce as well as construct meaning through digital and multimodal environments are transforming what and how we communicate as well as impacting both social and cultural practices in our ever-changing global community. Literacy can no longer be viewed as an autonomous act, but as a multidimensional practice embedded within social contexts.

Definition of Terms

Literacy: A set of social practices situated in particular contexts and cultures that are used to construct and share meaning with other members of one's society.

Digital Literacies: The ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills.

Multimodal Literacies: The ability to exercise critical thinking when using digital and multimodal media in a variety of contexts to communicate and collaborate creatively, cross-culturally, and globally.

Implementation: Specific set of planned and intentional educational strategies and activities designed to improve learning outcomes for students.

Technology Implementation: Integrating technology tools into education content areas, allowing students to apply technology skills to learn and problem solve to enhance and support instruction and educational outcomes.

Teacher Beliefs: Assumptions, conscious or unconsciously held, about academic and educational outcomes and processes.

Teaching Practices: A set of procedures, strategies, or activities teachers use to influence the outcomes of student learning.

Text: Is fluid and is any stretch of language (written, screen-based, visual, multimodal or remixed) to construct or convey meaning in context. It refers to content rather than form.

In the following chapters I will discuss and present information gathered as a result of this study. In Chapter 2, I will review the literature regarding what we know about the use and implementation of digital and multimodal literacies in K-12 classroom settings, what we know about implementing digital and multimodal literacies versus technology integration, the effects of teacher preparation programs on teacher beliefs and practices, what we know about how preservice teachers teach, and the knowledge and beliefs preservice teachers have surrounding digital and multimodal literacies. In Chapter 3, I will present the methodology and design for my study. Chapter 4 will detail

my findings related to the understandings preservice teachers have about digital and multimodal literacies, their beliefs surrounding these literacies, and their implementation practices of these literacies during their internship semester. In Chapter 5, I will discuss my findings in relation to the literature as well as discuss the implications of my study and provide suggestions for future research.

Chapter 2: Review of Literature

This study sought to gain a deeper understanding of what preservice teachers and know and believe about digital and multimodal literacies and implementing them into classroom instructional practices. The review of the literature provides a foundation for the study by examining the practices of 21st century classrooms and exploring how elementary students are engaging with digital and multimodal literacies both inside and outside K-12 classrooms. This review will also examine what is known about teacher beliefs and understandings, particularly their beliefs and understandings surrounding digital and multimodal literacies. Finally, there will be a review of the effects of teacher preparation programs on preservice teachers' understandings and beliefs, especially around digital and multimodal literacies.

21st Century Literacies

More than two decades ago, the New London Group (1996) challenged experts in the field to expand their definition of literacy to include more diverse and encompassing forms of communication afforded through digital technologies. Today, the affordance of new technologies in the 21st century provides unprecedented access to information, social interaction, and the ability to easily create and share digital content in an increasingly fluid, interconnected, and complex world. Twenty-one years into the 21st century, the definition of a 21st century classroom is still open to interpretation and controversy. However, a sociocultural perspective of literacy (e.g., Gee, 1996; Lankshear & Knobel, 2006; Street, 1984) demands literacy practices take into account context and culture. Therefore, with the affordances provided by new technologies, as well as the widespread use of these technologies for both personal and professional

practices in today's society, 21st century literacies are being reimagined to provide students the skills necessary for being lifelong learners with the ability to continually adapt their knowledge to accommodate new technologies and new literacy skills.

Twenty-first century literacies need to focus on the 4 c's of the 21st century skills. These include communication, collaboration, critical thinking, and creativity (Riegel, 2015). Golinkoff and Hersh-Pasek (2016) took the 4 c's a step further to include 6 c's they believe to be crucial skills for children growing up in the 21st century, adding content and confidence. Keeping these "c's" in mind, learning in the 21st century requires an approach to teaching and learning which joins content to skills, allowing learners opportunities to master content through producing, synthesizing, and evaluating information using a wide variety of sources and demonstrating an in-depth understanding of digital literacy and civil responsibility, along with respect for diverse cultures. In 2013, Rowinski reported there were 20,000 apps per month added to the Apple IOS store. This presents a unique challenge for teachers to select apps for integrating digital and multimodal literacies which is exasperated by the fact that many popular children's educational apps focus primarily on supporting basic literacy skills rather than rich and participatory literacies (Rowsell & Wohlwend, 2016; Vaala et al., 2015).

Digital and Multimodal Literacies Research

Research on digital and multimodal literacies has focused on two categories: multimodal text creation and online comprehension and research. While there is much research that informs our understanding of comprehending and creating print-based text (Afflerbach et al., 2008; Allington, 2006; Button et al., 1996; Culham, 2005; Duke &

Pearson, 2002; Faigley & Witte, 1981; Harvey & Goudvis, 2007; McGee & Richgels, 1985), the research surrounding the skills and practices necessary to access and engage in using digital and multimodal literacies is scarce. Even more scarce is the research surrounding learning and teaching strategies students and teachers need for engaging with these literacies meaningfully in classroom instructional practices.

Multimodal Text Creation

Multimodal text creation has been discussed by researchers in terms of either digital writing, defined as writing in digital spaces, or digital storytelling (DST), defined as the practice of using technology tools to create and tell a story. DST and digital writing, which can also be thought of as multimodal text creation, allow students to produce and share texts using technology tools, including educational apps. Using these apps, students can plan for the creation of their text, research and make inquiries about their topic and insert links directly to the information within their text, insert pictures and images into their text, create their own avatar to speak within their text, insert video into their text, and finally, put their digital and multimodal text all together and share it with others (Kervin & Mantai, 2016; Merchant, 2015). However, it is important to remember that creating digital and multimodal texts is not just about inserting images, adding music, or making things move, these various modes must meaningfully add to the purpose of the text (Kervin & Mantai, 2016).

Digital Storytelling. DST requires and develops both traditional literacy skills and digital and multimodal literacy skills necessary for the 21st century (Dogan, 2012). Some researchers (Dogan & Robin; 2009; Frazel, 2010; Hett, 2012; Ohler, 2013; Yamac & Ulusoy, 2016) argue that the new generation of storytelling should integrate

pictures, music, and audio using technology (Hett, 2012), and it is the process of blending these multiple modes of media along with digital text to tell a story that should be taught in 21st century classrooms. Lambert (2009) identified seven elements for effective digital stories: point of view, dramatic question (attention grabber), emotional connection (engages viewers), economy (efficiently convey message), pacing (rhythm that keeps audience engaged), the gift of voice (authorial voice), and soundtrack (using music to evoke emotional connection).

The main findings of DST research are enhancement of student literacy skills (both traditional and new literacies), collaboration as a key component, connections between in-school and out-of-school literacy practices, potential decreases of the digital divide, and increased engagement and motivation for students. Kervin and Mantai (2016) examined the digital writing practices of a grade three primary school student. The purpose of their study was to examine and explore the processes the student engaged in as he planned, produced, and shared digital and multimodal texts. They found the student demonstrated the ability to create an interactive digital and multimodal text using appropriate apps in conjunction with all stages of the writing process from planning/brainstorming to presenting as well as maintaining focus throughout the process. He also demonstrated the ability navigate information based on his interests and adjust the difficulty level of texts to match his reading comprehension abilities. However, this third-grade student received support both from his father, who was an educator interested in technology, and his classroom teacher. Collaboration was observed through his text creation process as he received support from his teacher and his peers throughout the writing process (Kervin & Mantai, 2016). Though this study

pointed out the importance of adult support for creating DST, it did not provide details of the support given or how the adults providing support were prepared for providing such support.

Yamac and Ulusoy (2016) did an action research study with 26 third grade students to explore the effects of DST on the narrative writing skills. They found that DST was an effective tool for enhancing the writing skills of the 3rd grade students. They also concluded that DST expanded the students' perceptions of what counts as literacy and helped students develop new literacies skills. They argued this indicates DST could be a tool for decreasing the digital divide and creating a community of learners within a classroom. Students in this study were also found to be more motivated to participate in the writing process (Yamac & Ulusoy, 2016). While this article discusses the benefits of implementing DST into classroom instruction, it does not discuss the importance of the teacher for implementing or how teachers should be coached for using these literacies with students.

A longitudinal study (Liu et al., 2019) spanning two years investigated how 26 third grade students participated in a DST community mediated by a social network app. Using both a quantitative and qualitative approach, researchers examined students' learning performance, engagement, collaborative practices, and social networks. Students participating in the DST activities were guided with mentor texts, practiced sentence development, illustrated scenes from their stories, narrated their stories, and published their digital stories online. The teacher served as a guide to help students collaboratively create, share, and ultimately publish their digital stories on an online DST platform using their iPads. Findings suggested that students' learning performance

improved. Overall, students reported high levels of engagement and intrinsic motivation. However, initial engagement waned during the fixed phase where students were assigned partners and then increased again when dynamic teaming began (Lui et al., 2019). What the study neglected to examine was the role of the teacher as a guide for students as they created their DST, such as the specific strategies for guiding students, how the instructional unit was developed, and/or how the teacher learned to integrate these literacies into his or her instruction.

Bogard and McMackin (2012) studied how using traditional literacy practices and strategies could be blended to enhance the writing skills of third graders, such as the writing process blended with new literacies skills. Specifically, they used the writing process to create digital stories by adding to the five-step writing process (prewriting, drafting, revising, editing, and publishing) steps for creating DST, including planning, developing stories through recorded oral rehearsal, listening, critically thinking, and conferring, creating storyboards, and producing digital stories. However, information about how the instructional unit was developed and the preparation the teacher received for integrating the new and traditional literacies into her classroom instruction was lacking.

The literature supports the benefits of and the importance for integrating DST into classroom instruction on student learning to increase their abilities to engage with and master 21st century literacy skills, such as communicating and collaborating efficiently and effectively, engaging in critical and creative thinking, and exploring and comprehending content as well as becoming confident participants in their learning. Not only did students learn traditional literacy skills through DST, but they also learned new

literacies skills associated with multimodal text creation, such as creating stories using various technologies, and incorporated meaningful audio, visual, and graphic components, along with skills associated with searching online for information. In addition, DST increased student engagement and motivation, which may have been a factor associated with the enhanced literacy skills seen in students. However, there is little or no examination of the adult support needed for students to be successful with DST, nor is there explanation of how teachers learned how to provide the needed support.

Digital Writing. Digital writing, another form of multimodal text creation, goes beyond the notion of writing using technology tools. Digital writing involves using technology tools to communicate with an audience in digital spaces, particularly networks. These networks such as wikis, blogs, and social media platforms not only provide for meaningful collaboration but also provide avenues for cultural changes to how we write. Digital writing makes it easy to write in new ways, which include multi modalities such as images, sound, and video. It also allows writers to easily create and share their writing. Communication through the use of digital tools allows writers opportunities to interact with authentic audiences, providing more meaningful and engaging experiences (Merchant, 2015). The main findings of student digital writing practice research were increased writing abilities, increased motivation, increased knowledge of digital literacies skills, and increased opportunities for working collaboratively (Aktas & Akyol, 2020; Baken, 2016; Barone & Wright, 2008; Graham & Harris, 2013; Hsu & Wang, 2011; Larson, 2009; Young & Stover, 2015).

Blogging provides writers with digital supports, including peer collaborations,

spell check, and online dictionaries (Graham & Harris, 2013) as well as allowing users to create rich content which can include text, pictures, graphics, videos, and other multimedia features that can be shared with an authentic audience who can interact and engage in an online discussion (Hsu & Wang, 2011). Young and Stover (2015) looked at a group of second graders to determine if blogging could be used to encourage them to write expository essays and revise based on peer feedback and what, if any, impact this would have on the students' writing, revising, and editing abilities. Findings from this study suggested blogging is a powerful tool for both increasing the quality and length of student writing and motivating students to revise their writing based on the feedback of their peers, and blogging prepares students to provide constructive feedback to their peers. The teacher, who was one of the study authors, modeled blogging and giving constructive feedback for students before they engaged in their own digital writing. The study authors pointed out explicit instruction of writing as a key factor for student success, but they did not go into details of the instructional practices associated with digital and multimodal literacies, nor did they provide details of how the teacher planned for or learned about the integration of these literacies.

Baken (2016) sought to discover how students responded to texts using blogs. Specifically, the researcher looked at student motivation to write and interact with their classmates as well as student awareness of audience, proper mechanics, and engagement through blog writing. There were 20 fourth grade participants in this qualitative study, who were all in the same classroom. The teacher/researcher prepped the students by modeling a blog post and discussing social media and the importance of collaborative learning. The study found that students demonstrated the use of voice in

their blog writing and experimented with non-formal writing such emojis, which aided readers in deeper level understandings, as well as engaging in a discourse used for interacting with peers, demonstrating an awareness of audience. Additionally, students shared connections to text such as text-to-text and text-to-self connections and every student provided text evidence to support what they were sharing about the books they were reading. Overall, students had positive feelings about blogging with a few students expressing concerns about sharing their writing, not feeling comfortable with technology, and not getting enough comments on their blogs (Baken, 2016). While this study did allude to the teacher/researcher modeling how to create a blog post and discussing the how social media could be used for collaborative learning, it did not provide details of how students were scaffolded during their blog writing or of the support available for the teacher in implementing digital writing into her instructional practices.

Another example of digital writing is digital writing workshop, which Aktas and Akyol (2020) examined over a 14-week period with a group of 30 fourth grade students. Their study used an experimental design to determine the effects of digital writing workshop activities on student writing motivation and story-writing skills. They found the writing quality of the 15 students in the experimental group increased for developing ideas, organization, word choice, sentence fluency, and conventions. However, though other studies have found increased motivation for using multimodal text creation (e.g., Liu et al., 2019; Yamac & Ulusoy, 2016; Young & Stover, 2015), the results for this particular study indicated decreased motivation for the experimental group in the areas of writing task value and writing self-perception. The researchers speculated this was

due to a lack of experience with the digital tools and applications and student buy-in; the students did not consider the digital writing workshop as meaningful for themselves. The study lacked any explanation of the teacher's role for integrating digital and multimodal literacies into the writer's workshop.

Larson (2009), using the theoretical underpinnings of the transactional theory of reader response (Rosenblatt, 1978), examined how fifth-grade students learned as they socially constructed meaning through responding to literature using an online message board asynchronously. Ten students were purposefully selected by the classroom teacher based on their ability to communicate both in writing and verbally as well as being deemed "hard workers." Student were required to read and respond in their e-journals followed by posting on the message board in response to a prompt provided by the researcher. Following the initial prompt, students requested the ability to create their own prompts for discussion. Subsequently, the researcher and the classroom teacher taught students how to post a prompt (start a new thread) on the message board. Findings indicated that the average length of a student post was 28 words. Some issues surrounding the length of posts included previous experiences with online chatting outside of the classroom being brief and frustration over typing speed. Posts were also analyzed for patterns and commonalities of content. Findings also suggested that students created their own rules for social interaction in their online discussion groups. Finally, this study observed that online asynchronous literature discussions encouraged students to consider multiple perspectives, provide in-depth response to literature, and share their ideas with their peers. The researcher of this study provided the scaffolding for students as they engaged in responding to literature using their e-journals and an

online message board. The study lacked information about support for the classroom teacher for integrating such digital writing activities on her own.

Barone and Wright (2008) described the use of technology as a tool for incorporating new literacies into the classroom practices of one fourth-grade student. The student engaged in using new literacies for tasks, including digital learning centers, digital writing prompts and writing, digital graphic organizers, and digital worksheets. He also used a digital think-pair-share where he and a partner employed instant messaging to share their thoughts and answers to questions. Blogs were used for a digital literature circle where the student interacted with others in his group to share ideas and provide comments to peers about the book they were reading. Findings from this study suggested that when students are afforded the opportunities to use new technologies and literacies routinely in the classroom, they develop skills and strategies for using new literacies as well as growth in their literacy development (Barone & Wright, 2008). While findings from the study suggested students who are routinely exposed to digital and multimodal literacies in the classroom increase their skills for engaging with these literacies, it did not provide research about best practices for teachers to implement these literacies into their instruction.

The literature on digital writing supports the benefits of and importance for integrating digital writing into instructional practices. Students showed an increase in writing skills and abilities. The research on digital writing also shows support for students' motivation for writing as well as students' abilities to work collaboratively with their peers and provide constructive feedback on peer multimodal text creation. Lacking in the studies surrounding digital writing is research on best practices for preparing and

supporting teachers for integrating digital writing into their classroom instructional practices.

Online Reading Comprehension and Researching

Reading and researching online is another category of research for 21st century literacies. In order to engage in reading and researching online, readers of today must understand how to read both print and digital text, including constructing meaning from images, sounds, videos, and other various types of media as well as being a savvy locator and evaluator of information relevant to the topic at hand (e.g., Coiro, 2003; Lankshear & Knobel, 2006; Leu et al., 2004; Lewis & Fabos, 2005; Reinking, 1998). Major findings from the studies surrounding reading and researching online indicated that online reading and researching literacy skills do not necessarily mirror those necessary for traditional, print-based texts. Reading and researching online is much more complex. Students need to be taught about the features of online text such as hyperlinks, strategies for searching for information online, identifying main ideas from that information, synthesizing information across various sources of online information, and communicating that information. The research also highlights a need for students to learn strategies for determining and confirming credibility and trustworthiness of information online. Hutchinson et al. (2016) in a study surveying the online reading, writing, and communication practices of elementary students age 9-12 found that students perceived reading online to be more difficult than reading a book and recommended increasing instruction to support students' abilities to communicate online, including reading and writing. Though the evidence would suggest that reading and researching online is much more complex than reading and researching with

traditional printed text and that students need additional literacy strategies to engage with these online activities (Coiro, 2011a; Leu et al., 2015), none of the studies discussed in-depth describe how to equip students with these additional literacy strategies or best practices for teachers to incorporate digital and multimodal literacies into instruction.

Pilgram et al. (2018) examined 80 first- through fifth-grade elementary students' knowledge of online text features and navigation as well as the developmental progression of these constructs using the Concepts of Online Text (COT) instrument developed by the researchers of this study. Participants were purposefully selected from schools that demonstrated a commitment to integrating technology. Results from the study indicated online literacy skills do not necessarily mirror traditional literacy skills. They found most of the elementary students were proficient with using the scroll bar and navigation arrows and knew how to close an open page on the internet as well as identify headings, authors, and titles of webpage text. However, most were challenged by the concepts of online texts involving knowledge of URL and navigating hyperlinks. Another key finding of this study was that knowledge and navigation skills surrounding online text features and navigation skills of online text features increased by grade level, indicating that students become more proficient as they gain more experience with these concepts. The authors of this study discussed implications for teacher preparation and teacher development, arguing that education for preservice and in-service teachers should extend to include concepts about digital print, indicating a need for examining how it could be done.

Pilgram et al. (2019) set out to explore the abilities of 68 first- through fifth-grade

students to critically examine the credibility of a hoax website. The majority of students believed the website and the information on it to be true and accurate. The accuracy of the website information was questioned more than trusted only by students at the fifth-grade level. Students in both first- and fifth-grade believed the website to be trustworthy. The fifth-grade students demonstrated more knowledge of text features such as URL. Since the URL for the website ended with .net, one fifth-grader suggested it was not trustworthy. This study was a repeat of an earlier study by Krane (2006) where a group of 25 seventh graders were asked to evaluate the credibility of Zapato's tree octopus. All 25 believed the information on the website. Even though 65% of students fell for the hoax, the findings from Pilgrim et al. (2019) indicated the elementary students in their study have stronger online literacy skills than the seventh graders demonstrated in 2006. Researchers from this study speculated experiences and exposures with the internet over the past decade as being the reason the elementary students were better able to identify the hoax. The authors for this study suggested teaching strategies such as online mentor texts, modeling online reading, and think-aloud of digital text. However, they did not provide information about how to support teachers for implementing digital and multimodal scaffolding in their classrooms.

A study by Kiili et al. (2018) of 426 sixth-graders in Finland elementary schools examined student performance to construct a six-factor theoretical model for online research and comprehension. The six-factor model included locating information online, questioning creditability of information, confirming credibility of information, identifying main ideas from a single online source, synthesizing information across multiple online sources, and communicating a justified, source-based position. The results of this study

suggested the elements of online reading and researching differ from those of offline reading, and therefore, theoretical models which are grounded in print-based reading contexts are not sufficient for students engaging in reading and researching in online environments. The authors of the study indicated instructional practices must go beyond making meaning with a single text and focus on helping students make sense of multiple resources from differing perspectives about a topic. However, there was no discussion surrounding how to prepare teachers for implementing these instructional practices.

These studies surrounding online reading and researching demonstrated the literacy skills necessary for engaging in online environments differ from those students use to engage in traditional print text. The research demonstrated students need to be taught concepts about online text features. While the research provides some suggested strategies for student learning surrounding online reading and researching, there was little discussion surrounding guidance for teachers to integrate effective strategies and instruction for online reading and researching in the classroom.

Connecting In-School and Out-of-School Literacy Practices

A theme across the research for digital and multimodal literacies as a whole is the importance of considering of how students use digital and multimodal literacy outside of school and the opportunities for connecting these outside-of-school knowledges and experiences into classroom instruction. Findings from the research surrounding the connections between students' in-school and out-of-school literacy practices suggested that making these connections are important for student learning, students are introduced to new multimodal and digital literacies at school, and they

bring the knowledge and skills they attain from using these literacies outside of the classroom into the classroom (Bjørgen & Erstad, 2014; Buckingham, 2007; Colwell et al., 2013; Hutchinson et al., 2016). Research found elementary students engaged more with digital and multimodal literacies at school, while middle school student engagement with digital literacies outside of school dictated their online search practices in the classroom (Colwell et al., 2013).

Hutchinson et al. (2016) used the Survey of Internet Use and Online Reading to examine the online activities and skills of 1,262 fourth- and fifth-graders. Results from the survey indicated students were moderately skilled at navigating, reading, and writing in online environments. They also found that students tend to be more consumers of information rather than producers of information at school and that students engaged in more digital literacies at school than at home. This is a shift from previous findings of student engagement in digital literacies being driven by outside-of-school practices (Buckingham, 2007; Colwell et al., 2013). However, this could be due to the students from Hutchinson, Woodward, and Colwell's (2016) study being preadolescents while the students from the other studies were of middle school age. The preadolescent students may not have had the same access and/or opportunities for engaging with digital literacies outside of school. Hutchinson, Woodward, and Colwell (2016) asserted teachers of the 21st century classroom must make explicit connections for students between the digital technology practices students engage in outside of school and the practices and learning goals in school. However, while the researchers from this study advocated for teachers making connections between in-school and out-of-school literacy practices, their study did not explore opportunities or best practices for teachers

to make these connections.

Colwell et al. (2013) used a formative experiment to study the use of Internet Reciprocal Teaching for increasing the internet digital literacy skills of 48 seventh-grade students. Students were selected for this study because their teacher was taking a content-area literacy course and reported using inquiry-based teaching strategies as well as indicating she was open to incorporating digital literacies into her classroom instruction. Researchers observed that students were often frustrated when searching for information on the internet and rarely clicked on links to explore other sources. When searching for answers to questions guiding their activities, they seemed by be searching for one website which could provide all the information needed. Most students in this study used the internet both inside and outside of school, although more outside of school. All the students indicated using search engines to find information for school, though primarily at home. These outside-of-school experiences dictated the online search practices of students in the classroom. The setting of this study was selected due to the access and willingness of the teacher to participate. However, although the study discussed the teacher's knowledge and abilities for the inclusion of inquiry-based learning, the study did not investigate or discuss the teacher's knowledge and ability for integrating internet digital literacy skills.

Bjørgen and Erstad (2014) examined how 37 students between the ages of 9 and 13 in three Norwegian primary schools made sense of the connections between school and leisure digital literacy practices. They found these students interpreted and understood digital practices in different ways depending upon the activities, their goals and intentions, and contextual requirements. In this study, children brought the

knowledge and skills attained from engaging in digital literacies outside of school with them into the classroom. Interestingly, the teacher of this study did not appear to notice the blending of students' leisure digital literacies' skills with those practiced in school. Another important finding from this study was that schools introduce young students to new digital literacy practices which are sometimes transferred to students' leisure activities. However, other times these school practices are deemed irrelevant for students' leisure activities because students want to create content of interest to them personally outside of school. While this study discussed the importance of making connections for children between in-school and out-of-school digital literacy practices, it did not offer any suggestions for how teachers can help students make those connections.

Connections between in-school literacy practices and out-of-school literacy practices highlight the importance of making connections between home and school digital and multimodal literacies' practices. The research indicated differences between how elementary students engage with digital literacies and how middle school students engage with digital literacies. While elementary school students are more likely to engage with digital literacies in school, the at-home literacies practices of middle-school students strongly impact how they engage with digital literacies in school. Regardless, teachers will need ongoing professional development and support for providing students with effective strategies for accessing and engaging with digital and multimodal literacies in the classroom. Hence, more research surrounding how to provide these supports for teachers is needed.

Access and Equity Surrounding 21st Century Literacies

Given the affordances provided by the ever-changing technologies of today's society, it is imperative that researchers and educators examine not only best practices for integrating digital and multimodal literacies into instructional practice, but also how issues surrounding access and equity impact teacher implementation practices for instruction as well student success. Findings surrounding the access and equity of 21st century literacies suggest socioeconomic status puts students at risk for less exposure to digital and multimodal literacies in a classroom and socioeconomic status impacts online reading achievement (Auld et al., 2012; Leu et al., 2015; Prinsloo & Rowsell, 2012; Ritzhaupt et al., 2013; Rowsell et al., 2017; Rubinstein-Ávila & Sortori, 2016; Shelby-Caffey et al., 2014; Thomas, 2008; Warschauer, 2011). A study by Leu et al., (2015) found evidence suggesting students in lower socioeconomic school districts use the internet less frequently at school and are less skilled at online reading than their higher socioeconomic counterparts. The purpose this study was to determine if there was an achievement gap based on income inequality for online reading ability when separating for the achievement gap that existed for traditional print-based reading. The seventh-grade participants of this study were purposefully selected from two different school districts which represented different socioeconomic strata. This study provided valuable information about the inequities surrounding socioeconomic status and digital and multimodal literacies and the need for teachers to teach skills and strategies for students to access and navigate digital and multimodal literacies, but it did not provide information for how teachers should be prepared to teach such skills and strategies.

Shelby-Caffey et al. (2014), when exploring the effects of use of DST on fifth-graders' writing practices, found the lack of digital and multimodal literacies integration

into instruction has the potential to amplify the achievement gap for students who have limited internet or technology usage experiences. The Matthew E-ffect (Shelby-Caffey et al., 2014) posited students who have opportunities to use technology and develop proficiency and interest for using technology are more likely to increase their knowledge and interest whereas those who lack access to technology may develop less knowledge and interest for using technology, contributing to a widening of the cap between those with effective and efficient 21st century literacy skills and those without. Shelby-Caffey et al. (2014) outlined the need to integrate digital and multimodal literacies in classroom instructional practices. What was lacking was a focus on teacher development for integrating these literacies effectively.

Ritzhaupt et al. (2013) examined the relation between middle-school students' information and communication technology (ICT) literacy and their socioeconomic status, gender, and ethnicity. 5,990 middle school students across 13 school districts in Florida were asked to complete a performance-based assessment measuring their ICT literacy skills. White students of high socioeconomic status achieved better than their counterparts in every area of the assessment, providing evidence of an existing digital divide among groups. However, researchers also examined individual differences rather than just group differences. Findings demonstrated a digital divide related to socioeconomic status, ethnicity, and gender. Similar to the study by Hutchinson et al. (2016), findings from this study suggested that girls were more proficient with ICT literacy than boys. However, suggestions for how teachers can address these disparities in their classroom instructional practices surrounding digital and multimodal literacies were missing.

In a review of the existing research surrounding lack of access to technology, Rowsell et al. (2017) sought to discover if the lack of access to technology limited the literacy learning of young people. After a review of the existing research, the researchers concluded that young people's literacy learning is indeed limited by a lack of access to technology and also a lack of established frameworks for implementing digital literacies. This review offered some suggestions for how the lack of access could be addressed in schools and classrooms, though they provided no examples of studies that examined best practices for addressing access and equality issues for implementing digital and multimodal literacies in the classroom.

The research demonstrates a need for integrating digital and multimodal literacies into classroom instructional practices. However, socioeconomic status appears to impact student access and achievement for these literacies in school settings. While these studies provided evidence of inequity and access issues in schools, they did not provide suggestions for how teachers who teach in schools with access and equity issues can find access and support for integrating these literacies into their instruction.

Teacher Beliefs and Understandings

To better understand why and how teachers implemented classroom practices surrounding digital and multimodal literacies, it was important to examine the research surrounding the beliefs and types of knowledge of classroom teachers. Understanding the belief structures held by teachers is essential for improving teaching practice as teachers' classroom behaviors are affected by their perceptions and judgments, which are influenced by the beliefs teachers hold (Ashton & Webb, 1986; Brookhart &

Freeman, 1992; Goodman, 1988; Nespor, 1987; Weinstein, 1989; Wilson, 1990). Further, understanding teacher belief systems and how they impact classroom instruction is important because research has shown that teacher beliefs and practices have an impact on student learning (Ashton & Webb, 1986; Gibson & Dembo, 1984; Lenski et al., 1997; Reutzel & Sabey, 1996).

Pajares (1992) reported that one of the difficulties in studying teachers' beliefs had been that beliefs are seldom defined clearly in studies but instead a variety of meanings are offered throughout the educational research. Commonly, a distinction is made between belief and knowledge. A belief is based on making a judgment or evaluation and knowledge is based on objective facts. In reality, when researchers speak about teachers' beliefs, they are referring to their educational beliefs such as beliefs and knowledge about schooling, teaching, learning, and students (Pajares, 1992).

Pajares (1992) reported a number of key findings surrounding teacher beliefs and their resiliency. Beliefs are formed early and are generally preserved even when contradicted with time, reason, education, or experience (Clark, 1988; Florio-Ruane & Lensmire, 1990; Schommer, 1990; Wilson, 1990). The belief system helps individuals define themselves and understand the world (Nisbett & Ross, 1980). Knowledge interpretation and cognitive monitoring is guided by epistemological beliefs (Kitchener, 1986; Nespor, 1987; Peterman, 1991; Schommer, 1990). Beliefs and knowledge are inextricably connected, but due to the episodic nature of beliefs, they are the lens through which new information is interpreted (Calderhead & Robson, 1991; Goodman, 1988; Nespor, 1987; Schommer, 1990). The earlier a belief is adopted into one's belief

structure, the more challenging it is to change (Clark, 1988; Nespor, 1987). The beliefs individuals hold are often based on partial or nonfactual information and persist even after being presented with scientifically valid information (Nespor, 1987; Nisbett & Ross, 1980). Beliefs play a vital role in interpretation, planning, and decision making, and a critical role in organizing knowledge and defining behavior (Bandura, 1986; Nespor, 1987; Nisbett & Ross, 1980; Schommer, 1990.) The behavior of an individual is strongly affected by their beliefs (Bandura, 1986; Clark & Peterson, 1986; Eisenhart, Shrum et al., 1988; Ernest, 1989).

Research also supports the idea that the theoretical beliefs teachers hold about teaching shape their classroom instructional practices (Bingham & Hall-Kenyon, 2013; Bliem & Davenroy, 1997; Johnston et al., 1993; Lenski et al., 1997; Maxson, 1996; Pressley, 2006; Pressley et al., 1998; Reutzel & Salbey, 1996; Richardson et al., 1991). For example, Bingham and Hall-Kenyon (2013) surveyed 581 teachers from two schools districts about their literacy instruction and implementation in relation to their beliefs about literacy. They found that teachers' implementation of literacy instruction and strategies were closely related to their beliefs about literacy, in particular their beliefs about the importance of code-based literacy skills. These findings reflected the findings from earlier studies that teachers' beliefs influence classroom instructional practices and guide pedagogical actions (cf., Korthagen & Lagerwerf, 1996; Richardson, 1996; Richardson et al., 1991). Bliem and Davenroy (1997) investigated teacher beliefs about assessment and their connections to literacy instruction. They found teachers' beliefs about assessment were an interpretative lens through which they processed information about classroom practices and teachers seemly unconsciously altered new

assessment tools so that their use aligned with teachers' existing beliefs. These findings are similar to Eisenhart, Cuthbert, Shrum, and Harding (1988) findings that teachers often altered instructional practices to fit with their beliefs.

Epistemological beliefs related to teaching theories have also been found to affect the behavioral and instructional practices of classroom teachers. For example, Stevens and Palinscar (1992) described their findings about what urban teachers believe and know about teaching and learning literacy in relation to two perspectives about how students become literate: mechanism or contextualism. They found most of teachers held beliefs that emphasized student learning begin with simple processes before introducing more complex processes, closely aligned with mechanism. The teachers emphasized a need for control of the learning process over student-centered learning, also aligning with mechanism. Researchers of this study found that teachers' beliefs about teaching and learning were overwhelmingly influenced by the context of teaching in a poverty-stricken urban neighborhood. Similarly, Richardson et al. (1991) found that teachers who hold beliefs consistent with the behaviorist view of reading focused their instructional practices on isolated skills for decoding, relied heavily on basal readers, tended to value the final product over the process of learning, and often used decontextualized modes of assessment, while teachers who held constructivist beliefs focused classroom instructional practices around the process of learning over product and the teacher served as a guide for the learning process.

Some studies have found that while teachers' beliefs influence instructional practices, their beliefs and practices are often influenced by other contextual factors as well, such as geographical location, administrative support, school and district policies,

federal testing mandates, knowledge of content area, lack of resources, lack of time, and teaching experience (Braithwaite, 1999; Lehman et al., 1994; Zahorik, 1987). Lehman et al. (1994) examined the congruence between teachers' beliefs and their practices regarding literacy instruction. They surveyed 350 elementary teachers with teaching experience ranging from 0-15 years in the classroom. They found that although teachers' beliefs were related to certain classroom practices, other contextual factors such as geographical location, teacher experience, state and local curriculum guidelines, federal standardized testing mandates, and lack of time and resources impacted both teachers' beliefs and instructional practices. Braithwaite's (1999) findings were similar when investigating the relation between teachers' beliefs about literacy and language learning and classroom organization, pedagogical practices, and student learning outcomes. He found that teacher beliefs affected implementation processes and student learning outcomes. Their beliefs guided lesson-plan creation and the learning environment. External context factors such as the setting and school policies had an impact on the ways teachers managed and operated their classrooms. Similarly, Shapiro and Kilbey (1990) in an examination of the research about teachers' beliefs and instructional practices found that teachers' beliefs and practices were affected by a complex range of factors, including practical issues such as classroom behaviors, limited resources, and lack of time, which impacted the new instructional practices and strategies they could implement in their classrooms. They also found a lack of professional development and administrative support were hampering factors. Valencia and Wixson (2000) also found that contextual factors such as federal, state, and district policies as well as diverse beliefs about teacher role and teaching methods affected

classroom instructional practices. Teachers' conceptual understandings of the content they teach was another contextual factor related to their beliefs and influenced their decision-making process about instructional practices and outcomes (Richardson et al., 1991). Furthermore, teachers with superior understandings of the content tended to modify textbooks and emphasized conceptual explanations as opposed to those with superficial understanding that leaned primarily on prepared texts for instruction (Grossman et al., 1989).

Classroom teachers solve problems daily, relying upon a combination of their beliefs and experiences (Ashton & Webb, 1986; Rosenholtz, 1989; Smylie, 1989). Teachers' beliefs appear to be formed mainly from their own ideas and those of the colleagues they work with closely (Zahorik, 1987). However, what teachers know or believe about teaching is relatively stable (Brousseau et al., 1999; Herrmann & Duffy, 1989) and is often tacit (Cooney, 1985; Thompson, 1984). When teachers accept information from outside sources such as universities or professional development programs, their belief systems work as a filter through which they integrate the new information (Berliner, 1987; Carter & Doyle, 1989).

Other studies, however, have found inconsistencies surrounding the congruence between teacher practices and their beliefs, in some cases finding what teachers believe and what they do are quite different (Duffy & Anderson, 1984; Johnson, 1992; Kinzer, 1988; Readence et al., 1991). Powers et al. (2006) used case study design to examine and describe the changes in the beliefs about literacy instruction and assessment over the course of one year of four teachers participating in a graduate-level reading clinical class. Findings from the study suggested that what teachers

believe about and how they implement literacy instruction in their classrooms are not always consistent. They also found that even though teacher beliefs may evolve over time, lack of support for implementing new literacy strategies and practices may lead to teachers persisting with comfortable patterns of instructional practices in the classroom. These findings are similar to those of Lenski et al. (1997), finding that even though a teacher's beliefs may change, their practices often did not reflect their change in beliefs. A possible explanation for the disparities in findings surrounding teachers' beliefs and their practices may be that when teachers' beliefs are in the process of major changes, they may not be congruent with their classroom practices (Ridley, 1990).

To summarize, the key findings from the research included that teacher beliefs and teacher knowledge are intertwined and should be examined together, teacher beliefs affect their instructional practices, and therefore, have an impact on student learning, and teacher beliefs are influenced by contextual factors. Though the research has produced mixed results as to what degree teacher beliefs impact their classroom instructional practices, it is evident that whether their beliefs are of personal or epistemological nature or are influenced by contextual factors, teacher beliefs directly affect their instructional planning, decision making, and implementation, which in turn impacts learning outcomes for students.

Teachers' Digital and Multimodal Literacies Beliefs and Understandings

The research on teacher beliefs about the integration of digital and multimodal literacies is sparse. Most studies (i.e., Ebrecht & Ku, 2014; Ertmer & Ottenbreit-Leftwich, 2010; Hermans et al., 2008; Hutchinson and Reinking, 2011; Judson, 2006; Ottenbreit-Leftwich, 2007; Roehrig et al., 2007; Schwartz, 2018; Tondeur et al., 2016)

addressed teacher beliefs about the integration of technology into classroom instruction in general and literacy instruction in particular, although a few did address the beliefs about digital and multimodal literacies. Some key themes that emerged from this research about technology integration into classroom instruction included teachers' pedagogical beliefs that impact if and how integration will occur (Ertmer & Ottenbreit-Leftwich, 2010; Hermans et al., 2008; Hutchinson & Reinking, 2011; Judson, 2006; Roehrig et al., 2007; Schwartz, 2018; Tondeur et al., 2016), internal and external barriers for integrating technology (Ertmer & Ottenbreit-Leftwich, 2010; Hutchinson & Reinking, 2011; Tondeur et al., 2016), and that teachers focus on the technology rather than curriculum, but they are unlikely to integrate technology if they don't see the connection to learning content (Ebrect & Ku, 2014; Ertmer & Ottenbreit-Leftwich, 2010; Isrealson, 2015; Schwartz, 2018; Shelby-Caffey et al., 2014).

Pedagogical Beliefs

Ertmer and Ottenbreit-Leftwich (2010) examined technology integration from the perspective of the teacher as an agent of change. They looked at what characteristics or qualities were necessary for teachers to possess in order to use technology resources as meaningful pedagogical tools in the classroom. They found that in order to facilitate the use of relevant ICTs used meaningfully as pedagogical tools it would require changes in teacher knowledge, teacher beliefs, and teacher culture. They also found teacher pedagogical beliefs had an impact on how they will use technology in the classroom. Teachers who held more traditional beliefs about teaching implemented "low-level" use of technology as opposed to teachers with more constructivist beliefs implementing "high-level" uses of technology (Judson, 2006; Roehrig et al., 2007).

As teachers incorporate more technologies, however, it can lead to a gradual change in their pedagogical beliefs (Ertmer & Ottenbreit-Leftwich, 2010). Since teachers' pedagogical beliefs can be attributed to values, teachers often make a value judgment about new technologies based upon whether or not they believe the tool is relevant to their instructional goals. Therefore, teachers are unlikely to incorporate a technology tool into their classroom practices unless a connection is made to content learning goals (Ertmer & Ottenbreit-Leftwich, 2010). Hermans et al. (2008) investigated the relation between computer usage and teachers' education beliefs with a questionnaire. Findings provide evidence to support that teacher beliefs surrounding teaching practices are indicative of teacher computer usage in the classroom. Specifically, constructivist teaching beliefs were found to be a strong predictor of classroom computer use. In contrast, holding more traditional behavioristic teacher beliefs seemed to predict a negative impact for using computers in the classroom. While there were other demographic and technology-related variables such as computer experience, attitudes about computers, and gender that could impact computer usage in the classroom, results from this study indicated teacher beliefs about teaching practices seemed to be at least as important as the other factors. These findings were supported by the best evidence synthesis done by Tondeur et al. (2016) who found similar findings, suggesting that constructivist beliefs led to integration of technologies into classroom practices. They also found that school context must be considered when examining the relation between technology and teacher pedagogical beliefs. Hutchinson and Reinking (2011) found that a teacher's beliefs about ICTs may be the best predictor as to whether he or she will integrate them into their classroom practices. Schwartz

(2018) found that teachers' technology integration practices were connected to pedagogical issues and teachers' beliefs about the integration of technology could be positive or negative. When teachers believed that technology was imposed upon them, they felt a lack of autonomy.

These studies' findings support the relation between teacher beliefs and their classroom practices surrounding the use of technology. And, although the research indicates that pedagogical beliefs impact teachers' classroom practices for integrating technology into instruction, it does not provide information about how to help teachers adopt beliefs, practices, and tools for supporting integration into instruction or helping them see the value of using these technologies in their classrooms. Furthermore, these studies focus on teachers' beliefs about technology integration. More research is needed focusing on teachers' beliefs surrounding the integration of digital and multimodal literacies.

Internal and External Barriers

Knowledge, confidence, and beliefs are not the only factors involved when it comes to integrating technology into teachers' classroom instructional practices. School or institution culture also plays a pivotal role. If integrating technology is not normal instructional practice in a school culture, then teachers may be reluctant to adopt the use into their own teaching practices. However, just as school culture can have a negative impact for technology integration, it can also have a positive impact if the school culture is one that is motivating and encouraging when it comes to integrating technology (Ertmer & Ottenbreit-Leftwich, 2010).

Hutchinson and Reinking (2011) used a nationwide survey to examine the

perceptions 1,441 literacy teachers held about integrating ICTs into literacy instruction. Results from the survey indicated issues with lack of access to both computers and the internet. While literacy teachers indicated they believed integrating technology into instructional practices was important, there seemed to be a gap between their perception of importance for integrating ICTs and their actual reported use of ICTs in the classroom. However, some items on the survey reported as not important, such as instant messaging, indicated teachers' beliefs about importance and actual implementation practices aligned. Another finding indicated that literacy teachers thought of integration in terms of the technology rather than the curriculum. Technology integration meant using technology to enhance traditional instructional goals and practices. Teachers reported their perceived obstacles for technology use were lack of time, lack of access, lack of professional development about how to integrate, lack of technical support, lack of student knowledge, high-stakes testing, lack of incentives, lack of administrative support, technology unreliable, lack of knowledge for how to use technology, and classroom management issues. Ebrect and Ku (2014) had similar findings about the lack of access to computers and students' keyboarding skills being a challenge for integrating blogging into their instructional activities.

Schwartz (2018) found teachers' beliefs that technology could not be a substitute for social experiences and interpersonal relationships coupled with integrating technology may be deemed as unnecessary by parents, families, and other community members because they may not have had experiences in school that included technology integration to be barriers for integrating technology into classroom practices.

This research indicates that both internal and external barriers exist for teachers

when it comes to integrating technology in their classrooms, including school and community culture, lack of resources, and lack of understandings. What the research does not provide are resolutions for these barriers. While the research indicates that school and community culture can be a barrier for technology integration, it does not address how teachers might overcome these barriers. According to the research, lack of resources and lack of understandings have impeded the integration of technology into classroom practices for decades. However, there are only sparse recommendations about how to solve these issues found in the research. Though there is little addressing teachers' beliefs and understandings surrounding digital and multimodal literacies, these same issues impact their integration in the classroom.

Technology and Curriculum Connections

How teachers perceived the value added to instruction when integrating technology into classroom practices was also a factor for successful implementation (Ertmer & Ottenbreit-Leftwich, 2010). Schwartz (2018) found that teachers use technology to differentiate instruction, foster learner independence, or as additional media or gaming opportunities and when teachers believed that technology would enhance student learning, they not only embraced the technology but also found creative ways to make it work for their instructional purposes. Ebrect and Ku (2014) investigated how elementary school teachers incorporated blogging into their instructional practices. Teachers from this study reported blogging added instructional value by providing authentic audiences, opportunities for communicating ideas, and ways to introduce and practice specific literacy skills required for state-mandated testing. Teachers also believe blogging was motivating for students and helped them

develop better editing skills as well as acquire and practice technology skills such as electronic writing, internet searches, navigation, keyboarding, and digital publishing.

Isrealson (2015) found that teachers who have in-depth knowledge of literacy instructional best practices and were aware of the potential value added to literacy development through using apps that engage students in multimodal writing disregarded their knowledge and prioritized app selection based upon visual appearance/graphics or price regardless of quality or value added. They also found K-3 teachers focused much of their literacy instructional time teaching comprehension strategies, whereas they used touchscreen devices and apps mainly for phonemic awareness and phonics practice in lieu of using these devices for the opportunities they afford students to comprehend and compose multimodal texts. Isrealson's study highlighted the need for teachers to be well versed in selecting apps for literacy instruction based upon the value they add to the acquisition of literacy skills rather than motivation factors. Despite the guidance of the app map and teachers' knowledge about effective literacy instruction, the teachers' beliefs about incorporating technology to promote motivation for students and using technology as an enhancement for literacy instruction clearly played a role in how they selected literacy learning apps.

A study by Shelby-Caffey et al. (2014) that examined the instructional practices of a 5th grade classroom teacher as she explored and implemented digital story telling (DST) found that blending traditional literacy strategies with digital and multimodal literacies strategies increased students' abilities to research, develop a point of view, and create emotional connections to the content they were studying. Other key findings from this study suggested DST, when combined with traditional literacy strategies,

provided opportunities for struggling writers who benefited from working collaboratively, enhanced student autonomy and motivation for learning, and expanded connections between in-school and out-of-school literacy practices. This study provided a glimpse of one teacher's experience with blending traditional literacy strategies with digital and multimodal literacies into her instruction. The teacher's beliefs about the importance of home and school connections were expressed in her goal. However, she clearly believed that making these connections through the use of digital technologies was important for motivating students rather than important for achieving curricular goals.

Research suggests that teachers focus on technology integration as a means of enhancing traditional curriculum and motivating students. This research focuses on how technology is being integrated in the classroom rather than supporting teachers for using best practices for integrating technology into their instructional practices. Though some of the research is using terms often associated with digital and multimodal literacies, such as digital storytelling, the research seems to be more technology-centric than focused on the integration of digital and multimodal literacies.

Preservice Teacher Beliefs and Understandings

The research demonstrates a link between the beliefs and instructional practices of veteran teachers. This next section will examine whether or not the same link exists between the beliefs and instructional practices of preservice teachers. Rokeach (1968) asserted that beliefs are dependent upon knowledge. As such, it is important to examine the beliefs, as well as the experiences and knowledge, held by preservice teachers. There were four key findings from the research surrounding the beliefs and understandings of preservice teachers. First, preservice teachers' initial beliefs were

shaped through their life experiences both at home and in school (Broman, 2018; Brownlee et al., 1998; Curry & Cherner, 2019; Gelfuso, 2018; Heydon & Hibbert, 2010; Hughes, 1994; Tanase & Wang, 2010). Second, quality teacher preparation programs influenced the beliefs held by preservice teachers (Broman, 2018; Hughes, 1994; Maloch et al., 2003). Third, school and community cultures and contexts influenced preservice teachers' beliefs and practices for learning and teaching (Broman, 2018; Curry & Cherner, 2019; Gelfuso, 2018; Stansell & Robert, 1979; Zeichner & Tabachnick 1981). Finally, preservice teachers' beliefs affected both their own learning and their teaching practices as well as their expectations for and the achievement of their students (Broman, 2018; Darling-Hammond, 2006; Flores, 2016; Gudenschwager, 2000; Heydon & Hibbert, 2010; Scharlach, 2008).

Preservice teachers enter into teacher preparation programs with both explicit and implicit beliefs about learning and teaching (Broman, 2018; Hughes, 1994; Tanase & Wang, 2010). These beliefs are formed through their home life, their schooling, and their community experiences (Broman, 2018; Curry & Cherner, 2019; Tanase & Wang, 2010). The relation between the experiences and the beliefs held by preservice teachers is highly complex (Heydon & Hilbert, 2010). While the beliefs most preservice teachers hold as they enter their teacher preparation programs are often characterized by researchers as naïve or simplistic (Brownlee et al., 1998; Hughes, 1994), they bring a range of epistemological beliefs with varying levels of strength into teacher education classrooms. These beliefs or ideas about knowledge and teaching practices shape their own learning experiences as well their future teaching experiences (Tanase & Wang, 2010). In a study examining the beliefs held by preservice teachers about literacy

teaching and learning, Lenek et al. (1999) found that while the preservice teachers' beliefs were more aligned with behavioralist notions that were teacher-directed and skill based, where the teacher imparts knowledge by telling students, towards the end of the semester a shift occurred and preservice teachers' beliefs were more aligned with constructivist, student-centered approaches, where learning was actively constructed by students and facilitated by the teacher. They found that these beliefs were shaped by the preservice teachers' own K-12 school experiences. This study demonstrated a shift in preservice teachers' beliefs from the traditional or behavioralist view to a constructivist view of learning and teaching, suggesting that teacher preparation programs have an impact upon the beliefs held by preservice teacher about teaching practices.

Though the research is clear about preservice teachers entering into teacher preparation programs with previously formed beliefs about learning and teaching, research indicates mixed results about how teacher preparation programs impact preservice teachers' beliefs about learning and teaching (Broman, 2018; Hughes, 1994; Maloch et al., 2003). For example, Hughes (1994) in a study examining the changes in preservice teachers' beliefs during their first literacy methods class found class requirements such as readings and assignments had little impact on preservice teachers' concepts and beliefs about teaching. Conversely, Maloch et al. (2003) observed 101 preservice teachers to explore the differences in their understandings, beliefs, and decision-making processes. They found that quality reading teacher preparation likely affected beginning teachers' beliefs and understandings of teaching practices for reading. Broman (2018) had similar findings when studying how preservice

teachers' beliefs and practices related to their theoretical perspectives. Preservice teachers in the study indicated that their experiences in their literacy methods courses as well as their professor for the courses were the primary influence on their theoretical beliefs about learning and teaching. So, it appears that while the reading and assignments alone may not have a significant impact on preservice teachers' beliefs, the combination of what, how, and who preservice teachers learn from in their teacher preparation programs does impact their beliefs.

In the same study, Broman (2018) also looked at how preservice teachers' experiences corresponding between literacy methods courses and internship influenced their theoretical beliefs. She found classroom experiences along with mentor teacher relationship was a key influence on preservice teachers' beliefs. Those preservice teachers who were treated as observers in the classroom were less influenced. Those that developed a strong working relationship with their mentor teachers and were treated as practicing teachers reported the experience was highly influential on their beliefs about learning and teaching. This aligns with the findings of Stansell and Robert (1979) who claimed preservice teachers' theoretical beliefs were influenced by university instructors, but often contradicted by mentor teachers' beliefs and practices during field experiences. In fact, Broman (2018) found that preservice teachers' instructional decisions during their internship were inextricably aligned with the expectations of their mentor teacher. They appeared to choose the approval of the mentor teacher over their own beliefs and adopted the teaching practices of their mentor teacher even if they conflicted with the theory and practice taught in their teacher preparation program. Gelfuso (2018) found that factors contributing to the

changes in beliefs of preservice teachers were field experiences, observations, and teaching strategies. Gelfuso posited that these field experiences created cultural, emotional, and political dissonance that impacted the beliefs held by preservice teachers. These findings are similar to those of Zeichner and Tabachnick (1981) who found that school context and culture superseded what was learned about theory and teaching practices in teacher preparation programs. Furthermore, in a recent study, Curry and Cherner (2019) examined how greater society, specifically political contexts, impacted the beliefs and practices of preservice teachers. Results indicated that community and cultural influences impact how preservice teachers integrate any instruction that can be deemed as political in nature, including digital and media literacies.

Preservice teachers' ideological beliefs about teaching and learning are important because these beliefs influence their approaches to instructional practices and curriculum (Broman, 2018; Gudenschwager, 2000; Heydon & Hibbert, 2010; Scharlach, 2008). Heydon and Hibbert (2008) explored preservice teachers' literacy histories and beliefs from a personal and political frame. They found powerful connections between preservice teachers' prior experiences as learners and the beliefs they held about learning and teaching practices. Further, they found that when one's own literacy experiences and teaching contexts align with dominant cultural views of literacy their teaching practices also align. Scharlach (2008) examined the beliefs preservice teachers held about teaching struggling readers and how their beliefs influenced their instruction, expectations, and evaluation of learners. They found preservice teachers' beliefs influenced their instructional practices for struggling readers

in a variety of ways. The researcher classified the preservice teacher participants as “coaches” or “suppliers” based upon the amount and types of instructional strategies and supports they provided the struggling readers. Coaches provided instructional strategies and supports that challenged students and encouraged students to actively apply new strategies and skills at higher levels. Coaches believed in their abilities to teach all students to read and that it was their responsibility to do so. Suppliers did not allow students opportunities to practice and apply strategies, and they provided all the answers for students. Suppliers believed they were not responsible for and were not able to teach all students to read. These preservice teachers’ beliefs about teaching struggling readers aligned directly with their observed instructional practices. When the preservice teachers in this study believed they were capable, the expectations they had for their students were higher. Broman (2018) similarly found that beliefs held by preservice teachers influenced their instructional practices and decision making in the classroom. However, this study also found that preservice teachers had a difficult time discussing their beliefs about teaching and learning and struggled to connect their instructional practices to their beliefs verbally. Research demonstrated that a teacher’s ability to provide quality instruction impacts student learning (Darling-Hammond, 2006; Flores, 2016). Therefore, if teachers’ instructional practices are linked to their beliefs, then teachers’ beliefs are linked to student learning.

To summarize, the key findings from this body of research indicate preservice teachers enter teacher education programs with beliefs that are consistent with traditional or behavioralist teaching. These beliefs were shaped by their personal experiences in K-12 schooling. Though quality teacher education programs appear to

have some impact on preservice teacher beliefs, it appears that the influence of mentor teachers' beliefs and practices in practicum settings as well as dominant political and cultural views may have a greater impact on the beliefs of preservice teachers. Further, preservice teachers' ideological beliefs about teaching and learning impact their instructional practices, which impact student learning experiences and outcomes.

Preservice Teachers' Digital and Multimodal Literacies Beliefs and Understandings

Beliefs preservice teachers hold about learning and teaching are a contributing factor to their beliefs about integrating digital and multimodal literacies. Research regarding beliefs preservice teachers have surrounding new technologies and literacies has been investigated from mainly technology integration perspectives. There is sparse research relating to the beliefs and understandings preservice teacher hold about ICTs, new literacies, digital literacies, and multimodal literacies, which are identified as digital and multimodal literacies in this review. The key findings from this research include preservice teachers' ideological beliefs about integrating technology and/or digital and multimodal literacies into classroom instructional practices (Birch & Irvine, 2009; Hundley & Holbrook, 2013; Kist & Pytash, 2015; Teo et al., 2008; Wimmer & Draper, 2019), preservice teachers experiences and knowledges for using technology and digital and multimodal literacies (Birch & Irvine, 2009; Hundley & Holbrook, 2013; Kist & Pytash, 2015; Lei, 2009; McVee et al., 2008; Schneider, 2015), and the supports and limitations for preservice teachers integrating technology and digital and multimodal literacies (Larson, 2012; McVee et al., 2008; Schneider, 2015).

Preservice Teachers' Ideological Beliefs about Digital and Multimodal Literacies

The epistemological beliefs that preservice teachers associate with learning and teaching, for example constructivist or behavioralist beliefs, have an impact on their beliefs and understanding surrounding technology and digital and multimodal literacies integration in the classroom (Birch & Irvine, 2009; Hundley & Holbrook, 2013; Kist & Pytash, 2015; Teo et al., 2008; Wimmer & Draper, 2019). For example, in a study designed to answer questions about the knowledge, skills, and experiences preservice teachers need to prepare their future students for our increasingly complex, multimodal world, Hundley and Holbrook (2013) engaged in action research with one of their writing methods courses. One of their findings was that preservice teachers resisted expanding their understandings of writing to include digital and multimodal text creation. Instead, these preservice teachers believed “real writing” was dominantly conventional printed texts. These beliefs aligned with traditional or behavioralist concepts of literacy. They also perceived digital composition as irrelevant and even dangerous for students. Similarly, Teo et al. (2008) examined the relations between preservice teachers’ beliefs and their uses of technology. They found those that held beliefs aligning with constructivist ideologies of learning and teaching were likely to use technology in both constructivist and traditional ways in the classroom, while those that held more traditional or behavioralist beliefs used technology in strictly traditional ways such as drill and practice activities. In another action research study, Kist and Pytash (2015) investigated the uses of new literacies in field experiences of students who were enrolled in their methods courses. They found their preservice teachers held tight to their traditional cultural models and beliefs about teaching and literacy. These preservice teachers, in general, had negative attitudes about integrating new literacies,

finding them inconvenient but at times necessary for teaching academic content. They viewed new literacies as an add-on to the traditional literacy instruction and curriculum and found it useful for reinforcing their traditional classroom instruction and/or as a motivational tool. These researchers were surprised to discover the disconnection between their own ideological beliefs about literacy and those of their preservice teachers. Similarly, Wimmer and Draper (2019) in an investigation of preservice elementary teachers' perceptions of the need to support or teach new literacies to their future students found these preservice teachers favored teaching traditional school-based literacies above new literacies. They posited that this belief stemmed from the preservice teachers' belief that the purpose of education was to do well in school. Birch and Irvine (2009) explored the factors that influence preservice teachers' acceptance of ICT integration into classroom practices. They found preservice teachers did not believe that integrating ICTs into instruction would be easy and would take too much time, they did not believe the people who influenced them such as mentor teachers, principal, and university faculty would think it was important for them to integrate ICTs in their teaching nor did they believe it was mandatory to integrate them, and they did not believe being able to integrate ICTs into instructional practices would increase their employment opportunities.

This body of research supports the relation between preservice teachers' ideological beliefs about teaching and learning and their beliefs and practices surrounding technology and digital and multimodal integration into the classroom. Although this research indicates preservice teachers' beliefs about technology in the classroom could be barriers for integrating it into instruction, the research does not

provide information about how to guide preservice teachers in adopting beliefs, practices, and tools for supporting technology integration into instruction or helping them understand the value of using these technologies in their future classrooms. Further, while some of these studies use terms such as “digital literacy” or “new literacies”, these studies are primarily focused on the technology rather than an expanded view of literacy that includes digital and multimodal literacies. More research is needed focusing on preservice teachers’ beliefs and understandings surrounding digital and multimodal literacies.

Preservice Teachers’ Experiences and Knowledge about Digital and Multimodal Literacies

Despite being avid users of technology outside of school, preservice teachers seem to have little pedagogical knowledge for integrating technology or digital and multimodal literacies (Hundley & Holbrook, 2013). Schneider (2015) observed preservice teachers’ technological literacy in a writing methods course and found that though preservice teachers understood how to use social media technologies, they had not taught with them or analyzed such practices to achieve curricula goals. Findings from this study also revealed that preservice teachers were instructional technology learners rather than experts. Similarly, Lei (2009) found preservice teachers were proficient users of technology in limited contexts but lacked the experience and expertise to integrate technology into classroom practices. Kist and Pytash (2015) also found preservice teachers to be consumers of technology but they struggled with integrating new literacies into instructional practices. Researchers (Birch & Irvine, 2009; Hundley & Holbrook, 2013; McVee et al., 2008) also indicated that preservice teachers

have doubts about their knowledge and abilities for integrating these literacies and technologies and even felt uncomfortable learning about new technology tools.

This research indicates preservice teachers' experiences with and understanding about technology are contextually limited and they tend to engage with technologies personally as consumers rather than producers, lacking the experience or expertise to integrate technology into their instructional practices as well as doubting their abilities to do so. Missing from this body of research is data about how to help preservice teachers develop knowledge and confidence for integrating new technologies into their instructional practices. Again, this research is focused upon technology integration rather than digital and multimodal literacies integration. More research is needed that focuses specifically on how to aid preservice teachers in making connections between their personal technology use and how they can integrate digital and multimodal literacies, using some of those technologies, into their instructional practices.

Supports and Limitations for Preservice Teachers Integrating Digital and Multimodal Literacies

A desire for and understanding of integrating digital and multimodal literacies into classroom practices does not necessarily provide preservice teachers with the skills needed for successful classroom integration. Preservice teachers need supports for integrating these into their instructional practices. Unfortunately, the research regarding the supports needed for integrating digital and multimodal literacies into classroom practices is scarce. Larson (2012) engaged in an action research project to explore preservice teachers' experiences using digital texts. At the beginning of the study, 63% of the participants had no prior experience with e-books. Results indicated the majority

of the preservice teachers believed the e-book supported their comprehension of the text, while a small percentage felt that it hindered their comprehension, and about a third of the participants believed it neither helped nor hindered their comprehension. Interestingly, although the majority of the preservice teachers believed the e-book format supported comprehension, an overwhelming 65% reported they would have preferred a printed version of the text. While this research specifically addressed preservice teachers' beliefs about the use of digital literacies for their own learning, it did not provide supports for integrating multimodal and digital literacies into their own teaching practices. Schneider's (2015) findings provided some generalized information surrounding what preservice teachers need for integrating digital and multimodal literacies. Results from their study indicated preservice teachers need explicit instruction in multimedia literacy and tech-mediated teaching, and they need support and scaffolding for integration. McVee et al. (2008) engaged in teacher action research in the context of a teacher education course in new literacies to examine new literacies practices. Findings from this study indicated teacher education courses should foster environments that allow problem solving and distributed learning and support integration of new literacies and technologies, including support for and knowledge of multimodal text design. Findings also suggested supporting preservice teachers' development of multimodality pedagogy is not enough without the support of K-12 school settings.

Findings from these studies indicated that support for integrating technology into instructional practices is critical for preservice teachers to be able to successfully integrate digital and multimodal literacies into instructional practices. However, these studies did not address what supports or how best to provide supports to preservice

teachers for integrating these literacies into classrooms. Future research is also needed that specifically addresses the supports necessary for preservice teachers to integrate digital and multimodal literacies into their classroom instructional practices.

Conclusion

Digital and multimodal literacies are redefining how we think about literacy—what defines it and how we teach it. Teachers will need to have a firm understanding of the beliefs and practices necessary for integrating these literacies into their classroom instructional practices. A review of the literature has focused on 21st century classroom practices and explored how children engage with these literacies inside and outside of the classroom; the beliefs and understandings classroom teachers hold about learning and teaching, including their beliefs and understandings about digital and multimodal literacies; and the beliefs and understandings preservice teachers hold about learning and teaching, including their beliefs and understandings surrounding digital and multimodal literacies. There are few empirical studies surrounding the beliefs, understandings, and experiences of preservice teachers for integrating digital and multimodal literacies. Perspectives from preservice teachers during their internships surrounding their beliefs, understandings, and experiences integrating digital and multimodal literacies into their instructional practices extends our understandings regarding the digital and multimodal practices of novice teachers.

Chapter 3: Methodology

The purpose of this study was to examine the understandings, beliefs, and implementation practices surrounding digital and multimodal literacies of elementary teacher candidates in their internship. This chapter will describe the research design, participants, setting and procedures, subjectivity, data collection methods, and data analysis. The overarching research questions were: What are teacher candidates' understandings of digital and multimodal literacies? What are their beliefs surrounding the use of digital and multimodal literacies in the classroom? How are they implementing digital and multimodal literacies into classroom practices? There were four sub-questions considered within the scope of the overarching questions: What are the perceived limitations teacher candidates have for implementing digital and multimodal literacies? What supports are available for teacher candidates for implementing digital and multimodal literacies? Do they plan to implement digital and multimodal literacies in their future teaching practices?

Research Design

The qualitative approach was best suited for this study as qualitative methods tend to address research questions that require exploration of a topic. In particular, an in-depth exploration about the problem in a specific setting for which a detailed understanding of a central phenomenon is needed (Creswell, 2013). Other quantitative and qualitative research approaches considered that used surveys and/or a larger sample size would not have provided the in-depth discussion required from the participants to fully examine the experiences of each participant. Whereas quantitative research seeks to explain, qualitative research seeks to understand a phenomenon.

The case study approach was also preferable to other types of qualitative research methods for this study because a major feature of case study methodology is that it combines other types of research approaches, allowing the investigator to illuminate the case from different angles and triangulate by combining methodologies (Johansson, 2003). Qualitative interpretive research focuses on a holistic approach to the issue being examined and is utilized as a part of this case study approach. Case study research is desirable when the focus of a study is to answer “how” and “why” questions and it is believed the contextual conditions are relevant to the phenomenon being studied (Baxter & Jack, 2008).

The case study research approach allows an investigator to explore either a bounded system (a case) or multiple bounded systems (cases) over time through detailed, in-depth data collection involving multiple sources of information (e.g., interviews, documents, and observations) that results in rich case descriptions and case-based themes (Creswell, 2013). The purpose of this design was to describe the uniqueness of each case while allowing for analysis of themes across all cases.

Harling (2012) defined a case study as “a holistic inquiry that investigates a contemporary phenomenon within its natural setting” (p. 1). A goal of case study research is to consider the contextual factors that influence behaviors and develop causal explanations by tracing the process in which specific aspects affect other aspects of a phenomenon, rather than showing a relationship or correlation, as is found in quantitative research (Baxter & Jack, 2008). Harling (2012) identified three distinct types of case studies. Instrumental case studies are those which the researcher selects one bounded case to provide a general understanding of a phenomenon. Intrinsic case

studies allow the researcher to develop a more substantial understanding of the uniqueness of a particular phenomenon. Collective case studies allow the researcher to focus on an issue with the selection of multiple case studies to illustrate a general understanding of the issue. According to Stake (2003), analyzing multiple cases for the purpose of comparison adds value to the findings. In case studies, participants are purposefully chosen because of their membership of a specific group that has knowledge, experiences, and access to the topic of interest.

A multiple case study with a cross-case analysis approach was a good fit for this study because of the clearly definable cases, which provided an in-depth understanding of each case as well as allowing a comparison of the cases for common themes (Stake, 2003). For this study, multiple case studies were chosen because the phenomenon to be studied was the digital and multimodal literacies implementation practices of elementary teacher candidates during their internship. However, the case could not be considered without the context of the classroom settings in which the participants completed their internships. This multiple case study with a cross-case analysis approach was particularly appropriate for the research questions because it could provide a rich description of the beliefs and understandings these teacher candidates held about and for implementing digital and multimodal literacies in classroom instruction during their internship. When individually described and compared, the cases provided insight into the greater issue of teacher preparation and the integration of digital and multimodal literacies into instruction.

Methods

Participants

Recruitment

The recruitment process began with an email to the instructor of the internship course requesting permission to attend both sections of her class to recruit teacher candidates. I attended the second class of the semester and potential participants were given the option of signing the consent form and turning it at the end of the recruitment presentation or taking time to consider whether they would like to participate. Potential participants were instructed to return the consent form to the course instructor. A follow up email was sent out one week after the initial recruitment presentation as a reminder with instructions on how to submit a consent form if a decision was made to participate.

The participants of this study were elementary education teacher candidates enrolled in their internship/student teaching semester in a College of Education at a comprehensive university located in the southwestern region of the United States. The teacher candidates from this university program were recruited for this study because the program was a one-to-one iPad college in which students were given an iPad as they were accepted into the teacher education program. In addition, as part of the requirements for the internship, the teacher candidates completed a technology integration course, educational psychology courses, and three literacy courses. These courses required the use of iPads and other technologies which allowed teacher candidates ample opportunities for observing/incorporating the integration of technology and/or digital and multimodal literacies into classroom practices. The completion of these courses should have provided participants with greater opportunities for learning about and using multimodal and digital literacies for literacy instruction and how to incorporate these into their classroom practices. Teacher candidates in this program

also participated in a variety of practicum experiences which both required the use of technology and provided opportunities for them to observe how technology was integrated into classroom instructional practices. These field experiences should have provided this particular group of teacher candidates with further opportunities to observe and integrate digital and multimodal literacies into instructional practices with multiple grade levels.

I limited the pool of potential participants to elementary teacher candidates in this education program who were in their internship/student teaching semester because all the potential participants had completed the coursework and practicum experiences before entering into their internship semester. Additionally, elementary teacher candidates in their internships were more likely to have opportunities for implementing digital and multimodal literacies into classroom instructional practices because they have access to classrooms and had requirements to prepare lessons and teach during their internship. Elementary teacher candidates at this university were required to teach individual lessons early in the semester and gradually add on each subject until they were responsible for preparing all lessons and providing instruction for all students in their cooperating teacher's classroom. Thus, this group of elementary teacher candidates had unique access to incorporate digital and multimodal literacies into a wide range of lesson plans and classroom practices.

The three participants in this study were White females in their mid-twenties. All three were interning in the same school district, a suburban school district in which the university was located. The school district had just over 16,000 students in attendance at 17 elementary schools, four middle schools, two high schools, and an alternative

school. Each of the participants did their internships at different elementary schools located within the district.

Rachel. Rachel (all names for people and places in this study are pseudonyms), a 23-year-old White female interned in a first-grade classroom at Redbud Elementary School. Redbud Elementary served approximately 400 children from Pre-k through 5th grade from culturally, ethnically, and socioeconomically diverse backgrounds. The student population consisted of 34% minority students, including 13% Hispanic, 5% black, 3% American Indian/Alaska Native, 1% Asian, and 15% identifying as two or more races. The class sizes at this elementary school were just below the state average of 17 students per teacher. The class Rachel completed her internship in had 21 children. Approximately 55% of the students at this elementary school qualified for free or reduced lunch. Rachel reported that the technology available included an interactive white board, five iPads, two laptops, one classroom computer, and a teacher computer.

Star. Star, a 24-year-old White female, interned at Oak Elementary School in a second-grade classroom. Oak Elementary served approximately 415 children from Pre-k through 5th grade from diverse socioeconomic and ethnic backgrounds. Approximately 60% of the students served at this elementary school qualified for free or reduced lunch. Oak Elementary had a student population that was 55% minority, including 3% American Indian, 6% Asian, 15% Hispanic, 13% Black, and 18% identified as two or more races. The class sizes at this elementary school were relatively small and lower than the state average for an elementary classroom. The second-grade class Star interned in had 19 children. Star indicated the technology available at Oak Elementary School included an interactive white board, a classroom set of 5 laptops, a laptop cart

(available upon request from library), a classroom computer, and a teacher computer.

Charlotte. Charlotte, a 24-year-old white female, interned at Cedar Elementary School in a fifth-grade classroom. Cedar Elementary served approximately 325 children from Pre-k through 5th grade with ethnic and socioeconomic diverse backgrounds. Approximately 75% of the students served at this elementary school qualified for free or reduced lunch. Cedar Elementary was a diverse school with a population that was 44% minority. They identified as 7% Black, 16% Hispanic, 3% American Indian, 1% Asian, and 17% two or more races. The class sizes at this elementary school were relatively small. Charlotte's class had 20 students. Charlotte reported the technology available at Cedar Elementary School included an interactive white board, a set of 5 laptops, a classroom computer, a teacher computer, and a computer lab and laptop cart.

Data Sources and Processes

Data sources for this study included two individual interviews for each participant, copies of lesson plans they prepared and/or taught that integrated digital and multimodal literacies, and a short demographic/technology use survey.

Table 1

Study Research Questions and Matching Data Sources

Research Questions	Data Sources
What are teacher candidates' understandings of digital and multimodal literacies?	• First Individual Interviews • Second Individual Interviews • Lesson Plans that include digital and multimodal literacies
What are their beliefs surrounding the use of digital and multimodal literacies in the classroom?	• First Individual Interviews • Second Individual Interviews • Lesson Plans that include digital and multimodal literacies
How are they implementing digital and multimodal literacies in their own teaching	• First Individual Interviews • Second Individual Interviews

practices during their internship?	• Lesson Plans that include digital and multimodal literacies

Information/Technology Use Survey

The purpose of the information/technology use survey was to collect background information from the participants regarding demographics, practicum placements, literacy courses, and technology usage in order to richly describe the participants of the study. Participants were asked to supply basic demographic information including their birthdate, gender, and ethnicity. Additionally, participants were asked about their practicum placements and their literacy courses in order to find out about their perceptions of their opportunities for learning about technology and digital and multimodal literacies and understanding about how to integrate these literacies into classroom practices. Finally, participants were asked to identify the technology they regularly used outside of school as well as how they used that technology in their daily life (see Appendix A: Information Survey). Each teacher candidate completed the electronic form on my iPad prior to the beginning of the first interview. They were given as much time as needed to complete the form. All participants completed the form in under 10 minutes.

Interviews

The purpose of the individual interviews was two-fold: First, I intended to explore the participants' understandings and beliefs about digital and multimodal literacies and their implementation into classroom practices. Second, I wanted to explore their actual implementation of digital and multimodal literacies into their internship instructional practices.

In qualitative interviews the researcher facilitates a conversation in which the participants are free to respond as they wish and provide as much detail and background as they feel comfortable with. Unlike a fixed survey, questions may be modified to match the knowledge, experience, or comfort level of the participant, which is a benefit of the qualitative interview (Rubin & Rubin, 2012). The first interview (see Appendix B: First Interview) was to explore the understandings and beliefs the participants had regarding the implementation of digital and multimodal literacy practices. Topics in the first interview included understandings of and beliefs about digital and multimodal literacies; plans for implementing those literacies in their own lessons and instructional practices; their observations of the implementation of digital and multimodal literacies in their internship classroom or school; and the supports available for implementing these literacies. At the end of the interview, each participant was asked to provide, before or at the second interview, copies of lesson plans they had taught or would have liked to teach in the intervening time during their internship that included digital and multimodal literacies.

The second interview (see Appendix C: Second Interview) occurred later in the semester after the participants had an opportunity to teach lessons during their internship placements. The purpose of this interview was to allow participants to further explain their understandings, beliefs, and implementation practices around digital and multimodal literacies. Furthermore, the second interview allowed me to gather reflective data from each of the participants and reconnect with the research questions. This interview also provided me the opportunity to revisit questions not previously answered to appropriate saturation.

The interview began by revisiting questions from the first interview about their understandings and beliefs about implementing digital and multimodal literacies in instructional practices. I then asked the participants to explain how the lesson plans they brought incorporated digital and multimodal literacies. Finally, I asked them about their plans and their future teaching practices.

Each interview was semi-structured, following a set of protocol questions that were determined before the study began. However, the questioning during the interviews developed as a result of the responses of the participants. Two interviews were necessary to reach saturation of the content. Each interview was approximately 30 to 45 minutes in length to allow ample time for in-depth responses, but also kept the demands on the participants' time to a minimum. Participants were interviewed in a private environment, free from as many distractions as possible. Each interview was digitally recorded and, following each meeting, transcribed.

The interviews were all completed face-to-face during the participants' planning period or after school was out for the day in their classroom or another private room of the school building.

Lesson Plans

The purpose of collecting the lesson plans were two-fold as well. First, they were used to prompt or guide discussion during the second face-to -ace interview about how the participants were implementing digital and multimodal literacies into instruction in their internship. The second purpose was for content analysis of goals and aspects of digital and multimodal literacies included in the lesson plan as well as to triangulate what the participants said about incorporating digital and multimodal literacies in their

lesson plans and instruction during the second interview. The content analysis focused on lesson purposes, objectives and standards, and lesson activities and procedures to determine if any aspects of the lesson referenced or included skills and practices around digital and multimodal literacies.

Subjectivity Statement

It is important for me to acknowledge who I am in relation to this study being that I am the only researcher and the main instrument of research. Therefore, it is important to acknowledge the personal biases that could influence my analysis of the data. I am a middle-class female doctoral student who has lived in Oklahoma my entire life. This is important to identify since the research is being conducted in Oklahoma. I myself am from a culturally diverse background as I am a member of the Choctaw Nation. It is also noteworthy to mention that I am a first-generation college student who did not complete high school because I came from a low-socioeconomic status family and had to drop out of high school to work and help support my siblings. Personally, I am a consumer of various types of technology that require the use of digital and multimodal literacies, and I believe it is important for literacy educators to provide learning opportunities for students in the K-12 environment to become fluent in skills needed for accessing and using digital and multimodal literacies as it will be necessary for them to compete within our growing technological and global society.

I also have professional experiences that have shaped my understanding of literacy, teaching of literacy, digital and multimodal literacies, and the teaching of digital and multimodal literacies. I am a former K-12 teacher who taught special education and general education students at various age/grade levels and in a variety of subject areas

including reading. Additionally, I have also been an instructor of preservice teachers for over 10 years. I've had multiple experiences observing, supervising, and instructing teacher candidates in a variety of settings as both a fulltime and adjunct instructor at the University-level as well. When I have worked with teacher candidates in the field, I have provided feedback on instructional techniques to enhance their knowledge of instructional planning and implementation.

In my work as an instructor of preservice teachers, I have integrated digital and multimodal literacies into both my classroom instruction and the products/projects my students are required to produce. My teacher candidate students have also been encouraged to implement and incorporate digital and multimodal literacies into the lessons they plan for K-12 students in their practicum settings.

I acknowledge not only my personal and professional experiences surrounding literacy, digital and multimodal literacies, and preservice teacher preparation, but also the beliefs with which I interpret the information to be collected and analyzed for this study. The beliefs in which I or any person views the world are directly related to one's experiences. I personally believe that literacy learning is the foundation of all future successes in both the education arena and the world at large. It is my strong belief that the growing and ever-changing field of digital and multimodal literacies that are focused upon the rapidly evolving ways in which literacy continues to change in order to keep up with the demands of our global society is key in preparing K-12 students to participate successfully in their communities and the world. And, it is my belief that teachers play a critical role in preparing their students to use digital and multimodal literacies to access, utilize, and produce information to gain and share their knowledge. Further, I believe

that teacher education programs have a unique opportunity to be an agent of change for how future teachers view literacy and, particularly, digital and multimodal literacies instruction in the classroom. The beliefs I hold as both a researcher and an educator might possibly cloud my interpretations. In order to minimize this, I wrote reflective memos about my perceptions of what was being reported in the interviews to better monitor my own subjectivity. These memos included ideas that struck me during the interviews and my reactions to the responses from the participants. Fischer (2009) suggested the use of bracketing as a method for identifying one's own perspectives and assumptions as well as a method of continually examining our interpretations or insights. Note-taking allowed me to reflect upon assumptions that could have potentially tainted my analysis. Acknowledging the existence of my own subjectivity served to help me both monitor and strengthen my analysis. Thus, allowing me to reduce potential bias that might have existed within a qualitative case study of this nature.

Data Analysis

Interpreting and analyzing the data involves a process of making sense of what participants say, searching for patterns, making connections between what is said in one part of the data with what is said in other parts of the data, and integrating what different participants say (Patton, 1990). I organized and transcribed the interview data following each meeting with each participant.

The decision to transcribe my data personally allowed me to preserve accuracy and to develop a closer relationship with my data. It also prevented a gap in time for processing and helped me better prepare for the second interviews. The interviews were first transcribed using precise transcribing methods (Rubin & Rubin, 2012). This

included stalling words, pauses, and hesitations as well as any important gestures that contributed to the data. Any detail that could influence the interpretation of the data was noted and included to support the utmost level of accuracy.

The responses from each interview guided my coding. The research questions for this study guided the inductive approach for analysis which allowed for determining codes and patterns in the data that led to the emergence of themes. Data analysis began after the initial interviews for each participant were transcribed. After reading the initial interview of each participant, I reviewed and read each interview for each participant again. I noted any elements of the initial interview data that struck me or helped me connect back to one of my research questions. Following the reading, I composed a summary for each initial interview and noted points most relevant to my research questions. This served as an informal set of notes that helped guide me for both the second interview with each participant and the next phase of my analysis. Once the second interviews were transcribed, I did an initial reading of each transcript, making notes as I had with the first interviews.

Next, utilizing my summaries, transcripts, notes, and the lesson plans submitted by the participants, I began the process of coding my data. The three research sub-questions served as board themes used during the coding of all data sources. I referred to these research categories as understandings, beliefs, and implementations.

After organizing the data by participant, I read the data again in an attempt to clarify and synthesize the ideas that appeared to be related. Each of my broad themes was highlighted using a different color. The “understandings” theme included anything in the data related to understandings teacher candidates had about digital and multimodal

literacies. The “beliefs” theme included statements during interviews that were relevant to how they felt or what they believed about digital and multimodal literacies. The “implementation” theme included all interview, lesson plan, and field note data referring to implementation practices. A codebook was developed to organize the data by theme, smaller categories, and codes (see Appendix H for the full codebook). After completing these steps for the initial interview of each participant, I repeated the process for the second interview and lesson plans. This inductive analysis process was completed for each of the participants of the study separately. A codebook that included data from interviews, field notes, and lesson plans was developed for each of the participants.

Following the coding of each individual participant, I printed each codebook. I looked for patterns across all of the participants in order to develop categories. Once I had all codes placed into groups, once again utilizing the three categories of understandings, beliefs, and implementation, I developed another codebook that included data from all sources and across all participants. This allowed me to analyze data sources across all participants.

Memo-writing was utilized throughout the data analysis process. Most memos were written to organize my thoughts about the data or to make note of important ideas about the data I wanted to further investigate. Many of the memos were regarding the ideas from the first interview data that I compared with the data from the second interview to look for either consistency or diversion from one interview to the next.

Bias

The participants in this study were all former students of mine and I work closely with the staff at two of the elementary schools where the participants were completing

their internships. When collecting data, I felt more comfortable interviewing the teacher candidates that were in the schools where I had previous working relationships with the faculty and staff because of the familiarity of the environment and the relationships. I made a mental note of these feelings as I proceeded with the interviews for each participant. To avoid my personal bias and preconceptions of teacher candidates' understandings, beliefs, and implementing practices surrounding digital and multimodal literacies, I kept my focus on the research questions during both the interviews and the data analysis. I kept notes of my thoughts and perceptions throughout the interviews and, following the interviews, I reflected to monitor my subjectivity. This note-taking occurred during and directly after the interviews and it was used to increase my awareness of ways my personal bias might distort the data. I believe it also increased my awareness of my own attitudes, beliefs, and interests. Additionally, I had discussions with other researchers which facilitated my awareness of any possible personal bias and subjectivity. My position as a researcher and an instructor could be viewed as both an asset and a liability because of the prior relationship with the participants. I have a vested interest in the success of these future teachers. It is likely that they sought my approval of the work they were doing in their internship. I continuously sought to focus on my role as a researcher and listen to what the participants were saying as a bystander with no previous ties. It is also true that my previous relationship with these participants was an asset because they were familiar with me and openly shared their understandings, beliefs, ideas, frustrations, and concerns about integrating digital and multimodal literacies into their instructional practices. These relationships heighten my awareness, making it possible for me to gain a deeper understanding of these

participants' understandings for, beliefs about, and implementation of digital and multimodal literacies.

I utilized an audit trail as a method to ensure the trustworthiness of this study. The purpose of the audit trail served both to corroborate the accuracy of the findings and confirm the results were supported in the collected data. The audit trail also served to check for biases and ensure objectivity was maintained.

My procedures and the analysis of my data was audited by two researchers within my field of study. First, during code development, multiple discussions with my research advisor helped me to identify, define, group, and categorize my codes. Once all my data was coded, I solicited the assistance of another doctoral candidate in my field to complete an audit of my procedure and data analysis to further enhance the trustworthiness. I began by explaining the purpose of my study along with my questions. Once the researcher doing the audit was briefed on the purpose of the study and the research questions, I presented her with my coding book and went through my codes and definitions in detail to ensure clear understanding. Finally, a coded transcription was reviewed to explain my thought processes for the codes identified. After this meeting to review the data together, I gave her a copy of uncoded transcripts for both the initial and second interviews for one of my participants and asked to her to code it to see if her coding was similar to my coding. I then compared and noted commonalities and differences between our coding and notes from the transcript.

Chapter Four: Findings

The purpose of this study was to contribute to the research surrounding teacher candidates and digital and multimodal literacies. The threefold purpose was to (a) better understand the knowledge teacher candidates had about digital and multimodal literacies; (b) explore the beliefs they hold about digital and multimodal literacies in the classroom; and (c) determine if and how teacher candidates were implementing digital and multimodal literacies into their instruction during their internship semester. Analysis of the data for each participant showed their understandings, beliefs, and implementation practices surrounding digital and multimodal literacies. The cross-case analysis exposed common themes and differences between all the participants in their understandings, beliefs, and implementation practices.

Charlotte

Charlotte was interning in a fifth-grade classroom at Cedar Elementary School. In her daily life, Charlotte engaged in using digital and multimodal literacies for personal, school, and work purposes. Outside of the classroom she used devices such as her smartphone, iPad, desktop computer, and laptop to access digital and multimodal literacies for the purposes of communicating with others through texting, email, and various social media platforms. She also utilized a variety of apps outside of the classroom to aid her with organizational tasks and directions. She used digital and multimodal literacies for entertainment such as watching movies and television, reading for pleasure, and shopping. For school and work purposes, Charlotte used her iPad and laptop to complete her homework assignments, engage in reading of scholarly texts, and communicate via email. She utilized apps for planning and scheduling for both

school and work purposes.

Charlotte's Understandings

Charlotte first described digital literacies as the use of electronic devices for reading and writing activities. She stated, "I'm imagining students that have iPads that are going through a story or maybe a story that is being read by a program on a whiteboard (Interview 1, line 8)." Other examples she gave included reading stories on an electronic device, taking tests and quizzes online, and computer-aided reading. She seemed to think that any lesson around or with technology use counted as digital literacy. She described a lesson her cooperating teacher taught where students read an article about the use of technology in the classroom and then wrote persuasive essays about the topic. She said, "Last week they all sat together on the carpet and the teacher gave them all a packet about technology in the classroom and they were reading the packet out loud together, so they were following along while the teacher was reading it and then they discussed what the purpose of their writing would be about. So, they would look at the pros and cons of technology in the classroom and no paper and pencil or the cons of that and then the other side, using no technology and they were supposed to choose an extreme that they would write about (Interview 1, lines 51-55)." Charlotte continued that during this lesson on technology use in the classroom and persuasive essay writing, students used only the article provided by the teacher as evidence for their persuasive essay and wrote their essays using paper and pencil, indicating that Charlotte's understanding about digital literacies was not fully developed.

At the beginning of her internship, Charlotte described multimodal literacies as any text that had print and pictures or any text that children could see and hear. She

said, “I don’t know if I would consider digital and non-digital in multimodal, but I’m thinking of how they have anthologies, just picture books, novels, worksheets even… so, just all the ways they read (Interview 1, lines 10-14).” Charlotte didn’t see a connection between digital literacies and multimodal literacies. While describing her understandings of digital and multimodal literacies, she stated, “The teacher is reading out loud a picture book that they are all listening to on the floor and answering questions about throughout the reading (Interview 1, lines 16-17).” Charlotte continued by describing a time when she was reading a picture book aloud to her students and she showed them the pictures and students were making connections between the pictures and the story. She said, “That is where they got to see it and hear it (Interview 1, line 43).” Charlotte viewed multimodal literacies through a narrow lens. She focused upon the hearing and seeing modes of communication without regard to other modes and had trouble seeing the connection between digital and multimodal literacies.

As Charlotte moved through her internship, her understandings of digital and multimodal literacies stayed fairly consistent. She continued to discuss digital and multimodal literacies separately and often referred to the use of technology resources rather than digital and multimodal literacies. Her ideas about digital literacies continued to focus on using electronic devices for reading and writing, but she also spoke about the apps she learned about in her teacher preparation courses that could be used on iPads. During a discussion that occurred later in the semester about the digital and multimodal literacies she had witnessed her cooperating teacher using throughout the semester, Charlotte stated, “We did Kahoot quizzes where they [students] were having to read from the board what the question was and click their answer. So, I’m not sure

but that was the only other time I can think of that we used technology (Interview 2, lines 220-222).” Charlotte also continued describing multimodal literacies as texts that were read aloud while students either looked at pictures or followed along with the text in their own copies. She said, “The novel reading, one where the teacher is reading out loud and they’re having copies of the book, so that would be multimodal but not really digital (Interview 2, line 146).” Late in the semester, Charlotte discussed her understanding of digital and multimodal literacies, making a connection between the two. She described an activity where students wrote stories and created a book. She said, “Writing stories, and they are typing their paragraphs and how their story is going to look and then they are going to print that out and paste it into an actual book, physical book of like 24 pages and illustrate [it] (Interview 2, lines 10-12).” Charlotte viewed this activity as a connection between digital and multimodal literacies because the students were using the computer to type their paragraphs and create a book with illustrations. Overall, Charlotte appeared to have little understanding of the difference between the use of technology resources and digital and multimodal literacies, as well as the connection between the two. While Charlotte had been asked to discuss her knowledge of digital and multimodal literacies together, she continued to separate these throughout the semester in all of our discussions.

Charlotte’s Beliefs

Charlotte’s beliefs about the importance of integrating digital and multimodal literacies into her own instructional practices were primarily focused around student engagement and enjoyment, preparation for the future, and future success. She believed that the inclusion of digital and multimodal literacies into the standard

curriculum and classroom instruction made learning more fun and engaging for students and enhanced the existing curriculum. Charlotte stated, “I think it’s important just because I feel really strongly about as students are learning they should be having fun, and so when you are doing multimodal things or digital things, that tends to just be more enjoyable for them (Interview 1, lines 266-268).” Along with making instruction more fun and enjoyable, Charlotte believed the incorporation of digital and multimodal literacies into instructional practices helped to keep students engaged. When discussing a lesson, she had taught, that she believed included digital literacies, Charlotte spoke of not allowing one group of her students to use the class laptops for searching on the Internet because of their behavior. In hindsight, she felt that allowing the students to use the laptops for finding information online in lieu of their textbooks might have helped them to be more engaged. Charlotte believed that the inclusion of digital and multimodal literacies was not an integral part of literacy learning for the 21 century, but an enhancement to the traditional literacy curriculum she had encountered during her years in school. During a discussion about the importance of integrating digital and multimodal literacies in the classroom she said, “It can really add to what I would want to teach (Interview 1, line 70).”

Charlotte believed digital and multimodal literacies as part of classroom instruction were important for preparing students for future success both in school and the workplace. Charlotte spoke about her own experiences with digital and multimodal literacies in the classroom as a learner, stating, “I don’t remember very many digital literacy things in school and there was definitely the technology to do that and I’m sure that if I had had more experiences like that in elementary school or middle school or

high school that would have prepared me better for college and better for my career of implementing it as a teacher myself. So, I would want to give my students those advantages that I don't feel I had (Interview 1, lines 273-278)."

In spite of her own school experiences, or maybe because of those experiences, Charlotte believed that the use of digital and multimodal literacies in classroom instruction was important to the future success of her students. Charlotte said, "Technology is going to be a big part of their lives throughout their school careers and their jobs (Interview 1, line 73)." She continued providing examples of various apps and programs she learned about in the technology course and literacy courses she was required to take during her teacher preparation program. Her beliefs appeared to be molded by both her own K-12 school experiences and her teacher preparation school experiences. While Charlotte didn't fully understand the difference between technology and digital and multimodal literacies, and often used these terms interchangeably, she did understand that technology played an important role in today's society, and therefore, instructional practices surrounding literacy and the use of digital and multimodal literacies were important for the success of her students. She felt it was important that current and future students have multiple experiences with digital and multimodal literacies and be well versed in the skills needed to engage with these literacies. When discussing her future teaching plans, Charlotte stated, "In an ideal world I would love to always be able to implement digital literacies throughout all my years of teaching with all my students (Interview 1, lines 75-76)."

Charlotte's Implementation Practices

At the beginning of her internship, Charlotte saw funding, time, support,

resources, and access as limitations for implementing digital and multimodal literacies into classroom instructional practices. She believed funding was an issue for most schools and would be a limitation for her in her future implementation of these into her own practices. She said, “I feel that most schools I’ll probably teach in can’t afford much technology (Interview 1, line 74).” Another concern for Charlotte was the time she believed it would take to incorporate the use of digital and multimodal literacies. She felt that the extra time it would take to learn how to use the technology necessary for incorporating these literacies might be burdensome for her as a novice teacher. Early in the semester, during a discussion about the supports available to her in her internship, Charlotte stated, “I haven’t met any IT support staff personally but across the hall her whiteboard was down for about a week…I don’t know [what supports are available] (Interview 1, lines 170-171).” Charlotte also believed resources and access to be a hindrance for implementation. She said, “It’s really difficult to do things with the 5 laptops because there are 20 student and 5 laptops… I haven’t seen anything with iPads, so I don’t even know if Cedar Elementary uses iPads in any classrooms or if there is a set or anything (Interview 1, lines 82-83).”

As the semester progressed, Charlotte’s ideas about the limitations for implementing digital and multimodal literacies evolved to include teacher buy-in, outdated resources, and her own understandings of their use. Charlotte spoke about a faculty meeting she attended late in the semester where the principal wanted all the teachers to experience making an iMovie so that they could use it with their students. She stated, “It was discouraging. Several of the comments that I was hearing were…yeah but we don’t have enough computers for this or yeah but we would never…

there is not time to do this with testing and all these different things and so I saw the principal wanting to show them something like that that's fun and different, like it helps students create something with the computers, and just the limitations that exist were kind of making them [veteran teachers] hard to buy into that activity (Interview 2, line 64)." As the semester progressed, Charlotte felt the outdated resources available in her internship placement were an obstacle for implementation. She spoke about how it would be difficult to use the computers available in her placement because they were slow and there was only one hooked up to the projector screen on the whiteboard. She conveyed how the digital and multimodal literacies she learned about and used at the University were wirelessly connected and how having that available in her school placement would make it easier for her students to connect and share their projects and ideas.

Another limitation that developed for Charlotte as her internship continued was her limited knowledge of how digital and multimodal literacies could be incorporated using a computer instead of an iPad. As the majority of Charlotte's experiences in her education courses incorporated the use of apps on iPads, Charlotte struggled with figuring out how to incorporate some of those ideas without having access to iPads for her students.

While Charlotte discussed support as a limitation for implementing digital and multimodal literacies, she also considered various types of support that she believed aided or could potentially aid her in implementation. These included support from her cooperating teacher and other school staff or faculty. Charlotte described the school librarian as a support for these literacies, stating, "The librarian seems usually

supportive of letting me use whatever books I want…so they [students] can have those visualizations with picture books while they are listening and discussing (Interview 1, lines 167-170).” Though Charlotte saw the librarian as a resource for helping her to integrate digital and multimodal literacies into her lessons, her lack of understanding about these literacies made it difficult to discern whether the librarian would have been a true resource. She saw her cooperating teacher as a potential resource for implementation. She said, “She hasn’t specifically ever said, ‘here’s how you could implement digital literacies. Here’s how you could implement multimodal literacies.’ When I asked to do that [reading out loud of a novel while students were reading it], instead of playing a recording she was all for it. I felt supported (Interview 1, lines 146-148).” Again, due to Charlotte’s limited understandings, how much support her cooperating teacher may have provided or been able to provide is hard to determine.

At the beginning of Charlotte’s internship semester, during a discussion about her plans for implementing digital and multimodal literacies into her instruction, Charlotte expressed concerns about her confusion and lack of knowledge for implementation, her lack of preparation, students’ lack of knowledge for using technology, and her students getting off task. She didn’t believe she had the necessary knowledge for implementing digital and multimodal literacies into her instructional practices. She said, “I’m confused about how I could do more with digital literacies because I haven’t seen much with the whiteboard and we really only have access to the computer cart during those selection [test] times…if we could have them more than that (Interview 1, lines 207-210).” She went on to discuss what she perceived to be a lack of preparation for implementing digital and multimodal literacies, stating, “I feel that during

courses about literacy and reading and writing that we didn't get to interact much ourselves with digital and multimodal literacies, like practicing together what we would do in the classroom. I remember having a lot of textbook readings and lectures, and having more activities might have been helpful (Interview 1, lines 254-258)."

Charlotte also conveyed her concerns about her students not having the knowledge for using technology that she believed necessary for engaging in digital and multimodal literacies. She explained, "If there is a technical issue and they [students] don't know where to click there are some who would just sit and not ask for any help so they would miss out on instruction (Interview 1, lines 231-232)." As the semester continued, Charlotte described a scenario where she was teaching about the American Revolution. She explained how she put her students in groups and asked them to use their laptop to research a person that was influential in the American Revolution. Charlotte continued, "When I was giving instructions and asking how to do computer research, they were telling me reliable websites that they use and places not to go when they are using the computer (Interview 2, lines 49-51)." She was also worried about students not staying on task. She stated, "I would worry about not being able to see all the screens and making sure they're all on the same page. I would be nervous they could easily have some kind of game on one tab and click over if I walk by and then click back over, so I don't know how to control that (Interview 1, lines 233-237)." As Charlotte moved through her internship, her concerns about students being off task lessened. She said, "Since I've used computer… I haven't seen that problem. I've been impressed with how on task they really are when they get the opportunity to use it (Interview 2, lines 89-90)."

In discussing the planning of and teaching of lessons for her internship that Charlotte believed to include digital and multimodal literacies, she mentioned using an ISTE standard about doing research. She stated, “One of our goals was for them to practice that skill of using reliable sources and I was liking what I was able to see from them doing that… I didn’t really have to teach them to do that though (Interview 2, lines 204-206).” In this same discussion, Charlotte explained she had her students use online resources to supplement the information in their textbook. She stated, “They were looking things up and they were kind of understanding. They also had their textbooks out and they were using those to supplement because the textbook had all the information that they needed on a certain page, and then I was excited that some of them, after they filled out their page, asked if they could write fun facts that they found online about the person, too (Interview 2, lines 173-177).” Charlotte went on describing the lesson, saying, “The other group that I taught it to were having a lot of issues just paying attention to the instruction, and so I chose not to give them the computers for it because I felt that they would be just too distracting. They were really upset about the groups that I put them in and they…I don’t know if maybe that was the wrong choice that if giving them computers might have helped them to feel more excited about doing the research (Interview 2, lines 177-182).” Charlotte saw the use of the Internet for researching as a type of reward or punishment for students in lieu of students learning skills for using the Internet for research as a necessary literacy skill.

As the semester continued, Charlotte shared many ideas for implementation and some future plans for integrating digital and multimodal literacies into her instruction. Some of her ideas included using iMovie for reporting information, using apps for online

presentations, and using a computer for typing information instead of paper and pencil. In hindsight, Charlotte had different ideas for how her students could have presented the information they found out about the American Revolution. She said, “A group could work on an iMovie just since were working through the Revolution right now, they could find pictures of what those Minute Men looked like and what the militia looked like and just create a short video with those pictures from the Internet and they have to cite those sources (Interview 2, lines 79-82).” Charlotte also said, “Their research social studies lesson where they looked into their specific character online and wrote notes… [They] could have made a presentation online [using apps] for that instead of writing notes (Interview 2, lines 147-149).” Charlotte continued to see digital literacies as simply using a device to type instead of paper and pencil, stating, “I would have had them type their song parodies instead of having to write it down because that was taking a lot of time (Interview 2, lines 216-217).”

Charlotte indicated that she did plan to use digital and multimodal literacies in her future classroom instruction. She believed she would have more confidence for implementing these literacies in her future classroom. She stated, “When it’s my own classroom, I think I will have a lot more confidence… Just will have those relationships built to where there’s that mutual respect and hopefully there aren’t as many behavioral issues (Interview 2, lines 187-189).” Although Charlotte indicated earlier in the semester that she felt a lack of preparation for using digital and multimodal literacies in the classroom was a hindrance to her implementing these into her own instruction, towards the end of her internship semester she spoke of a few examples of these literacies that she learned during both her literacy and other education coursework. These included

apps such as Book Creator, note-taking apps, and literature circles. She stated, “I really enjoyed learning how to use Book Creator and stuff in our classes so that I can do that with my kids when I’m, if I have a class that has access to iPads (Interview 2, lines 22-24).” She continued, “In one of our literacy classes we were to use Book Creator to make a short story with a mentor text (Interview 2, lines 116-117).” In another literacy course she was required to create a film as the final assessment for a literacy circle. She stated, “Me and my peers read a book together and then at the end the final assessment was that we had to film it, like film us acting it out and put that all together (Interview 2, lines 129-130).” She also described a fieldtrip to an art museum she took for one of her education methods courses that required them to use some kind of note-taking app that they could use to add a picture they took at the museum and write a paragraph about it. Though Charlotte seemed to recall more about the preparation she received about digital and multimodal literacies as the semester continued, she did not always make clear connections for how she could integrate these into her own classroom instruction.

Rachel

Rachel interned in a first-grade classroom at Oak Elementary School. Rachel used digital and multimodal literacies daily for personal, school, and work purposes. She used her iPad and laptop for both school and work, but preferred using her MacBook. Outside of the classroom, along with using her iPad and MacBook, she also used her smartphone to access digital and multimodal literacies for communicating with others through texting, making phone calls, and various social media platforms. Rachel used her iPad for entertainment purposes such as watching movies and television.

Rachel's Understandings

Rachel's understandings of digital and multimodal literacies included both incorporating digital and multimodal literacies into classroom instruction for accessing, creating, and communicating knowledge and for learning foundational literacy skills. Still, Rachel focused more on the knowledge she learned about in her teacher preparation technology course of technology resources necessary for accessing these literacies such as iPads, laptops, software programs, and apps. She talked about using technology as a tool to communicate, locate resources, and use to either learn literacy skills or use literacy in a purposeful way. For example, her students were using PebbleGo, an educational app for K-3 students that provided a tool for digital research where they had to use keywords for searching within the app (which was considered safe as opposed to using an online search engine.) She described digital and multimodal literacies, stating, "Resources like iPads or laptops to get on programs like PebbleGo is what we do in our class to research about people or animals… using resources such as that for them to have literacy resources outside of just books and biographies (Interview 1, lines 10-13)." Rachel continued by explaining how the students used a spelling app they accessed on the whiteboard during center time, saying, "With our whiteboard we do during centers like spelling… working on parts of literacy, learning to spell (Interview 1, lines 13-15)." The first graders had to be able to spell words by using letter sound correspondence for the spelling center activity on the whiteboard. The two learning activities Rachel described to express her understandings of digital and multimodal literacies both required access to technology to use them. However, the activity where students used PebbleGo for researching information about animals or

people required digital and multimodal literacy skills needed for accessing the information, such as keywords for searching. The center activity involved the use of technology for accessing an app used to reinforce foundational literacy skills.

Rachel's understandings of digital and multimodal literacies were closely tied to the programs and apps she learned about in the technology course for her teacher preparation program. She saw these programs and apps as a way for students to demonstrate their knowledge. She stated, "I remember in technology class using programs like ExplainEverything… we've also talked about video projects using video, so they can express through their words and not having to write it (Interview 1, lines 28-31."). As the semester continued Rachel spoke more about using these literacies as a way for her students to demonstrate their knowledge, but often confused digital and multimodal literacies with technology applications. She provided various examples of apps that could be used for instruction, stating, "We used Green Screen [in the technology class]… if you were telling a story with Green Screen or something that could be, I guess, a resource (Interview 2, lines 11-12)." While Rachel talked about resources for using digital and multimodal literacies, she rarely spoke of the literacy skills required for using these literacies. She seemed to see technology resources and digital and multimodal literacies as the same.

Rachel's Beliefs

Rachel's beliefs surrounding the importance of incorporating digital and multimodal literacies into classroom practices focused on students expressing knowledge and differentiating instruction. She believed the inclusion of these literacies into her instruction was important because it presented another avenue for students to

demonstrate their knowledge. She said, “I think it is a good thing [integrating digital and multimodal literacies into instruction] to do, especially being in the first grade… it can be challenging to scaffold them to write a lot and so, it would be helpful if they could express more information… through a video instead of having to work so hard on just writing a lot (Interview 1, lines 34-38).”

Rachel further explained that she believed integrating digital and multimodal literacies allowed for differentiating learning to meet the needs of all learners, stating, “It makes me think of different types of learning to meet the needs, different students learn in different ways so, I’d say that [integrating digital and multimodal literacies] could be helpful (Interview 1, lines 43-44).” She saw the use of these literacies as a great way to incorporate different projects. Her beliefs about the importance of digital and multimodal literacies focused upon how these could be used as an alternative to the typical instruction used for foundational literacy skills in the classroom, such as using video rather than writing a story or report. Rachel went on to discuss how the knowledge she gained from her coursework in the education program influenced her beliefs about the importance of integrating these literacies into her own instructional practices, saying, “I’m not someone that always leans toward technology, so I think that learning about different programs in the technology class or the things that you could do with it was helpful (Interview 1, lines 49-51).” However, while she believed the integration of digital and multimodal literacies in classroom instruction was important, she also believed it was not always feasible due to the lack of resources available for classrooms such as iPads for every student.

In a discussion about what influenced her beliefs about these literacies she

provided an example about the app Book Creator, which is used for students to create their own digital texts. She stated, “If we had an iPad for every kid... It would definitely make it more feasible... You would really have to be purposeful. I guess in your planning on how you were going to get all those books done for all the kids if you only have four [iPads]… having them do it in a group. And, I think that another thing is just having a backup plan because technology doesn’t always work out and so that can make it challenging (Interview 2, lines 30-36).” Rachel’s beliefs about integrating digital and multimodal literacies into her own classroom instruction were overall positive, but her lack of knowledge for integrating these literacies caused her to question the feasibility of using them in her instructional practices.

Rachel’s Implementation Practices

Rachel’s described both the supports and the obstacles for integrating digital and multimodal literacies into her own instructional practices. Although the first-grade team wasn’t familiar with many of the technologies available for integrating digital and multimodal literacies, Rachel felt supported by their willingness to try new ways of integrating these literacies into their instructional practices. Rachel spoke about how she and the first-grade team had planned to incorporate the use of Green Screen for the first graders to do oral reports, but there were some complications that arose, and they didn’t use it. She indicated she had seen her cooperating teacher and others on the team use digital and multimodal literacies, but she felt as though, while they were trying to figure out how to incorporate these literacies into their instruction, they were not comfortable using them.

At the beginning of her internship semester, Rachel saw her lack of knowledge

about supports for implementing digital and multimodal literacies as a limitation, indicating there were no supports that she was aware of in her internship placement. She was aware of tech support personal for the district that assisted with password issues and fixing computers. As the semester continued, Rachel described the school librarian, a middle school teacher from a middle school near her elementary placement, her cooperating teacher and the first-grade teaching team as persons who could support the implementation of these literacies. She spoke of the school librarian as a support stating, “She is a technology overseer of the school and is the person that will typically reach out to the IT people (Interview 2, lines 211-212).” Rachel also spoke about a middle school teacher that provided technology support for her internship school for using apps such as Green Screen and iMovie. She indicated that this teacher also provided some suggestions for how these apps could be incorporated into instructional practices.

She saw access to resources, funding, student knowledge and age, lack of time, lack of experiences, and feeling overwhelmed as limitations for implementing these literacies. She believed her greatest challenge for implementation was the lack of resources such as iPads and laptops. Rachel indicated there were six or seven iPads, a desktop computer and a laptop in her internship classroom. Later in the semester, she described how the lack of iPads available for every student in the classroom limited her from being able to incorporate digital and multimodal literacies into her instruction. She spoke of a unit where her students were writing personal narratives stating, “I wanted them to do that [write their personal narratives using iPads] but since we only have six… (Interview 2, 422).” She further described her dilemma explaining that without having

an iPad for every student they would have to set up a rotation so six students at a time could get on the iPads to write. She felt this presented too many issues to make it work in the classroom. Rachel believed that in order to incorporate digital and multimodal literacies into her instruction in a practical and effective way, each student in her classroom needed to have their own iPad.

Lack of funding for programs and apps needed for implementing digital and multimodal literacies was another perceived limitation for Rachel. She spoke of a situation where the first-grade teacher team in her internship placement couldn't use a Green Screen app they wanted to use for a project with their students because of lack of funding. She said, "We also talked about the app for Green Screen because they [first-grade] teachers don't have that because it costs money (Interview 2, lines 166-167)." She and the first-grade teacher team believed that the app was vital to being able to do the project because they felt it would be too challenging for the first graders to create a Green Screen with iMovie using a layering process. She believed these complications that were due to lack of access to hardware and apps created many challenges and often resulted in the teachers doing more of the projects than the students. She stated, "I think it is more complicated especially for younger students… It would make it a project where the teachers and myself, would be doing it more than the kids (Interview 2, lines 182-185)."

Rachel saw student age and knowledge as another limitation for integrating digital and multimodal literacies. She explained that she could see how doing the personal narrative unit in groups would work in a third-grade class where they are more independent readers and writers and are able to work independently in groups. She

also spoke about how students' lack of experience and knowledge with the skills and technologies for digital and multimodal literacies was a challenge. However, as the conversation continued, she stated, "Sometimes I think that I just underestimate kids and I think that they can do more with that technology than I think (Interview 2, lines 200-201)."

Lack of time and feeling overwhelmed were also limitations Rachel saw for integrating these literacies into her instructional practices. She spoke about wanting to use the app Book Creator stating, "I don't know if I'll get to do that this [semester]…There have been ideas that I've had. We just haven't had a whole lot of time since I've been here (Interview 2, lines 21-230)." Along with the issue of time, she felt overwhelmed at the thought of having to find ways for integrating digital and multimodal literacies into her instruction. She felt like in a year or two when she was in her own classroom and after having had the opportunity to teach the personal narrative unit a few times she would be able to integrate digital and multimodal literacies into her instruction. She said, "I think I'm thinking about the standards and how to even to do that at this grade level and then you know throwing in technology… It's just a lot of new stuff at once. (Interview 2, lines 491-493)." It was challenging for Rachel as a novice teacher to plan lessons that teach the literacy standards effectively and try to focus on how to integrate digital and multimodal literacies meaningfully into her instructional practices.

Rachel also spoke about her lack of practical experiences with digital and multimodal literacies in both her K-12 schooling and in her teacher preparation program. She stated, "I think my generation didn't grow up with technology [in school] (Interview

1, line47).” She continued explaining that she felt there was a lack of modeling in her teacher preparation courses for how to implement digital and multimodal literacies in a practical way for the classroom. She stated, “Practically how to include it into different lesson plans… I guess more practical ways because it sometimes feels like they were great ideas that weren’t always feasible (Interview 1, lines 150-152).”

Teacher preparation was a reoccurring theme during conversations surrounding digital and multimodal literacies with Rachel throughout the semester. Rachel expressed how it would have been nice to see modeling for how to meaningfully use iPads in her instructional practices when there are not enough for every student in the classroom. She stated, “A lot of what is modeled is, I think, is in a model where it would be one to one in the school… We get these big ideas of like, that would be awesome, if everyone had 23 iPads in their classroom (Interview 2, lines 466-470).” She also expressed that she would have liked to have seen a better connection between the technology she learned about in the technology class and how to use those technologies in a practical way for teaching in the classroom. Rachel even offered suggestions for ways she believed her teacher education program courses could have provided connections for implementing those in a practical way into her instructional practices in a classroom with limited resources. She described a scenario where there would be a group activity in one of her courses using one iPad, saying, “We all have one to one iPads, but what could we have done to make that more accessible if you had less iPads in your room (Interview 2, lines 515-516).” She also believed class discussions might have been helpful for herself and other preservice teachers in making connections between the digital and multimodal literacies they used in their literacy

coursework and how to use those in their instructional practices in the classroom. She stated, “It would have been nice to have even more discussion about like… Now let’s brainstorm, how could we have done that if we were in a first-grade class. Trying to make that connection more…I don’t always think that was a connection I was making. (Interview 2, lines 500-504).”

Rachel continued referring back to her teacher preparation throughout conversations about implementing these literacies into her instruction. She spoke about the apps she learned about during the technology and literacy courses including Book Creator, ExplainEverything, Epic, Green Screen apps, and iMovie, saying, “I wish that if we had hit that [technologies for using digital and multimodal literacies] hard in technology class, it could have been one of the first classes that just exposed us to a lot of different things, and then if like those things could, I guess practically, be incorporated into our different classes (Interview 2, lines 297-299).” Rachel expressed that she had difficulties making the connections between the technologies she was learning about in the technology course and how to use those technologies to implement digital and multimodal literacies in the classroom.

One other observation Rachel made about her teacher preparation program as a model for her own integration of digital and multimodal literacies into her classroom instruction was the technologies she learned about in the technology course seemed to be a one-size-fits-all model. Rachel explained how the technology course included early childhood majors, elementary majors, and secondary education majors. She said, “So, each class we were learning about so much that I almost feel like I’m not getting any practicals. I’m getting exposed to a lot which is great, but I don’t always feel like I can

remember practically how I would, I guess, use all those things (Interview 2, lines 293-296)."

Rachel's planning of and teaching of lessons during her internship she believed included digital and multimodal literacies ranged from lessons that incorporated the use of apps and programs for enhancing literacy skills to the use of apps for researching, creating, and sharing knowledge. At the beginning of the semester, Rachel spoke about her plans for implementing these literacies into her instruction, stating, "I know they know for sure how to do the PebbleGo for research and videos on people so, if I did it for the American heroes, I could have them use that to gather information (Interview 1, lines 133-135). She said she had learned about using various apps for making eBooks in her teacher preparation courses and discussed how she could have students demonstrate their knowledge using apps to make eBooks or videos. She thought having her first-grade students create an eBook or video to demonstrate their knowledge would work well, but she didn't know exactly how she would be able to make it work without an iPad for every student.

As the semester continued, Rachel was able to not only implement digital and multimodal literacies into her instruction, but also share some of her knowledge for integrating these with her cooperating teacher and the first-grade team. She described one example of how she shared her knowledge, stating, "That's something the first-grade teachers didn't know about that I've talked to them about was Book Creator (Interview 2, lines 24-25)." She went on to describe how she integrated these literacies into her teaching methods, explaining how she used PebbleGo to demonstrate for students how they could use it for research. In teaching her unit about heroes, she

modeled how to search for information about Eleanor Roosevelt and incorporated a video about her into her instruction. She pointed out that was an example of using digital and multimodal literacies in her teaching, but not necessarily how her students used it. She believed the modeling of the PebbleGo app for research enhanced their literacy skills by helping them think about what made Eleanor Roosevelt a hero and also the characteristics of their own heroes. She said, “I think I just kind of expanded on skills they already had because we use PebbleGo so much… Thinking about how are they’re a hero and how does this information help me understand how they’re a hero (Interview 2, lines 579-583).”

When describing her implementation of digital and multimodal literacies into her instructional practices she revisited the limitations of lack of time, how students use technology, and resources, which were discussed as hindrances to her plans and abilities to meaningfully integrate these literacies. When discussing the hero unit she taught, Rachel stated, “We wanted to do the videos, and we ran out of time. I was going to have them get on the iPad and they could use Book Creator too. And, I even showed them. I started by showing them a book I created on Book Creator with my personal narrative, but we are still not—we’re halfway through it (Interview 2, 388-398).” Rachel thinks of digital and multimodal literacies as something separate from literacy, so she views these literacies as an add-on to what she is teaching, rather than an integral part of the literacy skills and standards she should teach.

The experiences and knowledge her students had surrounding technology was also revisited by Rachel when discussing how she had planned to integrate digital and multimodal literacies into her instruction. Rachel saw her students’ prior experiences

with the devices, apps, and programs needed for utilizing digital and multimodal literacies as key to her successfully implementing them into her instruction. When discussing her plans for integrating Book Creator, she stated, “I don’t know how they use Book Creator here and so, that would be a process I think to teach because I think learning how to add a page and how to add a textbox and there’s a lot of different components to Book Creator… I think it’s a feasible thing to do. I just think it would be something that would just take time to teach in a way that it’s literacy and not just playing on the iPad (Interview 2, lines 279-285).”

Rachel’s future plans for integrating digital and multimodal literacies into her instruction included using apps such as Book Creator and ExplainEverything. She said next year she would love to use Book Creator because she thought it would be a fun resource for them to create their own books. Rachel also described how she could use ExplainEverything to incorporate art and digital and multimodal literacies into teaching the personal narrative unit. She spoke about how she could integrate these literacies into small group instruction and center time using apps on the iPad. For small group instruction she explained that she could read a story and have each table group retell the story using one of the iPads. They could use ExplainEverything to illustrate and record themselves retelling the story. She also described how she saw these literacies being integrated into center time, stating, “If we had a list or instructions or a lesson on how to use it [Book Creator] and then [I] introduce it for centers… they could go in and create a personal narrative on Book Creator (Interview 2, lines 250-252).” Rachel spoke of her first-grade students using iPads to demonstrate their knowledge rather than simply writing with pencil and paper. She believed students could demonstrate

knowledge easier with using the iPad to retell or act out what they learned because the cognitive load would be more manageable than when they write with paper and pencil.

Despite the many obstacles she mentioned and her limited knowledge, Rachel clearly had a desire to integrate digital and multimodal literacies into her future instructional practices. She indicated that she believed it would be easier in her own classroom stating, “I would really like to [implement digital and multimodal literacies in instructional practices]. When it’s my own classroom, I can kind of differentiate a little bit from what they [the other first-grade teachers] are doing (Interview 2, lines 620-621).” Still, Rachel did feel supported by the other first-grade teachers and felt comfortable enough to share her knowledge and ideas about these literacies with them, while they shared their knowledge about the literacy standards and best teaching practices with her as a novice teacher.

Star

Star interned at Oak Elementary School in a second-grade classroom. She engaged with digital and multimodal literacies for both the personal and school purposes. Outside of the classroom she used her smartphone and iPad to access digital and multimodal literacies for the purposes of communication, using text messaging, email, and social media platforms. Star used her laptop for engaging in the same types of communication, but also used it to complete school-related work and activities.

Star’s Understandings

Star’s view of what constituted digital and multimodal literacies was narrow. She described digital literacies as a text, digital or printed, that is displayed on a whiteboard for students to see, stating, “Digital literacy is just where it’s just written on the board.

So, maybe like the book is under the document camera on the board or the book is pulled up through some website (Interview 1, lines 10-11).” Other examples she gave included utilizing computer software programs for reinforcing foundational literacy skills and reading on the computer. She seemed to believe that any lesson involving reading text on a computer or whiteboard was considered digital literacy. She described what took place in her internship classroom during center time. She explained there were two groups during center time that used the computers. Depending upon their reading levels, students were placed in the group that used Achieve 3000 or the SmartyAnts group. She considered these literacy programs to be games that her students played on the computer during center time.

At the beginning of the semester, Star often had difficulty thinking about digital and multimodal literacies together and often separated the two even though the terms were always presented to her together. Her understandings of multimodal literacies focused on digital texts that could be seen, heard, and were interactive, stating, “Multimodal would mean that it has multiple parts, like it can read it to you. It can define certain words for you. It just has a lot more than just what students can actually see. They can hear, highlight, do multiple things than just see the book (Interview 1, lines 12-14).” Though Star originally separated digital and multimodal literacies, frequently, she spoke of them together, making some connections between the two, such as explaining how her cooperating teacher used the computer for everything, such as accessing the literacy book through an online login and work sheets that were on the computer. Her teacher pulled these up on the whiteboard, so students were able to see it online. They had their books open while the computer read to them, and they followed along. She

modeled for students how to complete worksheets by using a device that allowed her to fill in the blanks on the whiteboard. This understanding fit with both Star's original descriptions of digital literacies and multimodal literacies as she described students reading on a whiteboard, being read to from the whiteboard, and working interactively with the teacher using the whiteboard. Just as Star had a narrow view of what constituted digital literacies, her knowledge about multimodal literacies also appeared to be surface level.

Star's understandings of digital and multimodal literacies were closely linked to her technology course and the apps and programs she learned how to use in that course. Nearing the end of her internship semester, Star described what she learned about digital and multimodal literacies in her teacher preparation classes, for example, learning to create books using online apps and iBook. She said, "In our technology class… we had to create a book, and it had to have images that could move. You had to draw images. There was a list of things that your book had to include. You also had to use a Green Screen separately… we had another project where we had to use a Green Screen and create a story and turn it into a movie (Interview 2, lines 157-164)."

Star's understandings focused on the technology resources she learned about, rather than integrating digital and multimodal literacies into her instruction using these resources. She described some activities and projects that incorporated the use of technology resources that she considered digital and multimodal that she completed as part of her literacy coursework, including a digital toolbox and creating a mentor text with audio. She also described a project in her third literacy class where she was required to make a mentor text that included audio, saying, "During our PIP, during our

literacy [class], we had to create a book… we had to choose a mentor text first and so we had to create a book that went along with the mentor text. And, that had to include audio, so you had to record yourself reading the pages (Interview 2, lines 171-176)."

While Star was exposed to digital and multimodal literacy experiences within her teacher education program, she was more focused on using the technology than on meaningful integration of digital and multimodal literacies into her projects. Although she described experiences from her teacher preparation coursework surrounding the integration of digital and multimodal literacies into instruction, she also described situations such as the following, "Sometimes, during my full teach week, when I can't figure it [whiteboard/instructional logins] out… I just put the document camera on, and I put like a hard copy… under the document camera and write on it (Interview 2, lines 150-154)." These statements demonstrate that Star doesn't see a difference between using technology and integrating digital and multimodal literacies into instruction.

Star's Beliefs

Star's beliefs about the importance of integrating digital and multimodal literacies into her own instructional practices were primarily focused around the prevalence of technology in society, connecting with her students, and enhancing the traditional literacy curriculum. She believed the inclusion of digital and multimodal literacies was important because of the growing use of technology throughout society. She stated, "Like it [incorporating digital and multimodal literacies into instruction] is most important because technology is becoming so big (Interview 1: line 30-31)." Along with technology being more prevalent in society, Star believed children were accessing technology earlier and more frequently, saying, "Kids are using technology at a younger age

(Interview 1, line 31).” Star understood the importance of technology in schools and society.

Star believed integrating digital and multimodal literacies was a way of connecting with students because the technology devices and activities that use these literacies helped to make connections between school and home activities. She stated, “Students say things like, this weekend I spent most of my time playing on my Xbox or this weekend I spent most of my time playing on my iPad, or I did this on my computer, or I did this on the TV. It’s all, for the most part, I hear, all technology stuff. So, it’s like the best way to be able to connect with them is to continue using the technology in the classroom that helps to better interact with them (Interview 1, line 45-49).” While Star’s focus was on the technology, she did understand the importance of integrating home and school connections into her instructional practices.

Star believed the inclusion of digital and multimodal literacies into classroom instruction enhanced the foundational literacy skills. She said, “They are able to hear the correct pronunciation. They’re able to hear the correct fluency for reading that and it just helps them to become a better reader (Interview 1, lines 36-38).” Star also felt digital texts could allow students to gain a better understanding of what they were reading, saying, “It [digital texts] would make it easier for them to be able to grasp those books or those concepts because when they’re reading by themselves, they could always highlight the word or have it read it to them (Interview 1, lines 33-36).”

Star also spoke about how digital texts provided students with greater and more affordable access to information. She felt that having the ability to have digital textbooks and other digital texts allowed students to have better access and made providing texts

for students more affordable. Star believed the use of digital texts allowed students to locate information quickly. She said, “Some of the books, you can click on a word, and it will tell you the definition right away instead of having to find it in a glossary… it’s just a lot more fast paced which is kind of the direction we are going in… I need it right now kind of thing (Interview 1, lines 39-42).” She clearly understood the importance of being able to access information quickly in today’s society.

Later in her internship semester, in discussion about the importance of digital and multimodal literacies, Star spoke of the importance of teaching students to use technology in order to be successful when taking State-mandated tests. She said, “When you start fourth grade, your State testing, it’s on the computer. They take them on MacBook’s now… So, it’s super important that we work with them on the computer (Interview 2, lines 136-138).” She also spoke about various programs and apps she learned about in her technology course in her teacher preparation program that she believed she could use to have her students create their own online digital books, though she questioned the feasibility of using these in the classroom due to a lack of resources available. Again, she was focused more on the importance of learning to use the technology rather than the importance of integrating digital and multimodal literacies and the skills needed to engage in these literacies.

Star’s Implementation Practices

Star believed there were many limitations for implementing digital and multimodal literacies into classroom instructional practices. One important limitation for her was access to resources. She said, “I think if we had iPads… they could create their own online digital books because they’ve created their own book writing (Interview 2, lines

180-181).” Though there were no iPads available, there were some laptops available for student use in her internship classroom. In a discussion about whether or not she could utilize some of the digital and multimodal literacies she learned about in her teacher preparation courses, Star explained that they could use the computers, but most of what she learned about in her courses, she learned using her iPad, and she didn’t know if you could access those technology resources on computers. She went on to indicate that only having access to MacBooks in the classroom would be a challenge for implementing what she had learned in her teacher preparation coursework. Along with access, Star also spoke about resources that didn’t work such as a broken whiteboard in one of her placements as well as lack of support. She stated, “I am assuming we have somebody [to help implement technology]. I just don’t know who it is, and I’ve never heard them [second grade teachers] talk about it, talk about a person. And, I’ve never seen the person here (Interview 1, lines 151-153).”

Other limitations Star discussed throughout her internship were her lack of knowledge and experience with digital and multimodal literacies and the lack of understanding she believed her students had about using technology for creating digital texts. Star felt she lacked the knowledge necessary for integrating digital and multimodal literacies into her instruction because of her own lack of personal experience using them outside of school, her lack of experiences with them in her own K-12 schooling, and her lack of knowledge about navigating the technologies necessary for integrating these literacies. In regard to her personal experiences, she said, “It’s [digital and multimodal literacies] because it’s not what I’m used to (Interview 1, line 160).” She went on to discuss her school experiences, saying, “I guess it’s just a generational

thing, that's how I grew up, was it being that way [using textbooks instead of accessing materials online or via technology devices] (Interview 1, line 163)." She continued, discussing how she had a hard time finding the information she was trying to access online because there were so many buttons to click on to access the worksheets in the digital book and often had to ask her cooperating teacher for assistance.

As her internship continued, Star began to believe her students' lack of knowledge for creating digital literacies and navigating technology presented challenges for implementation. She stated, "They created a book about animals in winter, but I think it's too hard for them to try and do it on the computer [instead of iPad], especially trying to teach them iMovie. I think that's just too far like beyond what they're able to understand and all the different buttons that you have to push (Interview 2, lines 181-184)." Star believed her students had a better understanding of how to use iPads or tablets than they did of how to use computers, saying, "They play on their iPad, like they play on their parent's iPad. They don't play on MacBook as much or at least I don't hear them say that (Interview 2, lines 189-190)."

While Star indicated lack of support as a limitation for implementing digital and multimodal literacies, she also spoke of some types of support that she believed could potentially aid her efforts for implementation. These included support from her cooperating teacher and other teachers on her second-grade team. "[My cooperating teacher] always helps me to log into her logins and pull them up, so that when I teach a lesson with her, I'm able to use the online version of it instead of looking in her teacher book (Interview 1, lines 80-81)." Though Star saw her cooperating teacher as a resource, her lack of understanding about digital and multimodal literacies made it

difficult to discern whether her teacher was a true resource. Star also spoke about a second-grade teacher on her team who could offer support for using one of the software programs they used for enhancing foundational literacy skills in one of the literacy centers in her classroom. She said this second-grade teacher went to a district meeting to learn how to use the SmartyAnts program though Star had not personally witnessed the teacher reporting back what she learned in a staff meeting. Star's description of the support she received from her cooperating teacher and the second-grade teachers on her team focused upon support for using technology, rather than support for integrating digital and multimodal literacies, which made it difficult to determine how much support they may have been able to provide for integrating these literacies.

Another support for implementation was the librarian, Star described a unit on the weather she was teaching later in her internship. Her second-grade students were doing a research project and researching about the weather through a landing page set up for safe research by the librarian. Star continued, "They are eventually going to hone in on a question that they want to research about the weather. So right now, they are just gathering information. The librarian has set up a Symbaloo page (Interview 2, lines 25-29)." She spoke about child-friendly apps that were being used to filter reliable information for students. "[The librarian] has other apps too on her Symbaloo page, like Weather Wiz. They are, like the majority of them, are all, not the majority of them, are kid-friendly so it helps from just at a second-grade level searching through Google and not able to know or filter out which ones are not correct. It has different little apps so that they can use it to research different things depending on what they are looking for (Interview 2, lines 52-56)."

Star considered the use of digital and multimodal literacies as not only reinforcement of what she was teaching, but also as a motivator or time filler for students. Star explained how students search for information on specific topics using PebbleGo. She spoke about how she had a student who was researching thunder using PebbleGo. Using this app, the student could search for information about thunder and the app could read the information to the student. Once the student completed his research, he wrote what he had learned into a little book. Integration of this app into her lesson allowed for students to learn novice keyword-searching skills while limiting more advanced Internet searching, as is evidenced by the following statement, “Now if they don’t see something like they want to search like heatwave… It will tell you right away, heatwave, there are not articles in PebbleGo that has anything to do with heatwave. Now if they just do heat, they’ll say, ok here’s something on heat but not the heat that you think. They took heat from someone’s name. So, they have to be careful (Interview 2, lines 81-85).” Star’s focus for using the app was more in relation to how it could assist students with their reading decoding and vocabulary. She explained how the app helped students figure out unknown words with a button they could click on that would read the word and give them a definition. Star also spoke about incorporating videos with songs into her lesson plans that helped students better understand and remember information. Though as she described one of the apps she was using to integrate videos and songs into her instruction, she spent more time explaining how the app could be used as a time filler when they have indoor recess. Explaining how there were various categories of videos to select from depending upon what you were teaching she stated, “So this kind of helps to if you have indoor recess, they have videos to help you (Interview 2,

lines 107-108)."

Early in her internship, Star spoke of how her cooperating teacher used the whiteboard to enhance foundational literacy skills such as fluency and vocabulary by pulling up readings and worksheets, stating, "I think that it's really important for the kids to be able to hear not only my fluency, but someone else's fluency while they read or while it reads to them. I think it also helps that the vocabulary words, or even just words in general, when they click it or when I click on it automatically tells them right away what it means (Interview 1, lines 169-177)." Star's understanding about digital and multimodal literacies clearly limited her ability to identify and plan for meaningful integration into instruction. Later in the semester, when discussing the planning and teaching of lessons for her internship she believed included digital and multimodal literacies, Star pointed out the Standard she was basing the lesson on, which was "Students will evaluate written, oral, visual, and digital texts in order to draw conclusions and analyze arguments." The lesson goal was to determine theme and the objective was for students to be able to answer different sets of questions given and draw a conclusion about the different poems. Star believed the lesson integrated digital literacies because the text for her introduction to the lesson was read on the whiteboard and she used an app to enhance her instruction stating, "I'm using a BrainPop video… I'll read a mentor text and one of those texts is on my Kindle, so it will play from the board, and then I will show them the BrainPop video to go along with what we're talking about (Interview 2, lines 126-129)." Star's limited understandings of digital and multimodal literacies makes it challenging for her to integrate these literacies meaningfully into her instructional activities. Hence, her students may not get

opportunities to develop skills necessary for creating and communicating with digital and multimodal literacies.

After teaching the lesson about determining the theme of a poem, Star spoke about how she integrated digital and multimodal literacies into the lesson, explaining how originally she didn't plan to include these literacies because of behavioral concerns. She said, "I thought I might have some kids argue that wanted to write [on the whiteboard] but didn't get a chance to write, so I was kind of afraid about doing that part (Interview 2, lines242-243)." She continued describing how her students were able to write directly on the whiteboard as they worked together in their groups, underlining, highlighting, and writing out to the side of their poem to determine the meaning of the poem. She believed allowing her students to write on the whiteboard was a form of integrating digital and multimodal literacies and this facilitated their understanding of the lesson because they were physically able to write out what each line meant. Star didn't seem to understand that the same activity could have been completed with poster board and simply writing on a whiteboard did not constitute the inclusion of digital and multimodal literacies. Star's consideration for including these literacies focused on keeping her students engaged in the lesson rather than digital and multimodal literacy skills. When asked if she could think of a way to use some of the digital and multimodal literacies she learned about in her teacher preparation program for this lesson, she said, "If we had iPads and we were able to make a video… they could've acted out the poem… and made little video like snippets (Interview 2, lines 271-275). Star's lack of understanding surrounding digital and multimodal literacies made it difficult for her to implement these literacies into her instructional practices.

Star's future plans for implementing digital and multimodal literacies in her instruction included using books online, blog writing, and apps for enhancing vocabulary. Star planned to obtain a master's degree in special education following her internship, so she was interested in how using digital literacies could help nonverbal students to participate in class, having text on an iPad that could be read out aloud to the student or the student could read by typing it out. She said she planned to use this type of digital literacy with her future students. She also planned to use apps that could enhance the vocabulary of students in her future classroom, in particular the ELL students. She felt that ELL students could benefit from the incorporation of digital literacies that could translate reading materials into their own language. Finally, Star spoke about using blogs with her future students, stating, "I think it would be fun for them to use [a blog]… we connect to a class in New York and we talked through a blog…the students were the ones who were writing it (Interview 2, 476-479)." However, Star indicated she felt it would be difficult to implement digital and multimodal literacies into her future instruction because she would be teaching at a Title 1 school and she felt these schools don't always have the funding for resources such as computers or iPads necessary for implementation.

Cross-Case Analysis

Understandings

The three interns had a number of similarities in their understandings. They all confused the use of technology resources with digital and multimodal literacies, at times using the terms interchangeably. They all seemed to have surface-level understandings about digital and multimodal literacies and how to integrate these into their instructional

practices. Each of interns focused more on the technology resources necessary for integrating digital and multimodal literacies, rather than the literacy skills related to digital and multimodal literacies. While Rachel and Star both provided examples for using digital and multimodal literacies for students to engage in researching online with contained programs and apps, both were more focused on the technology resources necessary for integrating these literacies. Charlotte, on the other hand, was more focused on using technology resources to enhance literacy learning or make literacy learning fun. Rachel and Star also provided examples for using digital and multimodal literacies for their students to create and communicate knowledge, but once again the focus was more on the technology resources. The two of them clearly described activities that had the potential for integrating these literacies, but due to their lack of understanding were unable to make the distinction between integrating technology resources and integrating digital and multimodal literacies into their instructional practices.

All the participants' understandings were linked in some way to the technology resources they had learned about in the technology course they took in their teacher preparation program. Rachel was the most outspoken and made the most connections between what she learned in her teacher preparation program surrounding digital and multimodal literacies and her understandings for integrating them into her instructional practices. She spoke about apps and programs she learned that her students could use for demonstrating knowledge, researching online, and creating videos. Star also made many references to what she learned about these literacies in her technology course. Charlotte also made references but not as many and they focused more on programs or

apps that could enhance literacy skills or make literacy learning fun and engaging. Though they all connected their understandings of these literacies to their experiences in the teacher preparation program and K-12 school, they focused more on technology resources than digital and multimodal literacy integration.

Beliefs

While Charlotte's beliefs were mainly impacted by her experiences surrounding digital and multimodal literacies, or the lack thereof, in K-12 school, her experiences surrounding these literacies during her teacher preparation courses was also a factor related to her beliefs, whereas the opposite appeared to be true for Rachel and Star. For both of them, experiences surrounding digital and multimodal literacies in their teacher preparation courses, in particular, the technology course, appeared to have the greatest impact on their beliefs about these literacies. Each of the participants felt the experiences they encountered surrounding digital and multimodal literacies in their teacher preparation program were not always feasible for implementing into an elementary classroom due to the lack of available technology resources such as iPads, computers, apps, and programs. They often had difficulty generalizing how to implement the digital and multimodal literacies they learned about using an iPad when they only had computers available to them or if there were not iPads or computers available for every student.

Across the data, all three indicated a belief in the importance of integrating these literacies for enhancing or reinforcing foundational and traditional literacy skills and instruction. Star focused on how these could be used for modeling fluency and increasing vocabulary. Rachel spoke about how her students used these literacies

during center time to improve their spelling. Charlotte believed that having digital texts read aloud to students could improve their engagement and enhance their reading skills. All of them saw the integration of digital and multimodal literacies not as an integral part of literacy instruction, but as an addition to the literacy curriculum their students needed to learn.

Charlotte and Star both believed it was important to integrate digital and multimodal literacies into their instructional practices due to the prevalence of technology in society. They felt this would be beneficial for the future success of their students both in school and in society at large. While both lacked a full understanding of what these literacies are, they both believed in the importance of integrating them into the instruction of elementary age students.

Implementation Practices

The three teacher candidates identified both supports for and limitations to implementing digital and multimodal literacies in the classroom. All of the interns spoke about their cooperating teacher and the librarian as being a support for integrating these literacies into their instruction. However, the descriptions provided by these interns about how their cooperating teachers and other school personal integrated digital and multimodal literacies indicated these veteran teachers may have shared the lack of understanding the interns had for integrating these literacies, which raises the question of how much support they could provide for implementation. Each of the participants spoke about district technology support people available to assist with gaining access and resetting passwords as well as fixing technology resources such as computers and smartboards. Star and Charlotte never actually saw them in their internship schools.

Rachel was the only intern to mention a support teacher from a nearby middle school that not only provided assistance for using technology resources such as apps, but also provided ideas for how integrate digital and multimodal literacies.

There were various perceived limitations for the interns for integrating these literacies in their instruction. All of the interns spoke about the lack of funding and access to the necessary resources for implementing digital and multimodal literacies in the classroom. Each believed they needed one-to-one iPads or computers for students in their classroom in order to implement. They all felt they lacked the needed knowledge and experiences surrounding these literacies to meaningfully integrate them into their instruction. Though they all confused technology resources with digital and multimodal literacies, all spoke of difficulties navigating the technology resources. Lack of experiences using these literacies in their teacher preparation courses was another limitation for these interns. Star and Charlotte both mentioned a lack of experience in their K-12 schooling for using these literacies, while Rachel alluded to this when she spoke about being comfortable using a MacBook over an iPad because she learned on the computer. Rachel and Star both spoke about the age of their students (first- and second-grade) being an obstacle. All of them felt their students lacked the experiences and knowledge necessary for engaging in digital and multimodal literacies. While all of them felt supported by their cooperating teachers, their grade-level teacher teams, and the library, Charlotte spoke about the “buy-in” of veteran teachers as a limitation for novice teachers in implementing these literacies. None of them specifically said they did not feel supported with integrating digital and multimodal literacies into their instructional practices, but a lack of support was an apparent issue. Rachel spoke about how it was

overwhelming as a novice teacher to plan for teaching the standards and curriculum and then try to add digital and multimodal literacies into the instructional mix.

The lack of understanding surrounding digital and multimodal literacies was evident in the implementation practices of these teacher candidates. Some other commonalties amongst the three regarding their implementation practices were using these literacies to enhance or reinforce the learning of foundational literacy skills. They viewed digital and multimodal literacies as separate from literacy. The knowledge they had for implementing was closely linked to the apps and other technology resources they learned about in their teacher preparation courses. They each had a desire to integrate these into their instruction. While Rachel and Star both integrated apps such as PebbleGo for researching online into their instruction, all three focused more on how the technology resources they were familiar with could enhance traditional literacy learning. Star and Rachel both used videos as to enhance student learning. Charlotte and Star both confused having students utilize technology for writing such as writing on the whiteboard or typing on a computer as integration of digital and multimodal literacies. Charlotte and Star allowed concerns about student behaviors to interfere with their implementation, and Charlotte used the use of the technology resources as a punishment/reward for students. Star, instead, used technology resources as a time filler rather than an opportunity for her students to learn digital and multimodal literacy skills. These interns relied on the technology resources they learned about in their technology courses and other teacher preparation courses when planning and implementing digital and multimodal literacies, however, their focus was more on their students learning to use the technology resources rather than the skills required for

communicating, collaborating, and creating knowledge with these literacies. A desire for implementing these literacies was clearly evident, though many of the challenges these interns encountered surrounding their implementation practices of digital and multimodal literacies can be tied back to their lack of understanding for these literacies and their inability to view them as an integral part of literacy.

All three participants repeatedly referenced the technologies they learned about in their teacher preparation courses when discussing how they implemented digital and multimodal literacies into their instruction during their internship or planned to in their future teaching. Their knowledge for implementing appeared to be closely linked to the technologies they had used on their iPads in their teacher preparation courses. While all three referred to their teacher preparation courses multiple times, Rachel explicitly spoke of her difficulties making connections between the technology resources she learned about in her technology course and how to use them in a practical way for implementing digital and multimodal literacies in the classroom. She provided suggestions for how her teacher preparation coursework that might have better prepared her to use digital and multimodal literacies in her classroom instructional practices, such as making better connections between the technology class and practical ways to use technologies for teaching, modeling practical ways to integrate these literacies in a classroom without one-to-one iPads, and more class discussion about how to integrate digital and multimodal literacies. Rachel also spoke about the technology course, saying it felt overwhelming, because it was a one-size-fits-all model where there were early childhood, elementary, and secondary preservice teachers all in one class. She felt having all of them together caused an overload of information that

was not always practical for use in the classroom. Charlotte felt there was not enough interaction with digital and multimodal literacies in her literacy courses and would have liked more practice implementing these literacies during her coursework.

These candidates all planned to implement digital and multimodal literacies in their future teaching practices. Though the main focus was to enhance foundational literacy skills, their plans for future implementation varied. Star originally spoke about using technology resources that could aid students with special needs and ELL students with literacy learning and accessing texts digitally in her future classroom. Later, she spoke about the possibility of her future students creating blogs to communicate with other students across the country. However, she doubted that she would be successful in implementing these literacies due to lack of funding in the Title 1 schools where she planned to teach in the future. Charlotte spoke about utilizing apps and other technologies she learned about in her teacher preparation courses in her future classroom and having her students demonstrate learning through online presentations. Both Charlotte and Rachel felt it would be easier to integrate digital and multimodal literacies in their own classrooms. Charlotte believed this to be true because she would have fewer behavioral issues in her own classroom. Rachel also spoke about integrating apps such as Book Creator and ExplainEverything that she had learned about in her teacher preparation courses along with using videos to for her students to create and communicate their knowledge in her future classroom. She wanted to integrate digital and multimodal literacies into her centers and small group teaching as well. Though once again their lack of understanding surrounding digital and multimodal literacies will likely impact their implementation of these literacies in their future teaching

endeavors, the desire to integrate these into their instructional practices is clear.

As described in the analysis of the data, the teacher candidates' understandings surrounding digital and multimodal literacies and the implementation of these literacies was surface level at best. Each focused more on the technology and had difficulty distinguishing between integrating technology resources and incorporating digital and multimodal literacies into their instructional practices. Their understandings were centered on using technology resources for reinforcing and enhancing the foundational or traditional literacy skills of their students. The understandings held by the participants surrounding digital and multimodal literacies was closely linked to both their K-12 schooling experiences and the experiences with the apps and programs they learned about or used their teacher preparation program.

The teacher candidates' belief about digital and multimodal literacies was also greatly impacted by their K-12 schooling experiences and their experiences with these literacies in their teacher preparation courses, in particular the technology course. However, they believed the digital and multimodal literacies they experienced in their teacher preparation program weren't feasible for implementation into an elementary classroom. While the participants indicated a belief in the importance for integrating these literacies into their instruction due to the ever growing and evolving prevalence of technology in today's society, they did not see them as an integral part of literacy instruction, but instead viewed these literacies as an add-on to their literacy curriculum. Their beliefs surrounding digital and multimodal literacies centered on how these literacies could enhance their instruction or reinforce foundational literacy skills for their students, rather than the skills necessary for accessing and using these literacies.

When it came to the implementation practices of these interns, once again teacher preparation and K-12 schooling experiences were themes in the findings. While the technology resources they learned about in their teacher preparation courses helped to guide their implementation practices, these teacher candidates had difficulties making connections between technology resources they learned about in their coursework and practical ways for integrating digital and multimodal literacies in the classroom. The knowledge drew upon for implementation of these literacies was closely linked to the technology resources they used on their iPads during their teacher preparation program courses. The lack of experience these teacher candidates had with digital and multimodal literacies in their own K-12 schooling impacted their implementation practices because these literacies didn't fit into the model of K-12 schooling they themselves experienced. Other limitations these interns experienced for integrating involved funding issues, access to resources, student age and knowledge, and buy-in of veteran teachers in their internship placements. Though the knowledge and acceptance veteran teachers have for integrating these literacies is questionable, the interns indicated they felt supported by their cooperating teachers, the school librarian, and other teachers on their teaching teams for integrating these literacies. The actual implementation practices of these teacher candidates focused mainly on enhancing and/or reinforcing foundational literacy skills using technology resources. However, apps and programs were utilized for researching online but the focus was on teaching their students to use the technology rather than the skills required for creating, collaborating, and communicating with these literacies. Plans for integrating these literacies into future instructional practices included using these literacies for learning

foundational literacy skills, creating blogs, students using apps, programs, video, etc. to demonstrate their knowledge, and integrating these into center time and small group instruction. Clearly, the participants exhibited a desire to implement digital and multimodal literacies both during their internship and in their future teaching. However, the lack of experiences and knowledge with these literacies was and may continue to be an obstacle for the implementation practices of these teacher candidates.

Chapter 5: Discussion

The purpose of this qualitative study was to add to the current body of research regarding preservice teachers' experiences with digital and multimodal literacies. This study sought to investigate the beliefs, understandings, and implementation practices of preservice teachers in their internship in order to gain better understandings of the knowledge, beliefs, and supports needed for preservice teachers to successfully integrate these literacies into their instructional practices in their future teaching careers. The specific research questions addressed in this study were

1.) What are teacher candidates' understandings of digital and multimodal literacies?
2.) What are their beliefs surrounding the use of digital and multimodal literacies in the classroom?
3.) How are they implementing digital and multimodal literacies in their own teaching practices during their internship?

First, I will relate the key findings from this study to the literature reviewed and discuss how these findings extend the literature surrounding the understandings, beliefs, and implementation practices of preservice teachers around integrating digital and multimodal literacies into their classroom practices and the potential effects for the 21st century literacy skills of students in the classroom. Next, I will address implications for future practices, limitations of this study, and recommendations for further research.

Understandings of Digital and Multimodal Literacies

One of the key findings from this study was that in all three cases the preservice teachers conflated technology integration with digital and multimodal literacies. They spoke about using technology in their instructional practices, but they were unable to

relate those technologies to the key literacies necessary for 21st century learners. This is similar to previous research (e.g., Bogard & McMackin, 2012; Ebrect & Ku, 2014; Hutchinson et al., 2016; Israelson, 2015; Kervin & Mantei, 2016; Larson, 2009) around new literacies that in itself conflates digital and multimodal literacies with technology integration. One potential explanation for this may be the technology integration course in their teacher preparation program was the only class where these preservice teachers received both understandings for why to use technology and explicit instruction for integrating it into their classroom instruction. Since the technology course focused on integrating technology into general instructional practices across academic areas, the understandings they developed from this course probably did not help them gain a better understanding of the unique relation that exists between technology and literacy. Another possible reason for preservice teachers' confusion between technology integration and digital and multimodal literacies could be a lack of connection made in their literacy methods courses to digital and multimodal literacies that might have helped them to understand it was not just about integrating technology, but rather using technology as a tool to expand understandings of what literacy means as well as how to use the affordances of technology to develop 21st century literacies. Although, there was some evidence that technology was used for literacy learning in their literacy methods courses, it may not have been explicitly labeled as digital and multimodal literacies.

Beliefs about Digital and Multimodal Literacies

A key finding from this study concerning the beliefs these preservice teachers held surrounding the use of digital and multimodal literacies was these literacies were an enhancement of or an addition to the traditional literacy curriculum and instructional

practices. These preservice teachers viewed the integration of these literacies as additions to literacy instruction used mainly for motivating and engaging students or for practicing foundational literacy skills. This builds on the findings of Kist and Pytash (2015) that preservice teachers view technology integration as an addition to the curriculum. A possible reason for this belief could be that in each of these cases the preservice teachers' beliefs about teaching and learning may have been inclined toward a more traditional or behaviorist ideology, leading them to view digital and multimodal literacies as separate from literacy instruction, or an addition. This is consistent with the research findings of Teo et al. (2008) who concluded preservice teachers whose beliefs were more aligned with behavioralist ideals used technology in traditionalist ways, such as using electronic worksheets for drill and practice activities. Another potential explanation for this belief might be the prior experiences these preservice teachers had in K-12 schooling surrounding the use of digital and multimodal literacies, or technology integration, where the use of these literacies was modeled as supplemental to traditional literacy learning rather than an integral part of literacy learning. Research in 21st century elementary classrooms (e.g., Aktas & Akyol, 2020; Hutchinson & Reinking, 2011; Larson, 2009; Young & Stover, 2015) around the use of these new technologies and literacies has overwhelmingly demonstrated a technology centric approach where technology is often used as an enhancement for traditional learning. Therefore, it is likely these preservice teachers' experiences involving the integration of digital and multimodal literacies shaped their belief that digital and multimodal literacies are separate from literacy instruction and should be considered an addition.

Another key finding from this study concerning these preservice teachers' beliefs

around the use of digital and multimodal literacies was in all three cases the preservice teachers didn't believe it was feasible to integrate digital and multimodal literacies into their instructional practices in elementary schools. Each of the participants expressed similar reasons for digital and multimodal literacies not being feasible in elementary school classrooms, such as lack of resources and appropriateness of use for students. One possible explanation for the negative belief about the feasibility around the use of digital and multimodal literacies in elementary school classrooms could have been their own lack of ability to make adaptions for using the technologies they learned about in their technology course to work in their internship setting without the same one-to-one iPads access they experienced in their teacher preparation program. These preservice teachers may have lacked the ability to make these adaptions if explicit connections weren't made for them in their preservice teacher preparation courses about how to integrate digital and multimodal literacies using small group instruction when in a situation where there are a limited number of iPads in a classroom. Another potential reason for this might be the preservice teachers' concerns about the appropriateness of integrating digital and multimodal literacies due to student age and potential behavioral issues. The two interns who were in the younger elementary grades (1st grade and 2nd grade) mentioned age of their students as a potential limitation for implementing these literacies whereas the intern in 5th grade seemed more concerned with the potential behavioral issues surrounding technology integration. This concern is similar to the teachers in the Hutchinson and Reinking (2011) who reported beliefs that classroom management issues and lack of student knowledge were limitation for integration digital and multimodal literacies into classroom instruction. Another potential reason for this

belief may have been these preservice teachers lacked the experience and knowledge for integrating digital and multimodal literacies, and therefore, doubted the feasibility of integrating them into their instructional practices in elementary classrooms. This explanation is supported by the findings of Schneider (2015) who found that while preservice teachers were proficient users of technology in some contexts, they lacked expertise for integrating technology into their instructional practices. Additionally, Birch and Irvine (2009) found that preservice teachers had doubts about their knowledge and skills for integrating technology in their teaching practices.

A third key finding about beliefs surrounding digital and multimodal literacies was that all three preservice teachers in this study expressed a belief of the importance of integrating digital and multimodal literacies into their classroom instruction. However, it must be pointed out, since their understandings of digital and multimodal literacies equated to integrating technology into their instruction, this belief may be skewed by their understandings. For two of the participants, the importance of integrating digital and multimodal literacies focused upon their belief of using technology to reinforce or enhance traditional literacy skills and practices. This is consistent with the current research (Ertmer & Ottenbreit-Leftwich, 2010; Judson, 2006; Roehrig et al., 2007; Teo et al., 2008) indicating that both teachers and preservice teachers believe technology integration should be used to reinforce foundational literacy skills. The third participant's beliefs about importance seemed centered around the growing prevalence of technology in society and using technology as a motivation tool for engaging students in the classroom, which is consistent with research (Ebrect & Ku, 2014; Isrealson, 2015; Shelby-Caffey et al., 2014) indicating in-service teachers see technology as a

motivational tool. A potential explanation for the belief about the importance of integration of digital and multimodal literacies into classroom instruction could be these preservice teachers see the prevalence of technology in society and draw upon their own experiences with technology in K-12 schooling, teacher preparation, and outside of school settings, leading them to believe in the importance for their future students to learn to use these literacies. Another plausible explanation might be, due to the fact that this study was about the understandings, beliefs, and implementation practices surrounding digital and multimodal literacies, they felt compelled to express a belief in the importance of integrating these new literacies into their instructional practices.

Implementation Practices Surrounding Digital and Multimodal Literacies

Like previous research on preservice teacher preparation (i.e., Birch & Irvine, 2009; Broman, 2018; Hundley & Holbrook, 2013; Kist & Pytash, 2015; Teo et al., 2008) these preservice teachers' understandings and beliefs about digital and multimodal literacies played a key role in their ability to integrate digital and multimodal literacies into their classroom instructional practices during their internship classroom. The lack of understandings these preservice teachers had surrounding digital and multimodal literacies meant that their implementation practices focused upon the technology rather than how to use technology as a tool for 21st century literacies in their instruction. For two of the preservice teachers', Rachel and Star, their implementation practices appeared to be influenced by their beliefs surrounding lack of resources, student knowledge for using these literacies, and the use of technology as a tool for enhancing or supplementing instruction. The third preservice teacher's implementation practices were influenced by her belief that technology could be used as a system of rewards and

punishment, demonstrated by her withholding the use of computers for one group due to behavioral issues. Past research hasn't examined the use of technology specifically as a system for rewards and punishment, however, this would seem to tie to the research findings supporting the use of technology as a motivational tool (Ebrect & Ku, 2014; Isrealson, 2015; Shelby-Caffey et al., 2014). Though the research has clearly demonstrated a connection between the beliefs and understandings of preservice teachers and their instructional practices, a possible explanation for the impact of the understandings and beliefs of the preservice teachers in this study might be their understandings and beliefs were reinforced by their cooperating teachers, consistent with previous research (i.e., Broman, 2018; Stansell & Robert, 1979), while at the same time, their beliefs and understandings surrounding digital and multimodal literacies were not directly addressed in their teacher preparation program. Currently, there is no research that directly addresses how teacher preparation programs add to the beliefs and understandings preservice teachers have surrounding digital and multimodal.

For all three participants, the cooperating teachers' beliefs and practices appeared to influence the digital and multimodal implementation practices of the preservice teachers. The preservice teachers spoke about the perceived support they received from their cooperating teachers for integrating digital and multimodal literacies in the classroom. The preservice teachers' descriptions of how their cooperating teachers used digital and multimodal literacies in the classroom closely aligned to their own implementation of these literacies later in the semester. Other studies (i.e., Broman, 2018; Stansell & Robert, 1979) have indicated that mentor teachers have a profound impact on preservice teachers' beliefs and practices in the classroom. So, it is

not surprising that the participants of this study reported their cooperating teachers as supports in the planning for integrating digital and multimodal literacies. However, comments from the preservice teachers in this study about how their cooperating teachers supported them for implementing these literacies suggested their cooperating teachers may share the same lack of understanding surrounding digital and multimodal literacies as the preservice teacher participants, providing doubt that these cooperating teachers were really supports for implementing digital and multimodal literacies.

The teacher preparation program played a key role for the implementation practices of these preservice teachers. All three preservice teachers in this study, when speaking about their plans to implement digital and multimodal literacies, described apps and programs they learned about in their teacher preparation courses, particularly the technology course. However, when it came to actual implementation practices, all three used these technologies in ways that aligned with their cooperating teachers' use of them in the classroom, which is consistent with Lenek et al. (1999) found that teaching strategies in field experiences impacted preservice teachers' instructional practices. One possible explanation for this might be the preservice teachers, being novices at teaching, had not fully developed their own understandings, beliefs, and practices, and therefore, deferred to those of the cooperating teacher who they viewed as an expert. Rachel was the only preservice teacher who implemented some digital and multimodal literacies into her instructional practices rather than simply integrating technology. A possible explanation for why Rachel was somewhat successful in her implementation of digital and multimodal literacies and the others were not might be the influence of the beliefs and understandings of her cooperating teachers toward

integrating digital and multimodal literacies. This is consistent with Broman (2018) who found developing a strong working relationship with the cooperating teacher, where the preservice teacher is treated more as a colleague than a novice, influences both the practices and beliefs of the preservice teacher. Another possible explanation could be that Rachel was more reflective about the technologies she learned about in her teacher preparation program. Discussing what worked well and offering suggestions for her teacher preparation courses might have provided more guidance for using digital and multimodal literacies.

While all of these preservice teachers spoke often about the technologies they learned about in their teacher preparation courses, and were even able to implement the use of these technologies to some degree, their focus was on the technology rather than digital and multimodal literacies integration. Their implementation practices surrounding these literacies were influenced by their teacher preparation program, which adds to the findings of Broman (2018) that preservice teachers' beliefs and practices for teaching reading were influenced by both their experiences in their literacy methods courses and their course instructor. However, in this study, the lines between the influence of the teacher preparation program and the influence of the cooperating teacher were blurred. In this way, teacher preparation programs and the instructional practices of cooperating teachers seemed to be inextricably linked by the field experiences in which preservice teachers participate, though the two may, at times, be at odds with each other. In this study, the preservice teachers were all influenced by what they learned about in their teacher preparation program, however, when it came to the actual practical application of what they learned, they deferred to the practices of the

classroom teacher, consistent with the findings of Broman (2018) that preservice teachers' instructional decisions aligned with those of their mentor teacher and they adopted the teaching practices of their mentor teacher even if those practices were at odds with what they learned in their teacher preparation program. A possible reason why the actual implementation practices surrounding digital and multimodal literacies of the preservice teachers in this study aligned with their cooperating teacher may be that these preservice teachers viewed their teacher preparation courses as a place to learn about the theories of how to learn and teach and saw the cooperating teacher as the expert in actual teaching practices. Another reason may be that the practices of their cooperating teachers were more in line with the personal experiences these preservice teachers had with K-12 schooling.

Implications for Practice

This study offers insights into the understandings, beliefs, and implementation practices surrounding digital and multimodal literacies of preservice teachers in their internships. Preservice teachers demonstrated understandings about digital and multimodal literacies that were basic and not fully developed. The beliefs they held about digital and multimodal literacies seemed to be aligned with their ideological beliefs about learning and teaching. And, their digital and multimodal implementation practices were impacted by both their understandings and their beliefs. This study demonstrated the need for preservice teachers to develop deep understandings of digital and multimodal literacies through teacher preparation literacy methods courses and field experiences. Teacher education programs provide an obvious outlet for preservice teachers to have these experiences. However, technology integration courses may not

provide the knowledge needed for integrating digital and multimodal literacies. This knowledge needs to be attained through direct modeling and activities with digital and multimodal literacies in literacy methods courses that provide opportunities for preservice teachers to actively engage in using these literacies for their own learning as well as integrating them into instructional practices associated with assignments and field experiences. Preservice teachers also need opportunities to engage in classroom discussion, in both their technology integration course and their literacy methods courses, about their own beliefs and practices for integrating technology and digital and multimodal literacies. These literacies must be explicitly taught and modeled, making connections between the technologies learned about in the technology integration course and how to use those technologies as a tool for integrating digital and multimodal literacies in elementary classroom settings. While it appears these preservice teachers experienced readings, assignments, and some class discussion surrounding digital and multimodal literacies in their literacy methods courses, these readings, assignments, and class discussions must be more explicitly connected to elementary classroom instructional practices in order for preservice teachers to develop the critical literacies and problem-solving strategies they need to help them integrate digital and multimodal literacies. For example, all three participants were required to use digital and multimodal literacies in assignments for their literacy methods courses, such as digital literature circles and multimodal literacy projects, however, the preservice teachers from this study did not make the connections between these digital and multimodal assignments and how they could be used with students in an elementary classroom. In addition, since preservice teachers' beliefs and understandings about

digital and multimodal literacies impact their practices, literacy methods courses must engage preservice teachers in activities and discussion that encourage reflection on their beliefs and understandings in relation to the best practices for 21st century literacy instruction, which includes digital and multimodal literacies.

While teacher education programs provide an avenue for developing the understandings, beliefs, and implementation practices of preservice teachers, the influence of cooperating teachers as well as school and community cultures cannot be overlooked. This study reinforces the impact cooperating teachers have on preservice teachers' practices and beliefs surrounding digital and multimodal literacies. Therefore, it is important to consider the understandings, beliefs, and practices of in-service teachers surrounding digital and multimodal literacies. Universities need to partner with K-12 schools and provide professional development for in-service teachers to develop their understandings, beliefs, and practices surrounding these 21st century literacies. This professional development must specifically address how teachers can integrate digital and multimodal literacies meaningfully into their instructional practices rather than integrating technology as an addition to their literacy instruction, and the beliefs and understandings they hold for integrating these literacies. Teachers will need continued mentoring from university instructors as they implement these literacies into their classroom practices. Furthermore, the written standards and curriculum need to embrace digital and multimodal literacies as integral to literacy rather than separate from literacy. This will need to occur at state and district levels as well as in the classroom. For example, while the Oklahoma Academic Standards (OAS) for English Language Arts (ELA) do include a multimodal literacies standard, essentially this makes

digital and multimodal literacies separate and more around technology integration than the new 21st century literacies that include effectively communicating and collaborating using videos, multimodal presentations, and the internet; applying critical thinking skills for reading and writing of digital and multimodal texts and websites; and the ability to comprehend, evaluate, and synthesize information for research using digital and multimodal literacy skills, such as internet search skills, and present their research in multimodal texts, including visual or graphic components that add to their topic. Finally, due to the vast amount of resources available for digital and multimodal literacies as well as the deictic nature of these literacies, not only teachers and preservice teachers, but those engaged with developing policies and standards surrounding these literacies must be able to use critical thinking and problem-solving skills to successfully adapt to the influx of new technologies and literacies and their impact on classroom instruction.

Limitations and Future Research

It is important to discuss the limitations of this study. One such limitation was the number of participants. The number of participants in this study was only three preservice teachers. While case study investigations are often done with few participants and provide an in-depth understanding about the participants' experiences, they provide for limited generalization of results to a larger population. The participants were volunteers from the internship course in the preservice teachers' education program. The researcher was the instructor of one of the literacy methods courses these preservice teacher participants were required to take in previous semesters. It is not known from this study if the relationship the researcher had with these preservice teachers skewed the results of this study. Future studies could adjust for this limitation

by recruiting participants with no prior relationship to the researcher.

Additional questions for future research include: What are the impacts of their own K-12 school experiences on preservice teachers' understandings and beliefs surrounding digital and multimodal literacies? How do cooperating teachers influence the understandings, beliefs, and implementation practices of preservice teachers surrounding digital and multimodal literacies? How do teacher preparation programs, particularly literacy methods courses, influence the understandings, beliefs, and practices of preservice teachers surrounding digital and multimodal literacies? A longitudinal study that follows preservice teachers from the first literacy methods course through their first three years of teaching would allow for examination of how beliefs and understandings are built and change over time, during K-12 schooling experiences, preservice teachers' field experiences with cooperating teachers, and during their teacher preparation program literacy courses as well as how each of these factors impact or influence preservice teachers' understandings, beliefs, and practices for implementing digital and multimodal literacies.

Conclusion

As teachers, we teach the way we are taught or so the adage goes, and this adage appears to hold true for preservice teachers who engage in teaching about and with digital and multimodal literacies. This study helped to illuminate preservice teachers' understandings, beliefs, and implementation practices surrounding digital and multimodal literacies in the classroom. Although the preservice teachers in this study engaged with digital and multimodal literacies outside the classroom, they demonstrated rudimentary understandings about the use of digital and multimodal literacies in the

classroom. The preservice teachers in this study often confused technology resources with digital and multimodal literacies. This lack of understanding coupled with their beliefs about digital and multimodal literacies influenced if and how they integrated these literacies into their classroom practices. Their beliefs surrounding these literacies aligned closely with the traditional views of learning and teaching they experienced in their own K-12 schooling. Their implementation practices were also influenced by both their cooperating teachers and their preservice teacher preparation courses. Teacher preparation may be the key to shaping the understandings, beliefs, and practices of both preservice and in-service teachers for integrating digital and multimodal literacies. This study provided insights for teacher preparation programs for developing the understandings, beliefs, and implementation practices of preservice teachers surrounding digital and multimodal literacies.

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Appendices

Appendix A: Informational Survey

Directions: Please answer the following questions. Answers only viewed by researcher.

Name_____ **Date**_____

Birthdate_____ Age_____ Gender: Female/Male

Ethnicity_____

1. What is your current grade level placement for your internship?

2. What school are you placed in for your internship?

3. Is this the grade level you plan to teach?

4. What type of technology equipment is available at your school placement? Circle all that apply.
    a. Smartboard/interactive white board
    b. iPads for each student
    c. iPads but not one for every student
    d. laptops for each student
    e. laptops but not one for every student
    f. classroom computer/s
    g. teacher computer
    h. Computer lab or laptop cart (circle which one)

i. other: _____

5. Does the school provide support for using the technology in the classroom?

   Yes No

   If so, what type of support is available?

   _____

6. What types of technology do you use outside of school? Circle all that apply

   a. Smartphone

   b. iPad/tablet

   c. desktop computer

   d. laptop computer

   e. other: _____

7. For each type that you checked briefly describe what you use it for.

   a. Smartphone: _____

   _____

   _____

   _____

   b. iPad/tablet:_____

   _____

   _____

   _____

   c. desktop computer:_____

   _____

   _____

_____

d. laptop computer:_____

_____

_____

_____

e. computer lab or laptop cart:_____

_____

_____

_____

f. other:_____

_____

_____

_____

Appendix B: Interview Part One

This is a semi-structured interview. The questions in bold italics will be asked of all participants. The questions in non-bold italics are possible follow-up questions to be asked in accordance with the response of the participants to the bold italics questions.

Thank you for participating in the study. The purpose of the study is to investigate how teacher candidates integrate digital and multimodal literacies in their classroom instructional practices. You are free to opt out of answering any question/s or to stop the interview at any time.

This study is about implementing digital and multimodal literacies. What do these mean to you?

If they respond with "I don't know" I will respond with this the following

> *For the study we are defining digital literacies as "*the ability to communicate and construct meaning from digitally represented materials" and multimodal literacies as "communicating meaning through creatively combining two or more modes including written language, spoken language, visual, audio, gestural, tactile and spatial." Does any of this sound familiar to you? Tell about what's familiar.

Do you think it's important to use digital and multimodal literacies in the classroom? Why or why not?

Possible probing question

> *So, what has influenced your opinion about that?*

Tell me what's happening in your internship school placement with digital and multimodal literacies?

Possible probing questions

> *Tell me about how your cooperating teacher incorporates digital and multimodal literacies in classroom instruction.*
>
> *Has your cooperating teacher encouraged you to use digital and multimodal literacies in the classroom? Tell me about that.*
>
> *Have you observed any other teachers in your placement school implementing digital and multimodal literacies into their classroom instructional practices? Tell me about that.*

So what supports are available to you and your cooperating teacher for implementing digital and multimodal literacies in the school and in the district?

Tell me about the access to technology available in your internship placement school/district.

What supports are available for using technology at your internship school placement?

Are you planning to implement digital and multimodal literacies into your teaching practices during your internship? Why or why not?

If they plan to do it, I will ask

Tell me about what you are going to do.

Could you bring me copies of all of your lesson plans for your internship that include digital and multimodal literacies? How about some samples of student-created work samples that include digital and multimodal literacies? Can you bring these to our next interview meeting?

If they do not plan to, I will ask

Is there something that you would like to try?

So, think about some of the plans that you have taught or are planning to teach. Are there any of them that you think would be amenable for incorporating digital and multimodal literacies? Could you bring a set of lesson plans that you have taught so we can talk about how you might have incorporated if you had opportunity?

Is there anything else you would like to tell me about digital and multimodal literacies?

Appendix C: Interview Part Two

This is a semi-structured interview. The questions in bold italics will be asked of all participants. The questions in non-bold italics are possible follow-up questions to be asked in accordance with the response of the participants to the bold italics questions.

Thank you for returning for a second interview. You are free to opt out of answering any question/s or to stop the interview at any time.

Let's look at the lesson plans you brought.

Tell me about your lessons. *(If the participant has indicated they are using digital and multimodal literacies, I will use the first set of probing questions. If not, I will use the second set).*

Possible probing questions for each lesson plan

Why did you choose these activities?

Tell me about your planning process.

Tell me what happened during your teaching.

What did the kids learn?

What would you do differently?

Have you implemented digital and multimodal literacies in other ways during your internship? If yes, tell me about those. If not, why not?

If the person is not implementing digital and multimodal literacies…

Tell me about your lesson plans.

Possible probing questions for each lesson plan

Where do you see digital and multimodal literacies fitting into these lessons and activities?

Tell me about your planning process?

What do you think the impact would be on the students?

Now that you are almost finished with your internship and have probably started searching for a teaching position. What kind of a position are you looking for?

Possible probing questions

Where do you want to teach?

What do you want to teach?

Are you hoping that where you end up teaching you will be able to implement digital and multimodal literacies routinely into your classroom? Why or why not?

Possible probing questions if they say yes

What might a school that you could use digital and multimodal literacies look like to you?

Possible probing questions if they say no

Would it be at all important to you to have access and support for beginning to implement digital and multimodal literacies?

So, we've been talking about your experiences with digital and multimodal literacies in your internship. Is there anything you would like to add?

Appendix D: Recruitment Protocol

I will make arrangements with Dr. Henry to speak with her students participating in the internship course in the Elementary Education Program. My visit will occur toward the beginning of the semester. At the beginning of the visit, Dr. Henry will introduce me to the students in the class. Following is a script of what I will say to the students during the recruitment presentation (italics indicates statements being said directly to the students).

Hello, my name is Staci Vollmer. I am a doctoral student here in the Jeannie Rainbolt College of Education, ILAC Department in Reading Education. I'm here to talk with you about my dissertation study. The purpose of the study is to investigate how teacher candidates, like yourselves, are integrating digital and multimodal literacies into their classroom practices during their internship. Your participation in this study will help to support future preservice teachers as they engage in integrating digital and multimodal practices. You will also help to contribute valuable information to the field of literacy education both for research and future practices about the digital and multimodal practices of teacher candidates. Understanding more about how you are engaging with and integrating digital and multimodal literacies will allow us to understand how we can support future preservice teachers as they learn about integrating digital and multimodal literacies into their instructional practices. Participation in this study is optional. If you choose to participate in the study, you will be asked to participate in two face-to-face interviews with me. I will schedule a time that works for both of us to meet here in the College of Education in a private room. You will be asked about your teaching practices that include digital and multimodal literacies in

your internship. You will also be asked to provide copies of lesson plans you have prepared during your internship. Each interview is estimated to last for 45-60 minutes. The interviews will be audio recorded. The audio recordings will be transcribed and only be used for the purposes of this research study. The recordings will be destroyed once the study is complete. If you choose to participate, you will choose a pseudonym upon signing the consent for participation and your identity will be keep confidential.
Are there any questions I can answer for you about the study?

I am passing out consent forms and envelopes. If you choose to participate at this time, you may complete the form, put it in the attached envelope and leave it in this large envelope tonight. I will stop back by to collect the envelope later during this class. I will also be sending out an email with the consent form attached later this week. If you choose to participate after receiving the email, you may print and sign it and return it to Dr. Henry. She will make sure I receive your consent form. Again, participation is optional and even if you choose to participate, you may opt out of participating at any time.

Thank you for your time and consideration of this study. Please feel free to contact me if you have any questions. My email is staci.l.vollmer-1@ou.edu and my cell is 405-535-2993.

Appendix E: Follow-up Recruitment Email

Thank you for taking the time to hear about my study last week in Dr. Henry's class.

I would like to answer a few questions you may have about this study. First, I will not ask you to produce any extra lesson plans above and beyond what you are already doing for your internship class. Second, I will not ask you to come to campus on an extra day to interview with me. If you need me to come to your school placement for the interview, I am happy to do so. I don't want to cause you any unnecessary inconvenience by asking you to come to campus an extra time. I know how busy you all are during your internship. Finally, I would like to help you all understand what I mean when I say, "digital and multimodal literacies." Digital literacies are the ability to communicate and construct meaning from digitally represented materials, such as reading online, reading on the Kindle or iPad, etc. or writing blogs, creating digital stories, etc. Multimodal literacies involve communicating meaning through creatively combing two or more modes of communication including written language, spoken language, visual, audio, gestural, tactile and spatial. So, some examples would be using Explain Everything, Book Creator, iMovie, Youtube or Schooltube videos, etc. Even if you don't believe you are using digital and multimodal literacies in your teaching practices, your participation in this study would be helpful.

As I mentioned previously, the purpose of this study is to investigate how teacher candidates, like yourselves, are integrating digital and multimodal literacies into their classroom practices during their internship semester. Your participation in this study will help to support future preservice teachers as they engage in integrating digital and

multimodal practices. You will also help to contribute valuable information to the field of literacy education both for research and future practices about the digital and multimodal practices of teacher candidates.

Thank you to those of you who signed the consent form for participation in this study. If you haven't signed a consent form and would like to participate, you may sign the attached consent form and put it in an envelope to give to Dr. Henry during class. I will collect any consent forms submitted to Dr. Henry. As a reminder, participation in this study is completely optional. If you choose to participate, you will be asked to participate in two face-to-face interviews with me. I will schedule a time that works for both of us to meet in the College of Education or your internship placement in a private room. You will be asked about your teaching practices that include digital and multimodal literacies in your internship. You will also be asked to provide copies of lesson plans you have prepared for your internship class. Each interview is estimated to last 45-60 minutes. The interviews will be audio recorded. The audio recordings will be transcribed and only be used for the purposes of this research study. The recordings will be destroyed once the study is complete. If you choose to participate, you will choose a pseudonym upon signing the consent for participation and your identity will be kept confidential.

If you have any questions about the study, please feel free to email me directly at staci.l.vollmer-1@ou.edu or contact me on my cell at 405-535-2993.

Thanks again for your time and consideration.

Staci Vollmer

Appendix F: Signed Consent to Participate in Research

Would you like to be involved in research at the University of Oklahoma?

I am Staci Vollmer, a doctoral candidate from the Instructional Leadership & Academic Curriculum Department and I invite you to participate in my dissertation research project entitled New Teachers, New Literacies: Examining Teacher Candidates Implementation of Digital and Multimodal Literacies. This research is being conducted at Jeannine Rainbolt College of Education. You were selected as a possible participant because you are completing your internship in the Elementary Education program. You must be at least 18 years of age to participate in this study.

Please read this document and contact me to ask any questions that you may have BEFORE agreeing to take part in my research.

What is the purpose of this research? The purpose of this research is to investigate how teacher candidates are implementing digital and multimodal literacies into their own instructional practices in the classroom.

How many participants will be in this research? About 5-10 people will take part in this research.

What will I be asked to do? If you agree to be in this research, you will participate in two face-to-face interviews with me to discuss how you plan to and are integrating digital and multimodal literacies into your instructional practices as well as information about how you observe digital and multimodal literacies being implemented by others in your internship placement. You will also be asked to provide copies of lesson plans and work samples that include the incorporation of digital and multimodal literacies.

How long will this take? Your participation will take 45 to 60 minutes for each of the two interviews. The interviews will occur during your internship semester.

What are the risks and/or benefits if I participate? There are no risks associated with participation in this study. You may benefit from examining your teaching practices.

Will I be compensated for participating? You will not be reimbursed for your time and participation in this research.

Who will see my information? In research reports, there will be no information that will make it possible to identify you. Research records will be stored securely and only myself, my doctoral advisor, and the OU Institutional Review Board will have access to the records.

You have the right to access the research data that has been collected about you as a part of this research.

What will happen to my data in the future? We will not share your data or use it in future research projects.

Do I have to participate? No. If you do not participate, you will not be penalized or lose benefits or services unrelated to the research. If you decide to participate, you don't have to answer any question and can stop participating at any time.

Will my identity be anonymous or confidential? You will be asked to choose a pseudonym that will be used in all data sources. Your name will not be retained or linked with your responses. Please check at the end of this consent form all of the options that you agree to.

Audio Recording of Research Activities To assist with accurate recording of your responses, interviews may be recorded on an audio recording device. You have the right to refuse to allow

such recording without penalty.

Who do I contact with questions, concerns or complaints? If you have questions, concerns or complaints about the research or have experienced a research-related injury, contact me at 405-535-2993 or staci.l.vollmer-1@ou.edu or my doctoral advisor Dr. Sara Ann Beach at sbeach@ou.edu

You can also contact the University of Oklahoma – Norman Campus Institutional Review Board (OU-NC IRB) at 405-325-8110 or irb@ou.edu if you have questions about your rights as a research participant, concerns, or complaints about the research and wish to talk to someone other than the researcher(s) or if you cannot reach the researcher(s).

You will be given a copy of this document for your records. By providing information to the researcher(s), I am agreeing to participate in this research.

Participant Signature	Print Name	Date
Signature of Researcher Obtaining Consent	Print Name	Date
Signature of Witness (if applicable)	Print Name	Date

I agree to being quoted directly. ___ Yes ___ No

I consent to audio recording. ___Yes ___ No

Please select a pseudonym for the study (if a pseudonym is not selected, one will be selected for you): _____

Appendix G: IRB Approval Letter

The UNIVERSITY of OKLAHOMA

Institutional Review Board for the Protection of Human Subjects

Approval of Initial Submission – Exempt from IRB Review – AP01

Date: January 23, 2019 **IRB#:** 10258

Principal Investigator: Staci Louise Vollmer **Approval Date:** 01/23/2019

Exempt Category: 2

Study Title: New Teachers, New Literacies?: Examining Teacher Candidates Implementation of NewLiteracies

On behalf of the Institutional Review Board (IRB), I have reviewed the above-referenced research study and determined that it meets the criteria for exemption from IRB review. To view the documents approvedfor this submission, open this study from the *My Studies* option, go to *Submission History*, go to *Completed Submissions* tab and then click the *Details* icon.

As principal investigator of this research study, you are responsible to:

- Conduct the research study in a manner consistent with the requirements of the IRB and federalregulations 45 CFR 46.
- Request approval from the IRB prior to implementing any/all modifications as changes couldaffect the exempt status determination.
- Maintain accurate and complete study records for evaluation by the HRPP Quality ImprovementProgram and, if applicable, inspection by regulatory agencies and/or the study sponsor.
- Notify the IRB at the completion of the project.

If you have questions about this notification or using iRIS, contact the IRB @ 405-325-8110 orirb@ou.edu.

Cordially,

Fred Beard, Ph.D.
Vice Chair, Institutional Review Board

APPENDIX H: CODE BOOK

CATEGORIES FROM CODING

CHARLOTTE

RESEARCH QUESTION #1
WHAT ARE TEACHER CANDIDATES' UNDERSTANDINGS OF DIGITAL AND MULTIMODAL LITERACIES?

Category	Sub-Category	Code	Definition	Example
Understandings	Understandings of digital literacies	Story reading on electronic device	Students reading or being read to using a digital resource such as an iPad or a Smartboard	"Digital literacies I'm imagining students that have iPads that are going through a story or maybe a story that is being read by a program on a Smartboard." (1:8-9)
		Online tests	Use of a digital resource for taking a test	"Selection tests that they take online that have reading passages and then questions about those" (1:12-13)
		Computer-aided reading	Students listen to books being read by electronic device	"A novel where the computer is reading it out loud and students are reading along in their own copies" (1:14-16)
		Reading about technology	Students read an article in a packet and	"Technology in the classroom…we're

			learn about technology use	reading a packet out loud together… they were following along while the teacher was reading it…they discussed what the purpose of their writing would be about…look at the pros of all technology in the classroom and no paper and pencil or the cons…They are using paper and pencil (to write their opinions)" (1:55-58)
		Creating books	Using iPads to create digital books	"I know that there are a lot of apps that lend themselves better to iPads as far as creating their own books so that would be really really fun to be able to guide my students through in my own classroom." (1:92-94)
		Communicate digitally	Use digital devices to create or communicate a message	"I haven't seen them create any communication using digital resources" (1:114-115)
		Write a breakup text	Students used pencil	"Did some digital um

			and paper to draw a picture of cell phone and write a text	they did some searching online? Yes um this isn't digital it kind of is this is a social studies lesson and their assessment for it was to write a break up text to Great Britain and so they drew cell phones and bubbles" (2:150-152)
		Kahoot quiz	Taking quiz on the computer using the kahoot program/app	"We did a Kahoot quiz for Spanish a couple of different quizzes where they were having to read from the board what they question was and click their answer. So I'm not sure but that was the only other time I can think of that we used technology." (2:220-223)
	Understanding of multimodal literacies	Paper, pictures and text	Multimodal texts are anything that has print and pictures	"anthologies, just picture books, novels, worksheets even" (1:12)
		Picture book sharing	Teacher shows picture book and had a discussion with students about the	"Teacher is reading out loud a picture book that they are all listening to on the

			book	floor and answering questions about through the reading" (1:16-17)
		Seeing and hearing picture books	Teacher reads book and shows students pictures in order to have auditory and visual modes of presentation	"that was where they got to see the story and hear it." (1:43-44)
		Seeing and hearing novels	Students follow along in their own copies of a text as they listen to it being read by whiteboard	"So that would be them seeing it and hearing it, multimodal reading literacies" (1:111)
		Ways of reading	Various types of texts that can be read	"ways they read" (1:14)
		Reading and responding	Observation of cooperating teacher having student read respond to an article about technology in the classroom	"reading that persuasive article and then them writing about it… none of that was digital but I could see it as multimodal because they are reading it and she is reading it and they are discussing it and then they're writing their opinions about it on a four square then an essay." (1:139-141)
		Novel Reading	Teacher is reading a	"So this is just the

			novel aloud and students are following along with their own copies	novel reading one where the teacher is reading out loud and they're having copies of the book so that would be multimodal but not really digital." (2:146-147)
	Connection between digital and multimodal literacies	No connection	Understanding about the relationship between digital and multimodal literacies	"I don't know if I would consider digital and non-digital in multimodal" (1:10-11)
		Typing and pasting	Writing stories to create a book using computers for typing and printing then pasting into physical book	"writing stories and they are typing up their paragraphs and how their story is going to look and then they are going to print that out and paste it into an actual book physical book of like 24 pages an illustrate" (2:10-12)

RESEARCH QUESTION #2
WHAT ARE THEIR BELIEFS SURROUNDING THE USE OF DIGITAL AND MULTIMODAL LITERACIES IN THE CLASSROOM?

Category	Sub-Category	Code	Definition	Example
Importance	Reasons for importance	Future jobs	Effects on future employment	"Technology is going to be a big part of their lives…and their jobs" (1:73)

		School success	Effects on success throughout school	“Technology is going to be a big part of their lives throughout their school careers” (1:73)
		Enhance instruction	Used to enhance the current curriculum and instruction	“it can really add to what I would want to teach” (1:72)
		Enjoyment	The incorporation of digital and multimodal literacies into instruction makes it fun for students	“I think it’s important is just because I feel really strongly about as students are learning they should be having fun, and so when you are doing multimodal things or digital things that tends to just be more enjoyable for them.” (1:267-269)
		Engagement	She believes the incorporation of digital and multimodal literacies into instruction is to engage students	“I think I would have given that one class the opportunity to use the computers. Um, looking back it doesn’t seem fair that the other class got to and they didn’t um and I think that would’ve actually helped them to get more engaged into it.” (2:212-214)
		Preparation	It is important to	“I don’t remember

			prepare students for the future	very many digital literacy things in school and there definitely was the technology to do that, and I'm sure that if I had had more experiences like that in elementary school or middle school or high school that would have prepared me better for college and better for my career of implementing it as a teacher myself. So, I would want to give my students those advantages that I don't feel that I had." (1:274-279)
	Plans for future implementation	Ideal World	Conditions necessary for implementing digital and multimodal literacies	"In an ideal world I would love to always be able to implement digital literacies throughout all my years of teaching with all my students" (1:77-78)

RESEARCH QUESTION #3
HOW ARE THEY IMPLEMENTING DIGITAL AND MULTIMODAL LITERACIES IN THEIR OWN TEACHING

PRACTICES DURING THEIR INTERNSHIPS?

Category	Sub-Category	Code	Description	Example
Implementation	Limitations	Funding	Lack of funding to provide sufficient technology for the classroom	"I also feel that most schools I'll probably teach in can't afford much technology" (1:73-74)
		Time	Limitations due to time	"I just feel like I might not have it all the time available to me" (1:76)
		Resources	Lack of actual digital technology in classroom to allow all children to have access	"It's really difficult to do things with the 5 laptops because there are 20 students and 5 laptops." (1:83-84)
		Usage	Lack of any models of usage within the classroom	"I haven't seen anything with iPads, so I don't even know if this school uses iPads in any classrooms or if there is a set or anything." (1:225-226)
		Access to computers	The availability of the resources provided at the school	"we really only have access to the computer cart during those selection [test] times that are important to help the students get used to testing on computers." (1:208-

				210)
		Access to iPads	The availability of iPads	“I haven’t seen anything with iPads, so I don’t even know if Wilson uses iPads in any classrooms or if there is a set or anything.” (1:225-226)
		Support	Lack of knowledge about support for use	“I haven’t met any IT support staff personally but across the hall her whiteboard was down for about a week…I don’t know [what supports are available for implementing digital and multimodal literacies].” (1:170-172)
		Teacher buy-in	Attitudes of the veteran teachers in the school about using digital and multimodal literacies in the classroom	“the principal wanted all the teachers to experience making one so that they could have that know how to make an iMovie with their students in their classes. Umm, and it was discouraging several of the comments that I was hearing was yeah but we don’t

				have enough computers for this or yeah but we would never there is not time to do this with testing and all these different things and so umm I saw the principal wanting to show them something like that that's fun and different like it helps students create something with the computers and just the limitations that exist were kinda making them hard to buy into that activity." (2:64-71)
		Out-dated resources	The technology available at the school placement was older and out of date.	"Something quick and easy that students can do with the ability to present it which would kind of be hard with these computers because they are slow and there is only one hooked up. Whereas at the college we could like easily air connect so that would be easier if

				we had that opportunity with kids in schools to connect to the projector better and more easily" (2:111-114)
		Understanding of technology	Doesn't have an understanding of what can be done with computers versus iPads	(2-122) "I think they could easily record themselves reading and put that in again with iPads because I don't think, I don't know anything to use on computers for that kind of thing." (2:122-123)
	Types of Support	Support people	Supports received from other school personal for implementing digital and multimodal literacies	"The librarian seems usually supportive of letting me use whatever books I want…so they (students) can have those visualizations with picture books while they are listening and discussing." (1:168-170)
		Technology support	Supports available for using technology needed for implementing digital and multimodal	"I haven't met any IT support staff personally but across the hall her whiteboard was down

			literacies	for about a week…I don't know (what supports are available for implementing digital and multimodal literacies)." (1:170-172)
		Support from cooperating teacher	Supports received from cooperating teacher for implementing digital and multimodal literacies	"She hasn't specifically ever said here's how you could implement digital literacies, here's how you could implement multimodal literacies…when I asked to do that (reading out loud of a novel while they were reading it) instead of play a recording she was all for it…I fell supported" (1:148-149)
	Present plans for implementation	Confusion/Lack of Knowledge	Concerns for implementing digital literacies into instructional practices	"I'm confused about how I could do more with digital literacies because I haven't seen much with the smartboard and we really only have access to the computer cart during those selection [test]

				times…if we could have them more than that so maybe we can" (1:207-211)
		Students being off task	Concerns about student being off task	"I would worry about not being able to see all the screens and making sure they're all on the same page… I would be nervous they could easily have some kind of game on one tab and click over if I walk by and then click back over so I don't know how to control that." (1:234-238)
		Students on task	During time on computers, students stayed on task	"you were a little concerned last time we spoke about students being on task if you were working on the computers and you were afraid that they might um click the page and go to a game and click back and forth when you weren't' watching um do you think this is a problem that could be

				solved?" "Well since I've used computer since then I haven't seen that problem. I've been impressed with how on task they really are when they get the opportunity to use it." (2:85-91)
		Student knowledge for using technology	Concerns about students not having the knowledge needed about the digital devices needed for digital and multimodal literacies	"If there is a technical issue and they (students) don't know where to click there are some who would just sit and not ask for any help so they would miss out on instruction." (1:232-233)
		Researching on Internet	Student work in groups on laptop computer to research information on the Internet	"I put them into groups so they could use each of those laptops to research a character that was influential in the American Revolution." (2:45-46)
		Student understanding	Students showed understanding of reliable websites for researching	"When I was giving instructions and asking how to do we do computer research they were telling me

				reliable websites that they use and places not to go when they are using the computer" (2:49-51)
		ISTE goal – reliable sources	She indicated that the ISTE goal for using reliable sources was a goal pertaining to digital and multimodal literacies in her lesson plan	"There was the standard from ISTE about what was it… just doing research so one of our goals was for them to practice that skill of using reliable sources and I was liking what I was able to see from them doing that it didn't I didn't really have to teach them to do that though" (2:204-206)
		Punishment	Students were not allowed to search for resources online because they weren't paying attention to the instruction	"Other group that I taught it to were having a lot of issues just paying attention to the instruction and so I chose not to give them the computers for it because I felt that they would be just too distracting. They were really upset about the groups that I put them in and they I don't

				know if maybe that was the wrong choice that if giving them the computers might have helped them to feel more excited about doing the research" (2:177-182)
		Supplement	Students were using online resources as a supplement to the information in their textbook.	"they were looking things up and they were kind of understanding they also had their text books out and they were using those to supplement because the textbook had all the information that they needed on a certain page and then I was excited that some of them after they filled out their page asked if they could write fun facts that they found online about the person too" (2:173-177)
	Ideas for implementations	Presenting online	Students completing presentations using online resources	"a group could work on an iMovie just since were working through the revolution right now they could

				find pictures of what those minute men looked like and what the militia looked like and just create a short video with those pictures from the internet and they would have to cite those sources" (2:79-82)
		Online presentation	Instead of using pencil and paper students could use online (digital resources) for presenting	"This is their research social studies lesson where they looked into their specific character online and wrote notes and could have made presentation online for that instead of writing notes." (2:147-149)
		Typing	Typing instead of writing with paper and pencil because it's faster	"I would have had them type their song parodies instead of having to write it down because that was taking a lot of time (2:216-217)
	Plans for future implementations	Preparation for iPad use	Learning how to use iPad apps in teacher preparation courses	"I really enjoyed learning how to use book creator and stuff in our classes so that

				I can do that with my kids when I'm if I have a class that has access to um iPads." (2:22-24)
		Confidence	She will have more confidence in her future classroom to incorporate digital and multimodal literacies	"Do you think that's something you'll feel more comfortable with the more you teach? Whether to incorporate that or… Yeah, and when it's my own classroom. I think I will have a lot more confidence and um just will have those relationships built to where there's that mutual respect and hopefully there aren't any as many behavioral issues" (2:185-189)
	Preparation	Lack of interaction	Concerns about not being prepared to implement digital and multimodal literacies due to a not having enough interaction with them during courses	"I feel that during courses about literacy and reading and writing that we didn't get to interact much ourselves with digital literacies and multimodal literacies like practicing together what we

				would do in the classroom…I remember having a lot of textbook readings and lectures and having more activities might have been helpful." (1:255-259)
		Book creator app	Learning to use book creator to for writing mentor texts	"in one of our literacy classes we were to use book creator to make a short story with a mentor text" (2:116-117)
		Note taking apps	Learning about apps used for note taking	"We took a fieldtrip to the one of the art museums and we got back to class we were to use some kind of note app to have a picture that we took at the museum and write a paragraph underneath it." (2:106-108)
		Literature circle films	One of her literacy courses required students to form literature circles and create a film as an evaluation of what they learned	"Literacy circles… Me and my peers read a book together and then at the end the final assessment was that we had to film it like film us acting it

				out and put that all together” (2:129-132)

RACHEL

RESEARCH QUESTION #1
WHAT ARE TEACHER CANDIDATES' UNDERSTANDINGS OF DIGITAL AND MULTIMODAL LITERACIES?

Category	Sub-category	Code	Definition	Example
Understandings		Resources	Understands resources such as iPad, laptops, programs, apps, whiteboards as digital and multimodal literacies	"Resources like iPad or laptops to get on programs like PebbleGo is what we do in our class to research about people or you know animals I think there are different areas but using resources such as that for them to have literacy resources outside of just books and biographies would be my first thought." (1:10-13)
		Whiteboard for spelling centers	Students learning to spell during centers using a website on the whiteboard	"I know with our whiteboard, we do during centers like spelling and I know that's not directly reading but like working on parts of literacy learning to spell and stuff like that." (1:13-15)
		Programs for sharing	She understands that	"I remember in

		knowledge	there are programs that allow students to express their knowledge	technology class using programs like Explain Everything is kind of another I would think of when you talk about that being able to express through that. I know we've also talked about video projects using video so they can either express through like word or their words and not having to write it." (1:28-31)
		Green Screen for story telling	She described using green screen as a part of her technology class in response to what digital and multimodal literacies mean to her	"We used green screen [in the technology class]. I don't know that that's, I mean I guess if you were telling a story with green screen or something that could be, I guess a resource." (2:11-12)
		iMovie for hero reports	She described using iMovie for reports when asked about what digital and multimodal literacies mean to her	"They usually use green screen like an app for iMovie to do green screen for them to read their hero reports. So, they research a hero and

				they write a report about them and then they'll read their report and have they're hero behind them on a green screen." (2:14-17)
	Connections between digital and multimodal literacies	Different types of literacy	She sees digital and multimodal literacies as similar and thinks of them as different from printed books	"I guess I usually see them really similar personally. Just the thought of using different types of literacy… online literacy is what I think of. So, that's what I think of when I hear multimodal usually." (1:17-20)

RESEARCH QUESTION #2
WHAT ARE THEIR BELIEFS SURROUNDING THE USE OF DIGITAL AND MULTIMODAL LITERACIES IN THE CLASSROOM?

Category	Sub-category	Code	Definition	Example
Importance	Reasons for importance	Express knowledge	Students can use digital and multimodal literacies to express their knowledge through video in lieu of writing	"I think it is a good thing to do especially being in first grade. They can't always, it can be challenging to scaffold them to write a lot and so, it would be helpful if they could express more information through,

				like about a person, through a video instead of having to work so hard on just writing a lot. I might be able to see I might be more well-rounded knowledge opposed to writing which they can't always get everything they know down." (1:34-40)
	Reasons for importance	Differentiating for students	Allows for differentiating learning to meet the needs of all students	"It makes me think of different types of learning so meeting different types of needs and different students learn in different ways, so I'd say that could be helpful. It's always to I think to change it and so not always doing a writing project or stuff like that just being able to have opportunities to maybe you could make a video project, or you know doing something different, not having to use the same types of

				projects over and over is what it makes me think of." (1:43-47)
	Influences opinions	Learning/knowledge	Knowledge gained from coursework in education program influenced her opinion about the importance of using them in her instruction	"I think that I'm not someone that always leans toward technology, so I think that learning about the different programs in the technology class or the things that you could with it was helpful." (1:49-51)
	Important but not feasible	Lack of resources	While Rachel believed integrating digital and multimodal resources to be important, she also believed the lack of available resources such as iPads for every student make it difficult to incorporate digital and multimodal literacies.	"I think, for instance, with Book Creator, if we had an iPad for every kid, I think that would make it a little bit easier. It would definitely make it more feasible if you had more iPads because there are only four. You would really have to be purposeful. I guess in your planning on how you were going to get all those books done for all the kids if you only have four. I'm trying to count the

				iPads, maybe six but having your rotation to get all that done. Or, having them do it in a group or something like that. And, I think that another thing is just having a backup plan because technology doesn't always work out and so, that can make it challenging is planning then planning to plan in case something happens." (1:30-37)

RESEARCH QUESTION #3
HOW ARE THEY IMPLEMENTING DIGITAL AND MULTIMODAL LITERACIES IN THEIR OWN TEACHING PRACTICES DURING THEIR INTERNSHIPS?

Category	Sub-category	Code	Definition	Example
Implementations	Limitations	Support	Lack of knowledge about support for use	"What supports are available to you and your cooperating teacher for implementing digital and multimodal literacies?" "Nothing that I am aware of. There could be, but just nothing I've seen in any of my placements the current one or past ones and nothing that I'm aware of or I've been told about." (1:104-109)

		Access to iPads	The availability of iPads provided at the school	“My current placement we have a computer a laptop and I think six or seven iPads so that like nine or ten, nine or ten online resources we have within our classroom we have 23 students.” (1:112-114)
		Access to iPads	The availability of iPads in the classroom	“I wanted them to do that [write their personal narratives using iPads] but since we only have six… so that was my dilemma is we would have to wait until they were done [writing] and then we would have to have a rotation where like six are getting on there and doing it. That’s what I mean. If we had 23 iPads, then they could get on there, and they could all be writing while they are doing that and that would be even easier to correct and go back and forth…” (2:422-427)
		Access to computers	The availability of computers	“In my last placement I think we had 22 kids and I think we had maybe 7 MacBooks, maybe 10. It might have been 10 but not enough for every student for sure.” (1:114-116)
		Funding	Lack of funding to provide	“We also talked about the

			programs and apps for integrating digital and multimodal literacies	app for green screen because they [first-grade teachers] don't have that because it costs money. They just would have to do it through iMovie and like layer it which isn't a big deal, but we talked about like how that would be a helpful tool to have. They were trying to advocate for maybe having the district buying that for us because that would be something we could be using." (2:166-171)
		Complications due to lack of access	Complications arise for integrating digital and multimodal literacies due to not having access to some of the apps they would like to use and MacBooks	"I think the way they did, it wasn't like the way we have to do it isn't bad, but I think it is more complicated especially for younger students so, I don't think it's something… I would make it a project where the teachers and myself, I would be doing it more than the kids, I think. I don't think it's not something that they couldn't learn but because you have to transfer it from here to here… So, we couldn't do it, the kids couldn't do it themselves here because we only have access to iPads in our room.

				We could rent a cart of MacBooks but you know it would just make it more complicated so then basically we would end up doing a lot of the transferring and doing all that stuff to send out the kids wouldn't be doing the project as much as I would be doing it on my own MacBook. So, it's an access issue too…if we had the app, we could use it on iPad. If we had Macs, we could do it on a Mac. So, we don't have the Macs and, we don't have the app for iPad. (2:182-197)
		Underestimation of student knowledge	She feels that sometimes she underestimated what her students are able to do with technology which hinders integration of digital and multimodal literacies into instruction	"Macs would be a process to learn because it's more complicated, but I don't know. Sometimes I think that I just underestimate kids and I think that they can do more with that technology than I think sometimes." (2:199-201)
		Lack of time	Concerns about there not being enough time to integrate digital and multimodal literacies into her instruction	"I wanted to use that [Book Creator]. I don't know if I'll get to do that this [semester]. I just don't know if there'll be time. There have been ideas that I've had. We just haven't had a whole lot of time since

				I've been here." (2:21-23)
		Student age	The young age of the students hinders the ability to implement digital and multimodal literacies with the resources available	"You have to check in especially since they are so young and so, I could see maybe that idea [having student use iPads to write their personal narratives] might work if it was like a third grade class where they were more independent readers and writers and you could have them be doing something more independently at a separate time, whereas with this it is so structured that I feel like that the only way to do that would be if each child had an iPad that would make it easier for sure." (2:474-479)
		Overwhelming	It's challenging as a novice teacher to plan lessons to teach the literacy standards effectively and thinking about integrating digital and multimodal literacies is overwhelming	"I think I'm thinking about the standards and how to even to do that at this grade level and then you know throwing in technology, it's just a lot of new stuff at once. So, I think eventually when I'm like if I was in the classroom for a year or two and I knew what it would be like each time I taught that like personal narrative both times and I could start thinking like now

				that I've had that experience like two or three times like what could I make that look like with technology." (2:491-496)
	Types of support	Technology support	Supports available for using technology needed for implementing digital and multimodal literacies	"I haven't seen anything here yet and then in my last placement I saw tech people come and fix computers for us to get in the password or things like that. I know before testing or something they had to go through all the laptops one day and do something to them, and I can't quite remember what they did but I just remember midday we had to stop and get all the laptops out to do something." (1:119-123)
		Support from cooperating teacher	Supports received from cooperating teacher and the first-grade team for implementing digital and multimodal literacies	"We were going to do the green screen for reading their reports We didn't end of doing that… I don't know that I've seen them use any others, but I know that they are open to trying to figure it out. I don't think that's like a mode they're used to or as comfortable with." (2:147-158)
		District support people	Supports received from other district personal using	"A lady came and saw us about the green screen app

			technology needed for implementing digital and multimodal literacies	and how to use it and like use putting into iMovie and doing all that stuff and so, we got a little lesson on that." (2:148-150)
		School support people	Supports received from other school personal for implementing digital and multimodal literacies	"Susan the librarian, I don't know what you would even call it, but she is a technology overseer of the school and is the person that will typically reach out to the IT people. I know for sure her because she was the one when I talked about PebbleGo that was like well you could download Epic, which I know of and then also Bookflix was another she talked to me about so she's given me ideas for…We talk about the app when we were talking about the heroes' unit and like what else we could do besides just that one app that I had, so I was brainstorming on different so, I guess ways to use it." (2:210-222)
	Present plans for implementation	Student lack of experience	Concerns students may not have the experience needed about the digital devices needed for digital and multimodal literacies	"I'd like to, but it would be challenging I think especially because there's not one to one and so yeah, I just have to really…we don't, I haven't seen them use it very often,

				so I'd have to kind of see where they are at with using different programs or even if they have used things besides the apps like the games that they play there's a few that they always play, so I'm not sure how experienced they are with anything else." (1:126-130)
		How students use the technology	Concerns about how they students would be using the technology and teaching them to use it appropriately for learning literacy instead of playing.	"Like with ChatterPics, I would just have to teach how that would be used not just like to take pictures and like put bows in your hair and stuff and I don't know that they use Book Creator here and so, that would be a process I think to teach because I think that's you know like learning how to add a page and how to add a textbox and there's a lot of different components to Book Creator that I think is great but I think it would be a process to learn how to do all those things. So, I don't think it would be, I think it's a feasible thing to do. I just think that would be something that would just take time to teach how to use

				that I guess in a way that it's literacy and not just playing on the iPad if that make sense." (2:278-285)
		Technology connections	Connections between how her students use technology and how she uses technology to engage in digital and multimodal literacies	"I think my generation… I did grow up with technology but even more so this generation [grew up with technology] than even me. I think you can tell kids when they are on their iPads because I didn't grow up with iPads and I don't prefer iPads. It's just not something I'm comfortable with as like a computer I've used most of my life or like a phone, but I feel like kids now a days are so adapted to the iPads because that's just something they use in their world all the time. Typing on it. Drawing on it. You know going to the home. They're just that's like an area that I think a lot of kids have iPads at home, so they are all just very comfortable with maneuvering them." (2:47-54)
		iPad versus MacBook	Students prefer to use iPad, but she prefers to use MacBook	"I would say like with a lot of these kids their first choice would be to go to an iPad

				whereas mine would be to go to a Mac. Like if we had both in the room that would be what I would choose. That is what I choose because I have both my iPad and my Mac. And, I even have a keyboard for my iPad and there is just something that I just prefer about using my Mac for writing and for even iMovie. I'd probably do on my Mac over an iPad whereas I think a kid would probably choose the iPad over a Mac." (2:61-66)
		PebbleGo for research	She describes a plan for using the PebbleGo app to have students research a hero for the American heroes' unit	"I know they know for sure how to do the PebbleGo for research and videos on people, so if I did it for the American heroes' I could have them use that to gather information." (1:133-135)
		eBooks or video to demonstrate knowledge	She describes using eBooks or video for students to demonstrate what they've learned	"I know we've [preservice teachers] learned about different apps to make eBooks and stuff like that. Having them [first grade students] maybe create something like that or make a video to show their knowledge. I could see that working really well, but I don't

				exactly how, what all I would be able to do with that." (1:135-138)
		Sharing knowledge	Sharing her knowledge of digital and multimodal literacies with the cooperating teacher and the first-grade team had for implementing digital and multimodal literacies	"That's something the first-grade teachers didn't know about that I've talked to them about was Book Creator." (2:24-25)
		Heroes unit	During a lesson on American heroes, she described how digital and multimodal literacies were implemented using the whiteboard and PebbleGo.	"We used the whiteboard in one of my lessons. I did use it kind of in one of my lessons where I instead of reading a book we got, I showed them how I would use PebbleGo to teach about one of our heroes. And so, I presented by going into Eleanor Roosevelt and talking about her and then going to the end and watching the video and then talking about her information that we got from that. So that was a way I used it to teach but not necessarily how they used it." (2:229-234)
		Online Resources for information	She used PebbleGo to model for students how to use online resources to gather information	"I kind of wanted to model what it would look like if I went on PebbleGo as them… I just was like that would be a good way to like use like how

				you could use online resources to get information." (2:564-567)
		Enhance literacy skills	She believed the use of PebbleGo for teaching enhanced students' skills	"I think I just kind of expanded on skills they already had because we use PebbleGo so much just kind of like how you can use that and like things to be thinking about because we did a lot of discussion during reading just like when they're reading it what you'll be thinking about how are they a hero and like how does this information help me understand how they're a hero." (2:579-583)
		Lack of time	She had planned to use PebbleGo for researching for the heroes unit but she ran out of time and then she wanted to use Book Creator for the narrative writing but again there wasn't enough time	"So, the ones they got to do were what I told you where I used PebbleGo on the screen with them and I wanted to do, we wanted to do the videos and it just, we ran out of time for that and then I was hoping that we'd be done with personal narrative since spring and it's just been slower moving she said this class is just slower moving in writing than others. So, I was going to have them what we do is we like write

				the narrative all together and then they go and write in their journals slowly and then after they were done I was going to have them get on the iPad and they could us Book Creator too. And, I even show them, I started by showing them a book I created on Book Creator with my personal narrative, but we are still not, we're halfway through it. We are not even done. So…" (2:388-398)
	Preparation	Practical application of technology	Concerns about not have learned how to practically use the information she learned about technology and digital and multimodal literacies in the classroom	"I don't feel like we learned a whole lot outside of the technology class and some of the literacy classes. We didn't learn a whole lot of how to use technology within the different subject areas or practically in the classroom and then yeah using, finding ways to use it practically or if you don't have one to one iPads or technology. So, how I would go about using that if you only have a certain amount of iPads or practically how to include it into different lesson plans just practical. I guess more practical ways cause it sometimes feels like

				they were great ideas that weren't always feasible." (1:145-152)
		Apps	She learned about apps in her teacher preparation that might be useful for integrating digital and multimodal literacies	"So Book Creator and ExplainEverything and Epic I think are some of the ones [apps] I have learned…We learned about Epic and then there was a green screen app. I can't remember what that's called but whatever that green screen app is called and iMovie. Those are all things that we've learned about. I know there's more, but I think those are ones that I've really held on to." (2:118-126)
		Connection between technology and literacy	Rachel expressed that she would have liked to have seen a better connection between the technology she learned about in the technology class and literacy	"It would have been nice if we could have had a connection between the technologies we were being taught about in the technology class, and how to use them in a practical way in the classroom for teaching literacy." (Technology glitch – quote from notes)
		One size fit all	She explained that she felt like what she learned in technology class was overwhelming and hard to retain because much of it	"I feel like, I almost feel like we hit it a little too hard in technology [class] where I was like I wish that we had hit, it's hard because I think

			didn't pertain to the specific age level she would be teaching	because there's early childhood [majors] and there's just so many different type like there's elementary and older that they try to do a really large variety of things in those classes so that each class we were learning about so much that I almost feel like I'm not getting any practical's like I'm getting exposed to a lot which is great but I don't always feel like I can remember practically how I would I guess use all those things I guess if that makes sense." (2:290-296)
		Practical connections	Making connections between the technology course and other courses for practical application of implementing digital and multimodal literacies	"But in the other classes, I feel like, I just feel like that wasn't something that was I almost fell like I wish that if we had hit that hard in that technology class it could have been one of the first classes that just exposed us to a lot of different things and then if like those things could be incorporated into I guess practically be incorporated into our different classes so that I could see I had been exposed to

				ExplainEverything but how would I sue that in these other classes or I've been exposed to Book Creator how would that be used in class where I don't know there's different games. Those are really what stand out to me but I just don't' feel like those were things that we used a whole lot." (2:296-303)
		Practical application	Helping preservice teachers to make connections between course projects and activities and how to practically use those activities in the classroom with their own students	"I don't want to say that we never used technology because I think sometimes we used it for projects that we did but I don't always feel like I saw how to use that in the classroom and I felt like whenever we talked about it was like a big project you would do so it almost feels like it's not something I would use every day. I'd be like if I was recording heroes like that would be something like green screen you could totally do that and that's what I would think of but I think there is surely ways that you could use it like in centers or in things like that that I just don't' think that we

				necessarily talked about things like that as much." (2:303-310)
		Connections through discussions	It would be helpful if instructors in the teacher prep program had discussions about how to use the class activities that integrated digital and multimodal literacies with students in they might teach in the future	"It would have been nice to have even more discussion about like… ok, this is what we used for you guys in this class and this is how we used it for you. Now let's brainstorm, how could we have done that if we were in a first grade class. Even if kind of trying to make that connection more, because I don't even think that was a connection. I knew sometimes, but I don't always think that was a connection I was making…There were times we talked about like this is what maybe you could do. We are modeling it because you are older and we are not going to do a kindergarten or first grade activity, but I feel like even just having the discussion after would be a nice close to kind of think about how could this have been used in a classroom if we did this activity. (2:500-510)
		Modeling	Technology that was	"The problem is we all had

			modeled in teacher prep coursework was all with one-to-one iPads	one to one iPads, so for us like projects we do typically are you have your own iPad do this on your iPad. So, a lot of what is modeled is I think in a model where it would be one to one in the school. I just don't feel like, maybe that's what I even mean practically is we get these big ideas of like that would be awesome if everyone had 23 iPads in their classroom or 23 Macs in or whatever grade level you are at but a lot of times people only have like 7, 8, 9 in their classrooms." (2:465-471)
		Modeling for lack of resources	She was describing how it would have been nice to have seen it modeled how to use iPads in the classroom for integrated digital and multimodal literacies when every student doesn't have their own iPad or laptop	"Even having a day in the class where you did an activity that would be like you had to bring an iPad and like 3 or 4 people did one thing on an iPad just to kind of model like this is something that you could do if you only had 7 iPads or 7 MacBooks in your class or talking like we all have one to one iPads but what could we have done to make that more accessible if you had less iPads in your room." (2:512-516)

		Resistant to integrate	Resistance of preservice teachers, veteran teacher, and instructors/professors of preservice teachers to use technology to integrate digital and multimodal literacies	"I think just maybe more discussion on what that [integrating digital and multimodal literacies into instructional practices] would look like throughout like our different courses because I think it just didn't stand out that that was something, there are specific classes where I felt like I remember learning stuff, so it must have been something that we brought up a lot but other than that I think that if we could just try to incorporate it. Though, I think a lot of us are kind of resistant for some reason… like teachers, like the professors, and the students. I think there is just… I don't know why that is." (2:642-647)
		Prefer to write a paper	Not used to using digital and multimodal literacies, so it's easier to write a paper	"You have to think, reflect on it, and create something and so, it is probably better but it is more challenging to try to like reflect on that whereas when I could've just written a paper while reflecting on it. So, maybe that's what it is. I don't know. Maybe our generation, we are just not as

				used to it. It's just not our go to. We're used to writing papers whereas maybe this coming generation will be not into that [writing papers]. I don't know. I'm not sure." (2:656-661)
		Prior experience in school	She explains that the preference for writing a paper in lieu of using digital and multimodal literacies comes from her personal experiences in K-12 school	"They [digital and multimodal literacies] are things I can do. I just prefer to write a paper and I know a lot of people who feel that way so, I don't know why that is. Maybe it's just how we've always done school and so like coming to college…like for all these years I never used technology in my high school or my middle school really all these years we've just learned to write. I don't know to do things the way that I don't and then we come to college and we're supposed to make iMovies and create things without papers and we are like I don't know how to do that. We haven't been taught to do that all these years." (2:667-673)
	Future plans for implementation	Book Creator	Using Book Creator as a resource for students to create a book	"This next year when I'm here, I would love to use that [Book Creator] because I

				think that would be a really fun resource having them create their own books." (2:23-24)
		Use iPad to demonstrate knowledge	Students using the iPad to do a retelling of a story or act out a story rather than writing it on paper.	"We were going over the standards [Oklahoma Academic Standards] yesterday, and one of the standards talks about being able to retell a story and so even you know I think I could see their knowledge more if I was having them retell a story on like an iPad or act it out on an iPad opposed to writing because I think they could express more through acting it out on an iPad and using their words rather than writing. I think there are a lot of things for them to focus on as they're learning to write. They're trying to focus on so many things. So, I think they wouldn't be able to get as many thoughts out if they were retelling a story through writing as opposed to if we set up the iPad and had them act out what just happened beginning, middle, and end." (2:74-81).
		Drawing and	Students will draw and write	"They could draw. I know,

		ExplainEverything	about what they draw using ExplainEverything app to put it all together	especially at the beginning of the year, that would be a good transition because in kindergarten I know one of the standards talks about when we are going into narrative and informational and in kindergarten the standard focuses more on like drawing out those things and transition to writing and ours go more into writing and so, I think maybe having them use both like on ExplainEverything or something like that." (2:88-93).
		Small group instruction	Using apps in small groups to implement digital and multimodal literacies	"And, small groups, I mean like I said if I read a story, I could have each table group retail the story with one of the iPads. I guess either they could do pictures on ExplainEverything or you know they could record themselves telling the story. I mean I could have them create a book on Book Creator and give them like the type of writing they need to use and they could do that as a group." (2:234-238)
		Center time	Utilizing apps that promote	"If we had a list or

			the use of digital and multimodal literacies during center time	instructions on some like how, you know have a lesson on how to use that and then introduce it for centers and have like a list of maybe if we were in our personal narrative unit they could go in and create a personal narrative on Book Creator." (2:250-252)
		Easier in her own classroom	She had a desire to integrate digital and multimodal literacies and believes it will be easier in her own classroom	"I would really like to. When it's my own classroom, I can kind of differentiate a little bit from what they are doing. (2:62-621)
		Sharing knowledge	Novice teacher learns about teaching standards and best practices for teaching literacy from veteran teachers while the novice teacher provides knowledge about how to use the technology needed to integrate digital and multimodal literacies as well as strategies for integration	"But also, helping, I think they kind of had a plan for the way this year would go but kind of tried to think of how we could incorporate technology…They know that's something I would be able to do and so, helping teach them to do stuff like that, so we can use that more often I think is something that I'd like to do even thinking about how to do something in centers. I don't know what that would look like but I'd like to." (2:621-627)

RESEARCH QUESTION #1
WHAT ARE TEACHER CANDIDATES' UNDERSTANDINGS OF DIGITAL AND MULTIMODAL LITERACIES?

Category	Sub-Category	Code	Definition	Example
Understandings	Understanding about Digital Literacies	Displayed on Whiteboard	When a text, digital or printed, is displayed on the white board for students to see.	"Digital literacy is just where it's just written on the board. So maybe like the book is under the document camera on the board or the book is pulled up through some website." (1:10-11)
		Computer software programs	Utilizing computer software programs for reinforcing foundational reading skills.	"During her centers, in their reading and math centers, they have two groups that use computers… in reading are Achieve 3000… and Smarty Ants. Depending on what reading level you are on that puts you on one of those two… and they play those two on computers." (1:66-72)
		Reading on computer	Student read text from the computer.	"I do have students that read straight from the computer." 2:15-16)
	Understandings about Multimodal Literacies	Multiple parts	When a text has multiple parts [modes] such as it can be seen, heard, and interactive.	"Multimodal would mean that it has multiple parts like it can read to you. It can define certain words for you. It just has a lot more than just what students can actually see. They can hear, highlight, do multiple things than just see

				the book." (1:12-14)
	Connections between digital & multimodal literacies	Computers	Views anything done with computers as using digital and multimodal literacies	"Tell me what's happening here in your internship placement with digital and multimodal literacies." (1:50-51) "My teacher actually uses everything on the computer… our literacy book is through a login…she pulls that up so kids can, are able to see that online. They have their book open, and it reads to them… the worksheets are all on the computer, so they all pop up onto the screen, and so then she writes, like helps them fill in the blank." (1:52-59)
		Digital reading	Reading on computer and answering questions	"They read passages on the computer and answer questions." (2:14-15)
		Technology versus digital and multimodal literacies	Seeing a difference between navigating or using technology and integrating digital and multimodal literacies.	"Do you see a difference between navigating technology and integrating this [digital and multimodal literacies] into your instruction… Yes, because sometimes like during my full teach week when I can't figure out… I just put the document camera on and I put like her hard copy… under the document camera and write on it." (2:150-154)

	Understandings gained from teacher preparation program	Technology class	Experiences and understandings of digital and multimodal literacies from technology class	"In our technology class… we did two things we had to create a book using, we could choose from a few online apps. I don't even remember what they are called. I think one was iBook on the Mac. You can create books from there, and so we had to create a book and it had to have images that could move you had to draw images. Yeah, there was like a list of things that your book had to include, and also had to use a green screen separately, so we had to do that project and then we had another project where we had to use a green screen and create a story and turn it into like a movie." (2:157-164)
		Digital toolbox	Digital literacy project creating digital toolbox	"I think it was our first literacy class. We had to create a digital, I don't remember what the name of the project was. I just remember it being digital, and we could only do it online and it had to be submitted online. Like we couldn't print it you and turn it in. I think that's when we had to choose to think about like different, our toolbox [Literacy strategies

				toolbox], I think that had to be digital." (2:166-169)
		Create audio book	Using a mentor text, she was required to create a book that had to include audio.	"During our PIP, during our literacy, we had to create a book… we had to choose a mentor text first and so we had to create a book that went along with the mentor text. And, that had to include audio, so you had to record yourself reading the pages." (2:171-176)

RESEARCH QUESTION #2
WHAT ARE THEIR BELIEFS SURROUNDING THE USE OF DIGITAL AND MULTIMODAL LITERACIES IN THE CLASSROOM?

Category	Sub-category	Code	Definition	Example
Importance	Reasons for importance	Wide use of technology	Effects of the growing use of technology including digital and multimodal literacies throughout society.	"Like it's most important because technology is becoming so big." (1:30-31)
		Kids use of technology	Effects of children now using technology including digital and multimodal literacies more frequently at younger ages.	"Kids are using technology at a younger age." (1:31)
		Accessibility	Provides students with better accessibility to textbooks and other materials.	"It's so expensive to buy textbooks for each student and constantly update them." (1:31-32)
		Enhance instruction	Digital texts allow students to gain a better understanding of what they are reading and	"It [digital texts] would make it easier for them to be able to grasp those books or those

			enhance curriculum and instruction.	concepts because then when they're reading by themselves, they could always highlight the word or have it read it to them." (1:33-36)
		Enhances reading skills	Digital texts have features that help students to become better readers.	"They are able to hear the correct pronunciation. They're able to hear the correct fluency for reading that and it just helps them to become a better reader." (1:36-38)
		Fast paced	Using digital texts allows students to locate information at a faster pace.	"I know some of the books you can click on a word and it will tell you the definition right away instead of having to find it in a glossary which is still a good way to do it but it's just a lot more like fast paced which is kind of the direction we are going in is fast paced. I need it right now kind of thing." (1:L39-42)
		Connecting with students	Digital and multimodal literacies are a way to connect with students because they engage in technology activities that require these at home.	"Students like say things like oh you know I well all this weekend I spent most of my time playing on my Xbox or this weekend I spent most of my time playing on my iPad or I did this on the computer or I did this on the tv. It's all for the most part I hear all technology stuff. So, it's like the best way to be able to connect with

				them is to continue using the technology in the classroom that helps to better interact with them." (1:45-49)
		State testing	Students will have to do State tests starting in the fourth grade.	"When you start fourth grade and you do your State testing, it's on the computer. They take them on MacBook's now… So, it's super important that we work with them on the computer." (2:136-138)

RESEARCH QUESTION #3
HOW ARE THEY IMPLEMENTING DIGITAL AND MULTIMODAL LITERACIES IN THEIR OWN TEACHING PRACTICES DURING THEIR INTERNSHIPS?

Category	Sub-category	Code	Definition	Example
Implementation	Limitations	Lack of experience	Believes she doesn't have the experience necessary for implementing digital and multimodal literacies.	"It's [implementing digital and multimodal literacies] because it's not what I'm used to." (1:160)
		School experiences	Didn't have experiences digital and multimodal literacies in K-12 school setting.	"I guess it's just a generational thing, that's how I grew up, was it being that way [using teacher book instead of accessing materials online or via technology devices]." (1:163)
		Navigating technology	Lack of knowledge about how to use the technology and navigate through the information available.	"I have a hard time. I find myself having a hard like I always have to ask my teacher like can you find the page because you have to click like so many buttons to get into the

				worksheet page that you are looking for to get into the book so, I do find that hard for myself to try to do a lot." (2:140-143)
		Non-working resources	Whiteboard broken so she didn't get to experience using it in previous school settings.	"Cause in my last, in my PIP, the Smartboard was broken, and you couldn't like write on it and stuff." (2:146-147)
		Access to iPads	The availability of iPads	"I think if we had iPads. I could make, like they could create their own online digital books cause they've created their own book writing." (2:180-181)
		Access to MacBooks	Lack of availability of enough MacBooks for all students.	"We only have so many Macs." (2:185-186)
		Support	Lack of knowledge about support for using digital and multimodal literacies or technology	"I am assuming we have somebody. I just don't know who it is, and I've never heard them talk about it, talk about a person. And, I've never seen the person here." (1:151-153)
		Lack of student understanding	The students lack understanding about using computers versus using iPads/tablets for creating digital literacies.	"They created a book about animals in winter, but I think it's too hard for them to try and do it on the computer [instead of iPad] especially trying to teach them iMovie. I think that's just too far like beyond what they're able to understand and all the different buttons that you have to push. Even iBooks on the

				computer, I think if you tried to create a book, I think it just might be too difficult." (2:181-185)
		Students understand iPads	Students understand how to use iPads/tablets better than MacBooks.	"I think if we had iPads. I think it's a lot easier for them to try cause a lot of them if they, probably at home, they play on their iPad like they play on their parent's iPad. They don't play on Macbook as much or at least I don't hear them say that." (2:188-190)
		iPad versus Computer	Lack of knowledge about apps and programs that work on both the iPad and the computer.	"Were there any types of things you did in your coursework on computers or with computers or on the Internet that you think maybe you can modify to do maybe in this classroom setting?" "I'm trying to think because a lot of it was on our iPads. Yeah, we could send it to our computers if we wanted to work on it on the computer but a lot of it was on the iPad… I actually don't know if you could access them on the computer." (2:191-197)
	Types of Support	Support from cooperating teacher	Supports received from cooperating teacher for implementing digital and multimodal literacies.	"She always helps me to log into her logins and pull them up, so that when I teach a lesson with them, I'm able to use the online version of it

				instead of looking in her teacher book." (1: 80-81)
		Support people	Supports received from other school personal from implementing digital and multimodal literacies.	"I know that we have an elected person for SmartyAnts. She's actually one of the second grade teachers, and she goes to the big meetings. I guess for the district and then reports back about SmartyAnts… I've only heard that she goes there. I've never actually seen her come back from a meeting and report in a staff meeting or anything." (1:121-124)
	Present plans for implementation	Computer readings	Texts being read by the computer to build fluency and vocabulary.	"She pulls up read, I think that's really important for the kids to be able to hear not only my fluency, but someone else's fluency while they read or while it reads to them. I think it also helps that the vocabulary words, or even just words in general, when they click it or when I click on it automatically tells them right away whit it means." (1:169-177)
		Symbaloo	Landing page for students to conduct online research.	"Right now we are doing a research project. It is actually our second-grade integrated unit and they're doing it about weather. And so, they are

				eventually going to like hone in on a question that they want to research about the weather. So right now, they are just gathering information. The librarian has set up a Symbaloo page." (2:25-29)
		PebbleGo	Research app for students to search for information about specific topic of study.	"She has like this app, PebbleGo, that they can click on and they can like research tons of different thing within PebbleGo… They have different tabs that break it up so really if they were to put it all together, it would probably be like a whole article but they break it up so each thing that you're researching, like right now I had a kid that is researching thunder and so it had like different tabs and underneath was a paragraph that explained the answer to that questions with a picture and then they can also listen to it. So, they can press the hearing button and it will read it to them… They put it [the information they find] in these little books. They each have a little book that like that, they write them down." (2: 31-43)
		Kid friendly apps	Apps that can be filter	"She has other apps too on

			reliable information for students.	her Symbaloo page like Weather Wiz. They are like the majority of them, are all, not the majority of them, are kid friendly so it helps from just at a second-grade level searching through Google and not able to know or filter out which ones are not correct. It has different little apps so that they can use to research different things depending on what they are looking for." (2-52-56)
		Assisted reading	Using apps that assist students with their reading decoding and vocabulary while they are researching.	"They have different tabs at the top that tell them a little mini paragraph. They have words that like maybe are words that they might not know and then this is the button that they can push (she pushed the button and it says hurricanes are huge ocean storms) and then it reads it to them. And then they can click on this word and it immediately takes them to what it means." (2:73-77)
		Contained information	All the access to information on the topic students are researching is found in contained apps that don't allow access to the Internet	"So, it's all within this contained app? Oh yeah, it's all within the PebbleGo." (2:80-81)

			at large.	
		Keyword searching skills	Students can still learn novice keyword searching skills from within the app but the apps limit more advanced Internet searching skills.	“Now if they don’t see something like they want to search like heatwave they don’t find it. It will tell you right away, heatwave, there are no articles in PebbleGo that has anything to do with heatwave. Now if I just do heat, they’ll say ok here’s something on heat but not the heat that you think. They took heat from someone’s name. So they have to be careful.” (2:81-85)
		GoNoodle	Using videos with songs that help students better understand and remember information.	“It’s not books they are all videos and on this website you can choose like different categories that you want to talk about or you want to learn about so they have like curriculum, they have mindfulness, sensory motor skills, school life, movement types, so this kind of helps to if you have indoor recess they have videos to help you… People have channels and there are different channels that make different things. If you are learning about bones, they make a song about bones to help students remember that bones or the water cycle.

		BrainPop	App that is similar to GoNoodle that uses videos to enhance instruction.	"I'm using the BrainPop video, so we'll read, I'll read, a mentor text and one of those texts is on like I bought it when on my Kindle so it will play from the board and then I will show them the BrainPop video to kind of go along with what we're talking about." (2:126-129)
		Writing on the whiteboard	Students wrote on whiteboard when determining the meaning of a poem	"So they got to write on the board and I showed them how you break down a poem… They went to the board and worked together by underlining, they could highlight, they would write out to the side what those meant." (2:211-215)
		Behavioral concerns	Lesson wasn't originally planned to include digital and multimodal literacies because of behavioral concerns about letting students use the whiteboard	"I thought I might have some kids that kind of like argue that wanted to write that didn't get a chance to write, so I was kind of afraid about doing that part." (2:242-243)
		Using technology for fun	Incorporating the use of whiteboard for fun	"Then I thought well, it might be kind of fun." (2:245)
		Whiteboard helps understanding	She believed the allowing students to write on the whiteboard facilitated their understanding of the lesson	"It helped them to better understand them because they were actually able to physically write out what each line meant." (2:252-253)
		Poster board	When asked if she could	"I could've written the poems

			have done the same lesson using poster board instead of the whiteboard, she indicated that she could	on the poster board and then had the students write on it." (2:262)
		Whiteboard engaging for students	She believed incorporating the use of the whiteboard in her poem theme lesson made the lesson more engaging for students	"I was more engaging for them to actually be able to feel like they were writing on the book because the book was online." (2:266-267)
		iPad availability	She described how the poem lesson could have been different if she had access to iPads in the classroom	"If we had iPads and we were able to make a video whenever they broke down they could've acted out the poem… and make little video like snippets." (2:271-275)
		Guided Inquiry with apps	Students do guided inquiry projects using apps such as PebbleGo and Weather Whiz for researching information	"They will go through and be able to look at like all those different like weather whiz, PebbleGo, all those different little apps in the library that she has so they can research." (2:287-289)
		Creating digital books	She discusses the feasibility of creating digital books for to demonstrating knowledge learned from guided inquiry	"If I recorded every student with their question and put in iMovie or something but then I would have to work with them one on one. Is there any way you could have them do it? Probably not." (2:296-299)
		Student knowledge	Students don't have the knowledge to use the technology necessary for creating digital and	"It's too hard to record yourself on here because you would have to flip it to make it the mirror image and they would

			multimodal literacies	have no idea how to do that." (2:301-302)
		Student age	She doesn't believe they are old enough to have the skills and understanding necessary for using digital and multimodal literacies	"I just don't think they are at an age where they know how to use that kind of technology to create like digital literacy yet." (2:305-306)
		Blogs for worksheets	She uses teacher blogs to download worksheets for her students to use in the classroom	"I have actually used worksheets and stuff from people's blogs that they have created. I've subscribed to oh she was a teacher for many, many years and now she creates different websites and takes like the curriculum and puts them into fun activities and she has a blog that you can download." (2:469-472)
		Blog writing	Future students could write blogs to communicate with other students in other parts of the country	"I think it would be fun for them to use and read like if they had I think it would be cool to use a blog to talk to like connect to a class from here we connect to a class in New York and we talked through a blog so we posted on our blog page what we did the whole week and the students were the ones who were writing it and then our friends who are our partners in New York did the same thing." (2:476-480)
	Future plans for	Technology for	She would like to use books	"I think being able to have

	implementation	students with special needs	online for future student because she believes it is helpful for nonverbal students	books that are online, if somehow we could connect that to the iPad… he could pull it up and then would be able to also have a book and also listen to it so like maybe when it was his turn to read he could read like have the computer read out loud or he could type it as if he was reading so that could kind of help kids who are nonverbal." (2:358-362)
		ELL students	She feels that ELL students could benefit from digital literacies that could translate reading materials into their own language	"You could click on it and you could choose the common languages and have it read to them at least the vocabulary word in their own language." (2:373-374)
		Lack of resources	She would like to implement digital and multimodal literacies into her instruction in her future classroom but feels that access to resources will likely be an issue	"I'm hoping that I do [implement digital and multimodal literacies], but I guess it just depends because I have to teach in Title 1 and sometimes Title 1's don't get enough money to have these sorts of things so it would probably be like I would have to just do it on my own device." (2:379-381)
		One to one iPads	She believes she would need one to one iPads to successfully implement digital and multimodal	"One to one iPads or even one to one computers…especially because in middle school it is one to one… and so it would

			literacies	help them get used to having that." (2"392-395)
		All books on one device	When asked how she thought digital and multimodal literacies has or should change the way we think about literacy, she talked about how all books would be digital on accessed on one device	"I think it would change the way we teach literacy because there wouldn't we wouldn't have all these books anymore we would get rid of all these hard copy books and everybody would have it right on their device." (2:398-400)
		Kids using technology at younger age	Because kids are experiencing technology use at younger age they are developing skills to engage in creating digital and multimodal literacies earlier	"They are starting younger and younger and so they are able to learn those skills at a younger age and they are building faster on those different knowledge and different skills and different apps and their knowledge is growing so much faster." (2:403-406)
		Internet access	Students today have better access to the Internet than she did when she was younger	"When I was a kid we didn't have computers and I mean we had like a home computer but it was like dial-up internet whereas now kids in here and they are like no wifi because they couldn't be on the wifi because we were on the wifi so they were like what no wifi we can't be on the wifi and so like everything was coming to an end no wifi." (2:406-409)
		Educational apps	She believes there are more	"So many more apps are

		and websites being created	apps and website being created for education use	being created for education so many apps in general are being created that that's all they'll use is apps and websites that are all on the computer." (2:411-413)
	Teacher Preparation	Implementing without resources	It indicated it would have been nice if there was more discussion during her teacher preparation program about how to implement digital and multimodal literacies without resources	"In our preservice if they taught us if we talked at least just a little bit about maybe what to do if your school doesn't have that or if your school, their whiteboard is broken what other ways you can do incorporate multimodal literacies of if you don't have iPads for your whole class what are like some other ways that you can like alternatives." (2:422-426)
	Preparing K-12 students for future	State testing	Prepare future students to take State testing on the computer	"When you get to the middle school and even upper elementary you have to take your State test online so I feel like if you go all these younger grades without doing anything on the computer and no reading on the computer they are going to have no idea how to do that." (2:454-457)
		Reading online	More books are going to be available digitally, so students need to be prepared for reading that	"I feel like so many books are going to all digital so even just reading in their free time they are reading on their Kindles.

			way	They are reading on the little Nooks." (2:459-460)
		World gone digital		"Lot of places have gone digital and so you have to contact them via the computer. A lot of people don't, like even my doctor's appointment they don't take calls anymore you schedule everything through their website. They have an app and you do everything through their website and job applications, it's all online." (2:462-465)