

The Integration of Technology in the Teaching of Literacy: A Study of Teacher Learning

A Dissertation
SUBMITTED TO THE FACULTY OF
UNIVERSITY OF MINNESOTA
BY

Kathryn Elizabeth Lawyer Allen

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY/EDUCATION

Dr. Deborah Dillon

May 2016

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Acknowledgements

I wish to thank the members of my committee, each of whom has influenced and contributed to my development as an educator and as a scholar. I thank Dr. Cassandra Scharber for introducing me to models used in technology integration, and for mentoring me at a critical point in my development as a writer; Dr. Mistilina Sato for her wise insights into teacher learning and for her guidance of my scholarship through coursework and through the work of the Teacher Education Research Collaborative (TERC) graduate student research group; Dr. David O'Brien, who contributed significantly to my understanding of qualitative research methods, and who also encouraged my interest in the integration of technology for literacy instruction. It is with deep gratitude that I extend my thanks to my advisor, Dr. Deborah Dillon. Dr. Dillon has been a guiding light and inspiration during the past four years. She has provided opportunities, which have challenged me and opened doors for further learning, and through which I have grown as an educator, a scholar, and as a person.

I thank my students, past, present, and future. You are the heartbeat of this work.

My gratitude goes to the Foundations of Reading team, whose collegiality, collaboration, and support was a consistent presence.

I also extend thanks to my fellow graduate students, travelling companions along this journey. May we continue to learn, laugh, and study together.

A special thanks goes to the faculty in the Teacher Education Department at the University of Wisconsin at River Falls. The Block II experience opened my eyes to the world of teacher education.

I am deeply grateful for the support and encouragement of my friends, especially Dayna and Julie. Thank you for your encouragement and laughter, and the occasional reality check.

I thank the community of the Episcopal Diocese of Minnesota, particularly the parish of St. John the Evangelist. You welcomed and held my family in prayer through a time of transition, challenge and celebration.

With great appreciation, I thank the teachers, administration, and staff at North Lake Elementary, whose willingness to serve as participants set this study on its path. Thank you for opening the doors of your classrooms and for sharing your learning experiences. Your generosity made this study possible.

Finally, my deepest gratitude goes to my family. To my parents, whose love of literacy has influenced all aspects of my life, and whose commitment to learning paved the way for my work. To my brothers and their families who encouraged me through this transition. And most especially, I thank my children, Michaela, Elliott, Rachel, Jessica,

and son-in-law, Brett. Thank you for your gifts of laughter and hugs, and for growing into the wonderful people that you are created to be. Granddaughters, Reese and Jemma, thank you for exploring the world of books with me and reminding me of the essential joy of literacy.

Dedication

This dissertation is dedicated to my parents, John and Evelyn Lawyer.

Abstract

Literacy and technology have historically informed and transformed each other. This mutual interaction creates cultural shifts that redefine what it means to be literate, and also impact the ways in which literacy is taught in contemporary classrooms. Literacy teaching and learning has been the focus of much study during the past 50 years (Dressman, 2007), and we have a reliable knowledge base regarding how teachers learn to effectively teach literacy (Dillon, O'Brien, Sato, & Kelly, 2011; Hammerness, Darling-Hammond, & Bransford, 2005; National Research Council, 2001). We also have a growing knowledge base regarding contemporary literacy (Coiro, Knobel, Lankshear, & Leu, 2008). However, there is a pressing need for research to examine and portray how teachers learn to teach in contemporary contexts and how teachers' understandings of literacy develop through practice (Curwood, 2014; Schmidt-Crawford, Tai, Wang, & Jin, 2016).

The purpose of this study was to better understand how teachers learned to teach literacy through the use of technology, and how teacher conceptions of literacy developed and were enacted in elementary classrooms. Using embedded case study methodology (Yin, 2014), I examined ways in which elementary teachers learned to integrate technology for literacy instruction. In addition, I explored specific learning processes that teachers used to support the integration of technology for literacy instruction. In this study I also sought to understand how teacher conceptions of literacy developed through the situated practice of everyday teaching and learning. Social cultural and social cognitive understandings formed the theoretical framework undergirding my study,

particularly as interpreted through a communities of practice lens (Wenger, 1998). Qualitative methods (Patton, 2002) were employed to collect data at three levels of inquiry: school context level, grade level team, and individual teacher.

Analysis indicated that teachers learned to integrate technology for literacy instruction in both formal and informal modes, including through district professional development offerings, learning in community, and learning in and through the act of teaching. Communities of practice frameworks revealed that processes of legitimate peripheral participation, reification, negotiated meaning, identity formation and locality were helpful ways of understanding the critical processes involved in shifting into contemporary literacy practices. In addition, social cognitive processes of modeling, self-efficacy, goal setting, and visioning assisted teachers in enacting new understandings of literacy. Findings generated from data analysis indicated that teacher conceptions of literacy shifted in response to reflection on practice, and often in response to student reactions to technology integration. This study offers practical insight into how teachers learn to teach in contemporary literacy contexts, and presents suggestions for school leaders, teacher educators, teachers, and researchers as society continues to reimagine the meaning of literacy.

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Introduction

My path to this dissertation begins, most probably, with the *Cat and Mouse* stories my father told while my brothers and I played with Legos. However, I will begin this introduction to my dissertation with the advent of my teaching career. It has been my great good fortune to have had the opportunity to teach in schools of innovation, collaboration, and inquiry. These schools have been places of learning for students, and even more importantly, they have been places of learning for teachers.

My first teaching experience was in an urban math/science/technology magnet school as a fifth grade teacher at a school that was, in the late 1980s, on the leading edge of technology integration. This school had both a science and a computer lab with regularly scheduled lab times, supported by competent teachers and innovative, integrated projects. One of my initial forays into integrating technology with literacy experiences was when my fifth graders built a fully functioning robotic interpretation of our literature circle novel, *Mrs. Frisby and the Rats of NIMH* (O'Brien, 1971). Due to my students' increased engagement in reading and deepened comprehension of the story I began to search out other ways to integrate technology into literacy instruction. The collaborative nature of our school supported this work, and we worked as a team to create learning experiences for our students.

My second teaching experience was at a small independent day school in Southern Appalachia where I served as a third grade teacher. This school grew from 50 to 300 students during my tenure, a growth that mirrored an explosion in technological

advances for education. The introduction of classroom websites, Smartboards, and iPads each challenged our community to rethink the meaning of literacy and the implications for us and for our students. Classroom websites afforded parents a window into the classroom through photos and student publications, with continual dialogue as to how to truly integrate websites as a communication tool.

While websites were thought of primarily as a form of publication, Smartboards brought technology into the very heart of daily instruction. The introduction of Smartboards changed the nature of our previously playful, experimental discussion to one increasingly fraught with tension. Teachers' beliefs were challenged and identities shifted as we struggled with literacy instruction and ways in which technology aligned (or not) with our collective and individual understandings of literacy.

Several teachers, including myself, enrolled in graduate studies at the local university. These studies fostered our discussions of literacy instruction and helped to guide the increased pressure to integrate technology into classroom activities. We began to recreate literacy culture with the guidance of a truly gifted technology specialist and a community of teachers open to learning through collaborative inquiry. The introduction of iPads accelerated the conversation as students began to show us the possibilities inherent in technology integrated into literacy instruction as learning tools, in addition to being forms of presentation or publication.

It was at this point that the curiosity simmering under the surface of my teacher-self began to boil over. I wondered what had happened to our school, how our community weathered the storm and, from all appearances, begun to emerge

transformed? As I watched my third graders and their kindergarten book buddies engrossed in reading digital books, I noticed that my thinking about “what counts as reading,” was somehow altered. I knew I needed more than the professional development offered through the school and felt that our collective journey may hold some essential truths about literacy in contemporary schools.

This dissertation, while certainly allowing the opportunity to see my original questions through an expanded lens, has also provided me with tools through which to continue asking and interacting with questions regarding the interplay among technology, literacy and teacher learning. My future work in teacher education and literacy instruction is guided through my experience as a classroom teacher and graduate studies, with the hope of easing elementary educators’ transition into contemporary understandings of literacy.

Chapter 1

Setting the Purpose

Traditional understandings of literacy teacher learning are grounded in understandings of literacy and literacy education that have been developed through interactions between research, policy, and practice. While these understandings form a foundation for the professional learning of k-6 educators, inquiry into contemporary teacher learning recognizes that literacy practices change over time and therefore practice and learning also must change. Understanding how teachers learn to teach literacy in ways aligned with contemporary literacy may lead to an expanded view of teacher learning.

Definitions of literacy change through time, and have often been defined through the latest technologies. Literacy transforming technologies, such as paper or the printing press, created cultural shifts impacting not only definitions of literacy, but definitions of culture and society as well. These cultural shifts in turn demanded increasingly refined technologies. This mutual interaction between literacy and technology creates spaces for learning that can be difficult to define and even more difficult to navigate. The current literacy-technology interaction has societal implications that not only redefine what it means to be literate, but also what it means to be in community, a participant in human activity.

Researchers have put forward a variety of definitions and titles to differentiate literacy in contemporary society from that of literacy predating common use of

computers. Oft used terms include 21st century literacies, digital literacies, or new literacies. Commonalities across definitions generally include multimodality, participation, and a global outlook, and contemporary researchers view literacy as socially situated (Beach & O'Brien, 2008, Coiro, Knobel, Lankshear, & Leu, 2008). These literacies are defined by technologies including the Internet and computers (Coiro et al., 2008), which provide possibilities for literacy never before imaginable.

Professional organizations have joined the conversation, including a position statement from professionals within the International Reading Association (IRA)—renamed the International Literacy Association (ILA). This statement explicates current perspectives of literacy, noting that new literacies: 1) demand new social practices, skills, strategies, and dispositions, 2) are central to participation in global society, 3) change rapidly, and 4) are multiple, multimodal, and multifaceted (International Reading Association, 2009).

Likewise, professionals within the National Council for Teachers of English (NCTE) crafted a position statement, suggesting that participation in the 21st century includes: 1) proficiency with tools of technology, 2) global participation, 3) the ability to “manage, analyze, and synthesize multiple streams of simultaneous information,” 4) the ability to “create, critique, analyze, and evaluate multimedia texts,” and 5) the willingness to “attend to ethical responsibilities required” by complex environments (National Council of Teachers of English, 2013). The interaction between technology and literacy is once again changing what it means to be a literate member of society, and for the purposes of this dissertation, I refer to this most recent turn of the evolutionary wheel as “contemporary literacy.”

Elementary school communities serve as one entry point into the world of literacy. Literacy for all students is a goal held by most schools, and indeed, is upheld by law and foundational principles of democracy (Dewey, 2012). Yet each school community approaches literacy in unique ways. My interest is in school communities and the professionals who work within them, as they find ways to learn in the spaces created through the current iteration of literacy-technology interaction. In line with the ideas proposed by Beach and O'Brien (2015), I embrace the definition of literacy practices that "involve the situated processes fostering learning, in monitoring understanding, in making transformations from understanding to articulations of that understanding through language, both spoken and written. Hence, these practices are both cognitive and social, and what one understands is mediated by social action and interaction, in a given activity, within a certain cultural context" (p. 7).

In order to learn in the literacy-technology interaction space, schools and teachers must integrate current technologies. Currently, this means learning technology tools, such as Internet navigation, specific apps, use of tablets, Smartboards, and other hardware available in classrooms. But educators also have to learn how to use knowledge of pedagogy and knowledge of content to evaluate appropriate use of technologies. In a school community, learning also means participating as a literate member of the community and understanding the rules, roles, and division of labor within the community. The introduction of technology often causes disruption in the community, creating a collective motive for learning how to integrate technology in ways that sustain

the school. The goal of this study was to describe and analyze these moments of learning, how they are navigated, and what they mean for the educators involved.

Elementary school communities are charged with educating students to be literate participants in society. The fact that definitions of literacy are changing does not alter this charge. Changing definitions of literacy call us to better understand how school communities and individual teachers learn to teach in the literacy-technology interaction space. This study explores the convergence of teacher learning, technology, and new literacies through inquiry into teachers' developing understandings of contemporary literacy, and presents a window into teacher learning for contemporary literacy instruction. The purpose of my dissertation study was to better understand ways in which elementary school teachers learn to integrate technology to teach literacy in the 21st century. Three questions guided this study:

1. What are ways in which elementary school teachers learn to integrate technology to teach literacy?
2. What learning processes support the integration of technology for literacy instruction?
3. How do teacher conceptions of literacy develop through the integration of technology into literacy instruction as evidenced through elements of teaching practice: planning, instruction, and assessment?

In order to respond to these questions I studied an elementary school immersed in district-wide change driven by a recent bond referendum. The school provided the opportunity to explore teacher learning and how conceptions of literacy developed

through implementation of a one-to-one technology initiative with innovative teachers in a supportive setting. Teachers at this school had access to professional learning opportunities, technology support, and community investment in the outcome of the district driven changes. A description and analysis of the interplay between technology and literacy, as lived in the experience of this school community, holds possibilities for better understanding how teachers learn to teach literacy in contemporary society.

The remainder of this chapter provides an overview of the complete dissertation. In Chapter 2, I present a review of the research that informed and guided my study. This review is structured around two primary headings, teacher learning and contemporary literacies. I explored the intersection of these two areas of research in my dissertation study.

Chapter 3 describes the theoretical frameworks informing my study, specifically, sociocultural and social cognitive schools of thought. Key terms, particularly those associated with communities of practice (Wenger, 1998) and cognitive processes (Bandura, 1986) are defined. I explain my rationale for the use of an embedded case study methodology and describe my participants. An outline of my research methods is provided, including data collection and analysis procedures.

In Chapter 4, I present findings structured through three levels of the embedded case study, the context level, intermediary level, and the individual level. I share results of the survey triangulated with interview and observation findings to provide context in areas of literacy and teacher learning. I then describe results at the intermediary level framed through a communities of practice lens. At the individual level, cognitive

processes are brought to light as tools for learning in and through action. This chapter concludes with a summary chart of findings organized by research question and level of inquiry.

Chapter 5 begins with a summary of the study, including examples of teacher learning found to be particularly interesting. I then put forth conclusions based on my findings and organized by research question. Implications for school leaders, teachers, teacher educators, and researchers are discussed. This final chapter ends as the study began, with questions and a call for practical applications of research.

Chapter 2

Literature Review

The following chapter reviews research informing my dissertation in areas of teacher learning and contemporary literacies. It is the juncture between these two bodies of literature that forms the basis of my study. I conclude this review by drawing out themes related to the questions guiding my dissertation study.

Teacher Learning

In exploring ideas on teacher learning, I selected the following three reports: *How People Learn: Brain, Mind, Experience, and School* (National Research Council, 2001), *Framework for Teacher Learning* (Hammerness, Darling-Hammond, and Bransford, 2005), and a review of teacher learning conducted by Dillon, O'Brien, Sato, and Kelly (2011). I selected *How People Learn* (2001) as a pivotal framework of the National Academies that positions itself as identifying principles of learning necessary for success in the twenty-first century. The *Framework for Teacher Learning* (Hammerness et al., 2005) synthesizes previous frameworks of teacher learning into a comprehensive model. The review by Dillon et al. (2011) was selected because of the alignment of general principles of reading teacher professional development between leading thinkers in the field and my own study.

The Committee on Learning Research and Educational Practice, a sub-committee of the National Research Council (NRC), was created in 1999 to explore links between research on learning and classroom practice. The resulting report, *How People Learn:*

Brain, Mind, Experience, and School (2001) presents an overview of how education has changed in the past century, as well as findings on ways teaching and learning are informing and being informed by contemporary educational contexts. Findings from this report describe twenty-first century educational goals as the ability to “identify and solve problems and make contributions to society...display qualities of adaptive expertise” and to “rethink what is taught, how teachers teach, and how what students learn is assessed” (National Research Council, 2001, p. 133). To this end, the NRC proposes four interconnected components of human learning; environments that are learner centered, knowledge centered, assessment centered, and community centered (National Research Council, 2001).

The *Framework for Teacher Learning* proposed by Hammerness et al. (2005) draws from research and professional standards for teaching to consider teacher learning along five dimensions situated within a learning community. These five dimensions include: (a) vision that guides teacher learning and can shift practice toward desired goals, (b) understanding of pedagogical knowledge and content knowledge as described by Shulman and Shulman (2004), (c) practices such as instructional activities, approaches, and assessments to build student learning, (d) tools, including both conceptual tools, such as theories and frameworks, and practical tools, such as instructional strategies, resources, or assessments, and (e) dispositions, or “habits of thinking and action regarding teaching and children” (p. 386).

In the fourth volume of the *Handbook of Reading Research*, Dillon et al. (2011) discuss similar facets of teacher learning. Their review discusses how relationships

among research, practice, and policy strengthen links between research and practice in teacher development, and recommends general principles of professional development that “focuses on specific learning outcomes for students, embeds teacher learning in the teachers’ practice, is sustained over time, and provides time for teachers to work together on issues important to them and their schools” (p. 642). The review includes an analysis of a school that successfully enacted these general principles through attention to context, coherence, coaching, and compassion (Gehsmann & Woodside-Jiron, 2005). This example serves to support my study through providing a brief look at how such a study informs the discussion on teacher learning in the area of elementary literacy instruction.

Taken together, these studies suggest that elements of teacher learning can be understood across three dimensions. First, that teacher learning is centered on knowledge of learners and content that is guided by learning outcomes or desired goals. Second, teacher learning happens collaboratively and is situated in identifiable communities. Third, impactful teacher learning connects ways of knowing to practice through the use of conceptual tools and processes. In the following section I explore each of these dimensions more thoroughly.

Learning Centered on Knowledge of Learners and Content

Much of our understanding of teacher learning builds from the work of Lee Shulman and the research that he, along with many colleagues (Hammerness, Darling-Hammond, & Shulman, 2002; Shulman & Sherin, 2004; Shulman & Shulman, 2004) have conducted to develop teacher knowledge in content, pedagogy, and the interplay between the two. Shulman describes pedagogical content knowledge (PCK) as “an

understanding of how particular topics, problems, or issues are organized, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction” (p. 8). Effective teachers develop knowledge of learners intellectually, socially, culturally, and personally, and also have deep and flexible understanding of the content matter they are teaching (Shulman & Shulman, 2004). Teacher certification requires evidence that future teachers meet minimum requirements for pedagogy and content knowledge, and continuing professional development often centers on developing these knowledge bases (e.g. Sato, Wei, & Darling-Hammond, 2008).

Snow, Griffin, and Burns (2005) describe teacher knowledge as a “process of development in which the capacities being used at any point are analyzed and elaborated” (p. 6). A teacher’s progression can be represented by the emphasis placed on types of knowing. Declarative knowledge, the “capacity to answer questions about what one should do in various situations” is typical of preservice teachers. Procedural knowledge is differentiated into “situated,” where the teacher is successful in structured, uncomplicated situations, and “stable,” in which the teacher functions independently in a typical classroom (p. 8). Experienced teachers develop expert, adaptive knowledge and are competent in complex teaching situations, and master teachers are characterized as having developed a reflective, organized, analyzed knowledge base. We know that a teacher knowledge base changes in both magnitude and in the proportion of knowledge allocated to expert-adaptive-reflective knowledge as a teacher becomes more expert (Snow et al., 2005). When considering the integration of technology for literacy instruction, teacher professional development also includes knowledge of technology for

literacy instruction as part of developing this progressive knowledge base (Angeli, Valanides, & Christodoulou, 2016). Thus, differences in teachers' abilities to adapt to a technology initiative may be influenced by the "types of knowing" teachers exercise as they work through new teaching practices.

Teacher learning centered on knowledge of learners and content is a continual process in which teachers become increasingly more expert, reflective, and develop a stable practice and knowledge base. Components of teacher learning that keep the focus on learners and content include effective use of assessments and attention to cultural competence, both of which are reviewed below. I also include reviews of conceptual frameworks and models of technology integration specific to teacher learning, all related to expanding a knowledge base for the interplay between pedagogical, content, and technological knowledge, as well as two models that guide technology integration.

Understanding the role of assessment and classroom-based feedback is critical to the process of a teacher becoming more expert (Bransford, Derry, Berliner, & Hammerness, 2005) and forms the backbone of advanced certification programs such as the National Board for Professional Teaching Standards (Sato et al., 2008). Assessment supports teacher agency in respect to solving learning problems (Johnston & Costello, 2005) and adapting instruction to respond to student learning needs (Lesaux & Marietta, 2012). Through assessments, teachers focus on the content students are expected to learn as well as how students are progressing, providing both the academic press and social support necessary for learning (Delpit, 2012). Teachers' capacity for analyzing and elaborating professional knowledge develops through increased understanding of

developmental patterns (Snow et al., 2005) and facility in using assessments to guide instruction in systematic ways (Lesaux & Marietta, 2012). Teachers also learn how relationships between knowledge of students and knowledge of content lead to an understanding of common misperceptions held by learners and typical ways in which student learning can be supported (Bransford et al., 2005). Due to the constantly changing nature of technology for literacy instruction, developing the stable procedural knowledge necessary for setting student learning goals, designing learning experiences that move students toward those goals, and assessing student progress are particularly relevant in the complex environments created by introducing new technology and ways of understanding literacy.

Culturally responsive teaching (Gay, 2010) invites teachers to reflect and draw from cultural strengths of their students. Expert teachers develop cultural competence in contemporary literacy instruction through reflection evidenced through inquiry based teaching cycles. Along with knowledge of content and pedagogy (Smith, 1998), caring and competent teachers engage in raising consciousness and cultural self-awareness (Gay, 2010). Teachers consider the funds of knowledge brought into the classroom (Gonzalez, Moll, Tenery, Rivera, Rendon, Gonzales, & Amanti, 1995) and integrate that knowledge into classroom structures, routines, curriculum, and practices. Technology affords increased access to literacy experiences through a variety of modalities and voices that expert teachers weave into daily literacy activities. Culturally responsive teaching enlarges teacher capacity for expert-adaptive-reflective knowledge and is an essential component of teacher learning.

Along with learning through inquiry and reflection, most teachers participate in more formal professional learning experiences. Typical professional development, such as one-day seminars, online classes, and even data driven professional learning community (PLC) meetings may drive the instructional cycle but do not necessarily change teachers' conceptions of teaching and learning, particularly in the intersection of literacy and technology. According to Curwood (2014), "The vast majority of professional development related to digital tools and new literacies are short-term, workshop-based, and organized around available technologies" (p. 10). Often, professional development accompanying technology initiatives center around learning the technology itself, neglecting to take into consideration the cultural nuances of individual schools and how certain technologies might be integrated differently in different contexts. Curwood (2014) suggests that there is a need for studies centered on the "relationship among professional development, teacher learning, and technology integration" (p. 10) in situated contexts. In my study I explore what this learning looks like for individual teachers and schools currently implementing technology in elementary grades.

Technology adds a third component to Shulman's theory of PCK as described in the Technology, Pedagogy, and Content Knowledge (TPACK) model (Koehler & Mishra, 2006) that research continues to explore as a model for teacher learning in terms of technology integration (e.g. Curwood, 2014; Jaipal-Jamani & Figg, 2015). Similarly to my study, Schmidt-Crawford, Tai, Wang, and Jin (2016) employed a case study approach including observations and interviews, analyzed using qualitative methods, to examine how teachers' technological pedagogical content knowledge (TPACK) could be

helpful in understanding how teachers integrate technology. They cite a need for research that captures “actual technology integration practices in classrooms” (p. 108), a need also addressed in my dissertation study.

While TPACK facilitates the development of a teacher knowledge base in areas of pedagogy, content, and technological knowledge, the Replacement, Amplification, and Transformation - Framework (RAT) (Hughes, Thomas, & Scharber, 2006) and the Substitution, Augmentation, Modification, and Redefinition Model (SAMR) (Puentedura, 2011) serve to facilitate integration of technology aligned with learning outcomes and meeting needs of specific learners.

The RAT Framework was developed through observations of and interviews with teachers to “identify technology’s enacted use in teachers’ classrooms” (Hughes, 2006, p. 1), paying careful attention to instructional methods, student learning processes, and curriculum goals. Three categories of technology use were identified: (a) replacement, technology use that replaces current instruction and in no way changes instruction or learning outcomes; (b) amplification, technology use that amplifies current instruction; and (c) transformation, technology use that transforms current instruction and learning goals so that the essence of the task is reorganized. The methods used and focus on enactment demonstrated in the development of the RAT Framework are mirrored in the goals of my study, in that I also assume that teachers learn through active practice evidenced in planning, instruction, and assessment.

The SAMR Model (Puentedura, 2010) follows a similar structure, including four rather than three categories of technology integration: (a) substitution, technology use

does not change the function of the task; (b) amplification, use of technology improves efficiency and function without significant changes to the task; (c) modification, in which the task is significantly redesigned; and (d) redefinition, or the “creation of new tasks previously inconceivable.” These categories are not hierarchical; rather, they are intended to assist teachers in determining the relationship between technology integration and desired learning outcomes.

TPACK, RAT, and SAMR offer language and visible, tangible tools (Margolis, 1993) for teachers to use when reflecting on or collaborating around technology integration for literacy instruction, thereby providing avenues for the development of expertise. In my study I explore how they are evidenced in both individual and collaborative teacher learning.

Teacher learning centered on knowledge of learners and content that includes continual expansion of PCK, the capacity for understanding assessments, dispositions fostering cultural competence, and the use of conceptual frameworks and models of technology integration supports the development of more expert teachers. In my research I will examine how knowledge is expanded in both individuals and in community through the embedded case study design, as described in chapter 3 of this dissertation.

Learning that is Collaborative and Situated

My study assumes that teacher learning takes place in situated contexts through active engagement with the task at hand. Lave and Wenger (1991) suggest that learning occurs as people are provided with access to knowledge and tools of teaching through structured teaching experiences. This pragmatic approach connects teacher learning with

practice through authentic teaching experiences; learning happens in and through the act of teaching. Sato et al. (2008) state, "Teachers' classroom teaching practices can be influenced by professional activities that allow them the opportunity to closely examine their own practice" (p. 694); while Kopcha (2012), in his case study exploring the gap between available technology and teachers' integration of technology, found that teacher integration of technology was supported through "professional development focused heavily on addressing gaps in teacher knowledge and engaging teachers in active learning through in-classroom coaching and support, modeling and observations" (p. 1111). These studies align with the ideas of Schön (1983), who posits that professionals learn by thinking in and through action in the situated contexts of daily professional activities. The structure of my study affords a telescopic view into how one teacher connects professional learning to active, situated development of expertise for contemporary literacy instruction.

Sociocultural theory holds learning to be situated in cultural and historical contexts, mediated through social activity, and an active way of engaging with the world. Wertsch (2007) describes mediated activity as linking cultural and historical contexts and the mental processes of individuals, a key concept in Vygotsky's theoretical propositions, and also one that may shed light on sociocognitive factors in teacher learning (Takahashi, 2011). Lave and Wenger (1991) propose that learning is "an integral and inseparable aspect of social practice" (p. 31), a point taken up in studies of teacher learning (e.g. Grossman, Wineburg & Woolworth, 2001) and one I explore in this study. Teaching and teacher learning take place within multiple embedded social contexts, which for the

purposes of this study are bounded by a purposively selected elementary school, a grade level team within that school, and a participating teacher within the grade level team.

School communities operate within norms and values that may or may not support teacher learning toward certain goals. Research has shown that communities who learn together create more sustainable change and support the efficacy of teachers (Bransford, Darling-Hammond, & LePage, 2005; Grossman et al., 2001; Takahashi, 2011). My study explores these and other factors of learning environments for teachers in the context of contemporary literacy, specifically posing questions regarding school context for learning, processes involved in integrating technology, and how teacher conceptions of literacy develop through practice.

Communities of practice theory (Wenger, 1998) provides a conceptual frame for exploring collaborative and situated teacher learning by exploring activities of participation and marginalization, as well as activity at the boundaries of a community. Disruption to everyday practice, such as the introduction of a one-to-one technology initiative, can shed light on habitual practices previously invisible, (Davis & Willson, 2015; Margolis, 1993), initiating processes of participation and reification as teachers decide how to adapt curriculum to new teaching contexts. Little (2002) also suggests looking at visible representations of practice, positing that individual teacher orientation to practice and communal norms of interaction impact meaning making as teachers adapt to changing contexts. Concepts included in Wenger's communities of practice theory provide avenues for understanding how teachers learn in the situated, complex contexts of everyday practice.

Communities of practice theory is a strand of sociocultural theory pertinent to my dissertation study in four ways. First, legitimate peripheral participation provides a framework for describing how learners gain access to resources and knowledge, move between the periphery and the centrality of practice, and participate in knowledge building of the community (Lave & Wenger, 1991). Second, learning holds meaning in relation to the community and is constantly negotiated. Third, learning is transformational, a shift in identity which manifests in how learners relate and are recognized in the community (Wenger, 1998). Fourth, learning is seen as interaction between individuals and the community, both of which are on learning trajectories, and which mutually inform and transform each other (Engeström, 1987/2015). Through these concepts we are able to locate teacher learning as well as conceptualize processes involved in that learning, both key goals of my study. The following illustrative study adds depth to understanding the nature of collaborative and situated teacher learning.

In a study on teacher learning, Little (2001) builds on understandings of professional communities by investigating how teacher learning is made evident during the “ordinary daily work” of collaborative teacher experiences. The premise for the study is that teacher learning should be evident and locatable in everyday collaborative interactions as teachers engage in “close collaborative work with colleagues” (p. 921). Findings from Little’s (2001) study “inform a more general conceptual scheme for investigating the significance of professional community to teacher development and school reform” (p. 934). Resources available for collective learning are dependent on visibility and transparency of practice, such as topics brought to discussion, teaching

artifacts, lesson demonstrations, student work samples, and the like. Inherent in collaborative work is identifying ways in which interactions support or inhibit learning, and how communities respond to disruptions and disagreements arising through the collaborative practice. My study also considers access to resources, transparency of practice, and norms of interaction as critical to understanding collaborative teacher learning, presenting these considerations through a communities of practice framework.

Wenger (1998) suggests that communities of practice theory can be used to characterize a community through constructs of learning, meaning, and identity. These constructs, in addition to the concept of legitimate peripheral participation, are useful in locating teacher learning and in making visible specific processes of teacher learning for more focused analysis, the topic of the next section.

Learning that Employs Conceptual Tools and Processes

Vygotsky (1978) presents a model of learning in which a subject accomplishes goals through the mediated use of tools. Tools exist as the product of culture and are cognitive tools, such as models and diagrams, as well as cognitive processes, such as reflection. Language serves as a means to internalize intrapsychological processes and also to form “a system of knowledge that comprises the content of the consciousness of the collective” (Leontyev, 1977, p. 54). Vygotsky suggests that the use of language organizes the use of tools to produce “fundamentally new forms of behavior” (Vygotsky, 1978, p. 24). Processes of learning are seen in negotiations around use of tools, identity formation, and movement into full participation in the community of practice.

In considering processes communities use to learn together, Wenger (1998) proposes four dimensions of communal learning, including processes of: (a) the duality inherent in participation and reification, (b) movement between the local and the global, (c) identification and negotiability of meaning, and (d) balance between designed and emergent learning. A brief explanation of each dimension follows, with a more detailed explanation included in the results portion of my study.

1. The participation/reification duality creates avenues that ensure artifacts and people are in place to negotiate the meaning literacy holds for both individuals and the community. The community participates by making tangible, or reifying, those elements essential to practice.

2. Movement between the local and the global suggests that although learning communities are locally situated and embedded in practice, communities are part of a larger constellation of learning. Wenger (1998) presents this paradox as, “No community can fully design the learning of another. And at the same time: No community can fully design its own learning” (p. 234).

3. Identification and negotiability refer to the negotiation of meaning in which elements of power, ownership of meaning, and allegiance or non-allegiance to the meaning (in the case of my study, the meaning of literacy) are navigated.

4. Learning is designed, yet “In a world that is not predictable, improvisation and innovation are more than desirable, they are essential” (Wenger, 1998, p. 233). Practice responds to the design of learning, negotiating emergent meaning and forming new learning processes and tools to mediate learning.

In their longitudinal study of teacher transitions into teaching, Grossman, Valencia, Evans, Thompson, Martin, and Place (2000) ask how beginning teachers develop understanding and practice over the course of the first few years of teaching. This study draws from the work of Engeström (1999) and Wertsch (2007) to suggest that teachers learn through the use of conceptual and practical tools. Grossman et al. (2000) define conceptual tools as “principles, frameworks, and ideas about teaching and English/language arts that teachers use as heuristics to guide their instructional decisions” (p. 633). Grossman et al. (2000) found that conceptual tools develop through reflective practice, arguing that, “Reflective practice depends on having a set of ideas with which to reflect” (p. 657). Practical tools have more immediate utility as “classroom practices, strategies, and resources” (p. 634).

In order for reflective practice to support meaningful professional growth, it must have purpose (Loughran, 2002; Maclellan, 2008) and connect learning to practical teaching situations (Risko, Vukelich, & Roskos, 2009). Clara (2014), building on definitions of reflection from Dewey (1933/2012), Schon (1983), and Wertheimer (1945/1971), proposes that, “reflection is the thinking process that gives coherence to an initially incoherent and unclear situation” (p. 5). It is this coherence that indicates teacher learning and provides the setting through which conceptual and practical tools are utilized for teacher learning.

Conceptual tools and processes for the integration of technology build on established theories of learning, such as Vygotsky’s attainment of goals through mediated action, and Shulman’s PCK. The following study illustrates how a conceptual tool,

Universal Design for Learning Infused TPACK (UDL infused TPACK), can serve to further teacher learning.

Benton-Borghi (2016) combined two models previously shown to support teacher learning; universal design for learning (UDL) (Rose & Meyer, 2002) and technological, pedagogical, content knowledge (TPACK) (Mishra & Koehler, 2006) in an effort to help teachers “comprehend the need for technology and to become more confident in their ability to integrate technology” (p. 143). Benton-Borghi (2016) suggests that the ensuing model provides a framework through which to prepare “efficacious teachers to teach all students and to prepare teachers to improve student performance” (p. 144). UDL Infused TPACK layers model into model, inserting TPACK into each dimension of the UDL framework.

Benton-Borghi’s (2016) mixed methods study collected online survey data along with semi-structured interviews to ask if preservice teachers’ sense of efficacy to teach all students was supported as a result of the UDL Infused TPACK Model. Quantitative data analysis presented effect size measures (Cohen’s $d=1.25$ for UDL Infused TPACK; Cohen’s $d= 1.04$ for TPACK alone), while qualitative analysis included transcribed and coded interviews to find themes of increased efficacy and “successful completion of the teacher performance assessment” (p. 158). Results from this study indicate that the UDL Infused TPACK model impacts teacher candidates’ efficacy for integrating technology to teach all students, and calls for further research on ways in which this model can be used in teacher learning. The implications lend themselves directly to my research study

through a call for inquiry into how models can be used to support teacher learning in regards to technology integration.

Through processes of learning, such as legitimate peripheral participation, dimensions of learning proposed by Wenger (1998), reflective practice, and the design and use of conceptual and practical tools, meaning is negotiated and integrated into the community. Thus, conceptions of what it means to be literate and ways in which to integrate technology to better fit emerging definitions of literacy can be located and described through exploring processes and tools of learning.

Conclusion

I conclude this portion of my literature review with a case study illustrating how the dimensions of teacher learning as understood through *How People Learn: Brain, Mind, Experience, and School* (National Research Council, 2001), *Framework for Teacher Learning* (Hammerness et al., 2005), and *Professional Development and Teacher Education for Reading Instruction* (Dillon et al., 2011) guide a school through a literacy initiative. These dimensions of teacher learning are (a) focused on knowledge of learners and content and guided by learning outcomes, (b) grounded in collaborative and situated learning, and (c) connected to ways of knowing practices through the use of conceptual tools and processes, and are evidenced through a reading initiative in a school identified as one of four highly effective schools in the CIERA Study, *Effective Schools and Accomplished Teachers* (Taylor, Pearson, Clark, & Walpole, 2000). Similar to the school in my dissertation research, this study was conducted in a moderately affluent school district experiencing demographic changes, and in a particular school with

dedicated teachers and supportive leadership during the introduction of a literacy initiative. I looked at this study from the role of teacher learning as it played into the success of the Early Intervention in Reading program at Sunnyside Elementary School (Taylor & Critchley, 2002).

Due to reading scores below other schools in the district, Sunnyside Elementary School decided to revamp their reading program. As part of this restructuring, the team participated in professional development, including a study of pedagogies of learning and the development of content knowledge in reading. Interviews conducted at the conclusion of the study indicated that teachers viewed continual, formal professional learning as important to student success, and that professional development was instrumental in improving student reading achievement. Subsequently, new teachers are now required to take training in the Early Intervention in Reading (EIR) Processes and in Guided Reading (Fountas & Pinnell, 1996)—both of which formed the basis of the intervention.

Building a sense of community within the school was a factor from the very beginning of the EIR initiative at Sunnyside. Primary teachers worked together to design and coordinate the initiative and met regularly throughout the process. The principal worked with the team to restructure daily schedules, find resources, and keep the school community focused on the goals of the reading program. The principal reported, “Developing a team approach to reading instruction was a success factor” (Taylor & Critchley, 2002, p. 167), and a teacher reported “cohesiveness across the school” (Taylor & Critchley, 2002, p. 173) was important to EIR success.

Teachers at Sunnyside Elementary learned by connecting knowledge to practice through several conceptual processes. Teachers reported a “strong emphasis on reading/language arts,” “personal commitment to students,” “systematic evaluation of student progress,” and “breadth of materials” as very important attributes present at Sunnyside (Taylor & Critchley, 2002). Although no specific conceptual tools are mentioned, processes using visible and transparent materials such as assessment results, continuous progress monitoring, and collaborative reflection, as well as specific teaching approaches such as coaching readers to use a process or strategy were part of effective group interactions. Space was created in which teachers could reflect on the effectiveness of instruction, recognize successes, and make changes where needed.

Findings from the Sunnyside research project suggest that the study of a school engaging in a literacy initiative holds promise for studying teacher learning in ways aligned with the research questions of my dissertation study. First, school improvement initiatives disrupt typical day-to-day teaching and learning, providing opportunities to locate and study teacher learning as it occurs. The development of expert-adaptive-reflective knowledge can be studied as teachers gain access to knowledge and resources. Access to knowledge and resources, as well as enactment of learning, is facilitated through the use of conceptual tools and processes. Also, the teaching inquiry cycle of planning, instruction, and assessment held in a reflective space is critical to fuller teacher participation in the goals of the initiative.

In summary, teachers learn through developing knowledge of students and knowledge of content. Teachers also learn as part of communities, and the communities

of practice model is instrumental in exploring how these communities learn, develop, and evolve in understandings of literacy and how technology can best be implemented for literacy instruction. Conceptual processes, such as reflective practice and Wenger's dimensions of learning, mediated through the use of tools in transparent practice, support emerging conceptions of literacy.

Contemporary Literacies

Elementary school literacy provides fertile ground for exploring the intersection of technology and literacy. The Common Core State Standards (CCSS) (Council of Chief State School Officers and National Governors' Association, 2010a) define literacy through four strands: reading, writing, speaking and listening, and language. Beach and O'Brien (2015), define literacy practices as involving "the situated processes fostering learning, in monitoring understanding, in making transformations from understanding to articulations of the understanding through language, both spoken and written" (p. 7). Literacy teachers are charged with cultivating these practices in themselves and in their students, using technology afforded by the given place and time.

Emerging conceptions of literacy reflect current culture and are sometimes referred to as "new literacies," or "21st century literacies," putting forward an image of a completely new way of communicating and making meaning. This study considers emerging understandings of literacy to be an extension of traditional literacies, building upon and expanding established definitions of literacy. National projects on literacy, such as the National Reading Panel (NRP) (National Institute of Child Health and Human Development, 2000) and the Common Core Standards for English Language Arts (CCSS-

LA) (2010) greatly influence school literacies and must be the foundation for research into ways in which teacher conceptions of literacy develop and are enacted in practice.

The current intersection of technology and literacy, although grounded in historical understandings of literacy, has a tenor developed in tandem with the development of technology. Researchers in this area of study speak in terms of affordances and ways of being that include changed emphases, broader range, and increased capacities for making meaning and communicating. The National Council for Teachers of English (NCTE) (2013) approved a position statement defining 21st century literacies, stating that:

Active, successful participants in this 21st century global society must be able to:

- Develop proficiency and fluency with the tools of technology;
- Build intentional cross-cultural connections and relationships with others so to pose and solve problems collaboratively and strengthen independent thought;
- Design and share information for global communities to meet a variety of purposes;
- Manage, analyze, and synthesize multiple streams of simultaneous information;
- Create, critique, analyze, and evaluate multimedia texts;
- Attend to the ethical responsibilities required by these complex environments.

This definition encourages an understanding of literacy as emphasizing technology tools and being aware of affordances and non-affordances of specific technologies for the intended purpose (Beach & O'Brien, 2015). It also emphasizes higher-level thinking, as evidenced in Coiro, Sekeres, Castek, and Guzniczak's (2014) work with comprehension. A global range requires an enlarged sense of purpose and audience, as is vividly demonstrated in Hull and Stornaiuolo's (2014) work with cosmopolitan literacies. Studies on multimodality (e.g. Vasudevan, DeJaynes, & Schmier, 2010) help us to understand capacities of multimodality driven by contemporary technology. Dressman (2015) eloquently proposes a theory of multimodality as:

Focused on describing relations among many modalities and different types of signs, each with their own inherent properties suitable for conveying particular types of messages: a theory and practice suitable not only for analyzing how multimodal texts produce meaning but also for learning and for teaching others, in the now and future digital age, how to create texts of increasing power, precision, and interpretability. (p. 25)

I consider contemporary literacies as (a) grounded in established literacy theories and practices, (b) embracing an ethos based on collaboration, shared authority, and relationship, (c) enabled through technology, and (d) informed by multiple perspectives. I firmly believe that traditional frameworks are an important part of guiding us from traditional definitions to new conceptualizations of what it means to be literate, yet these previous frameworks are changing in dynamic ways. For the purposes of my dissertation

study, I consider three dimensions of contemporary literacy that will shape new frameworks for literacy teaching and learning:

1. Social practices (global and local) need to be reinterpreted and situated in relation to literacy.

2. Contemporary literacies are constantly evolving.

3. Contemporary literacies are multiple, multimodal, and complex.

To arrive at this definition of contemporary literacies, I reviewed work by leading thinkers who have established reputations in the field of literacy in general accompanied by a more specific interest in how definitions of literacy are changing. Patterns and commonalities point to a shift in mind set as opposed to simply using enhanced technology to perpetuate cultural norms of modern industrial society. In the literature, what I am referring to as “contemporary literacy” is often referred to as “new literacies” (Coiro, Knobel, Lankshear, & Leu, 2008) or simply “literacy” presented in contexts of emerging technology (Beach & O’Brien, 2015).

Social Practices Need to be Reinterpreted and Situated in Relation to Literacy

A fundamental cultural shift is in progress, one that includes new ways of thinking, being, and operating in the world. This shift moves from individuality to collaboration, hierarchy to shared expertise, and places relationship as a central tenant.

As indicated by Lankshear and Knobel (2007):

Literacy practices that can be seen as being ‘new’ in a significant sense will reflect the extent to which these literacy practices involve different kinds of values, emphases, priorities, perspectives, orientations and sensibilities from those

that typify conventional literacy practices that became established during the era of print and analogue forms of representation. (p. 9)

Describing cultural shifts is essential, as “understanding of what happens in the realm of literary activity requires the study of the accompanying economic, social, and political conditions” (Rosenblatt, 1995, p. 244).

One way of looking at contemporary literacies is to view them from two distinct mindsets. In the *New Literacies Sampler*, Lankshear and Knobel (2007) thoroughly describe these mindsets. The first involves using new technology to serve traditional purposes using enhanced tools and capabilities. It assumes that norms and values remain static and that technology is used to further the cultural norms of modern-industrial society. Some of these beliefs are that the world operates in a hierarchical manner, individuals hold authority and expertise, that scarcity determines value, and holds certain ideas about physical space as compared to cyber space (Lankshear & Knobel, 2007).

The second mindset assumes that the world is significantly altered through the support of technology: “The world is being changed in some quite fundamental ways as a result of people imagining and exploring new ways of doing things and new ways of being that are made possible by new tools and techniques” (Lankshear & Knobel, 2007, p. 10). The advent of new technologies enables a new ethos based on collaboration, interconnectivity (networking), and relationship. Lankshear and Knobel (2007) highlight Schrage’s work by stating, “The emphasis on relationship and its connection to information—indeed, the significance of information in terms of relationship—is further developed by Michael Schrage’s (2001) argument that it makes more sense in the current

conjuncture to talk of a relationship revolution than an information revolution” (p. 12). This second mindset implies newness as new ways of being in the world. It is distinct from the new technology in that new technology can be used to simply do the same thing in more enhanced ways, whereas norms of the new ethos imply new possibilities for being human. In the new ethos, literacy is participatory, collaborative, and distributed.

Literacy is socially situated (Lave & Wenger, 1991; Vygotsky, 1978), and as such can be defined through social structures such as policies and practices. Shifts in these areas are indicators of newness. The International Literacy Association (ILA) (2009) states that “Public policy leaders must be informed about the changes taking place in reading so that thoughtful policies may be developed to prepare children for the literacy demands of their future” (p. 3). Research into online comprehension finds several implications for policy change and considers these “important as nations consider realigning public policies in education with the challenges of global competitiveness and information economies” (Leu, O’Byrne, Zawilinski, McVerry, & Everett-Cacopardo, 2009, p. 266). Policy change is slow in forthcoming, but acknowledgement of its critical role in education for contemporary literacies is increasingly recognized (Dillon et al., 2011).

Contemporary Literacies are Constantly Evolving

The IRA Position Statement on new literacies argues that traditional understandings of literacy and of literacy instruction are “insufficient” to meet the needs of today’s society (International Reading Association, 2009). Technology and literacy interact synergistically to create new forms of communication, as those attempting to

remain current on social media trends can attest. However, outward appearances can be deceiving, and much of what we traditionally understand about literacy holds true in contemporary contexts (Dressman, 2015). Likewise, Coiro et al. (2008) consider changes in literacy to be primarily matters of “speed” and “scale.”

When considering what is changing I draw on position statements from the leading literacy professional organizations, ILA and NCTE. Both emphasize that access to knowledge of the tools of literacy, such as computers, tablets and the like, are essential. This concept is not new, but the tools of literacy are more complex. And equitable access-- not only to the tools themselves but also to opportunities to learn how to use them-- creates barriers to full participation in society. Position statements from literacy professional organizations are joined by the International Society for Technology in Education (ISTE) in a call for attention to the ethical aspects of contemporary literacy. Voices from the field echo the need to reimagine social practices in light of technological advancements (Street, 2013).

ILA, NCTE, and ISTE also agree that contemporary literacy has a broader, more participatory scope. Current and future communication occurs in a global arena, which alters our understandings of audience and purpose for communication and creates multiple, accessible avenues for participation in literacy activity. While researchers acknowledge more participatory and global communication, colleagues are still exploring what elementary education for an expanded scope looks like in day-to-day classroom activities (Alvermann, 2008). My dissertation study addresses this call through observations and interviews with teachers as they wrestle with integrating participatory

literacy activities, designed to invite global participation, in the contexts of their own classrooms.

A third area of change presented by professional organizations is the heightened attention to higher-level thinking. Reading in digital contexts requires critical thinking skills in order to analyze and evaluate multimodal texts, and also to “manage, analyze, and synthesize multiple streams of simultaneous information” (NCTE, 2015).

Contemporary literacies include increased sophistication of skills in judgment and decision-making, and regularly change as their defining technologies change (Leu et al., 2009). The rate at which information must be processed in digital environments adds to the complexity of the meaning of literacy. Coiro et al. (2008) suggest that in order to adapt to this constantly changing context, being literate “will also include knowing how and when to make wise decisions about which technologies and which forms and functions of literacy must support one’s purposes” (p. 5). Teachers, as gateways to literacy for their students, must not only develop capacities for the increased speed and scale of contemporary literacy themselves, but also develop stable instructional practices in their classrooms.

As has been mentioned previously, traditional understandings of literacy continue to form the foundation from which evolving conceptions of literacy emerge (Coiro et al., 2008; Dressman, 2015). However, traditional conceptions of literacy are not sufficient for contemporary contexts (Coiro, 2011). Teachers who have developed expert-adaptive-reflective knowledge (Snow et al., 2005) are able to adapt instruction to new contexts, using their expertise to ground instruction in established literacy practices.

Reification, or bringing forward essential elements of literacy into expanded contexts, is part of the ongoing work of educators as we continue to consider what it means to be literate. Another aspect of this work is to design ways of bridging between traditional and contemporary literacies as understood in elementary classrooms. Many elementary classrooms, including those in my study, are guided by public policy standards for instruction and student learning, as well as instructional materials that adhere to policy documents such as the NRP report and the Common Core State Standards (CCSS). Negotiating meaning around these tangible, visible understandings of literacy and how these standards translate into digital contexts in real classrooms is one way that teachers create bridges between the traditional and the contemporary.

Contemporary Literacies are Multiple, Multimodal, and Complex

In some ways, literacy has always been multimodal (Dressman, 2015). However, multimodality, including text, sound, visuals, and video take on heightened emphasis in contemporary literacies, and is a primary factor when considering changes in literacy to be primarily those of speed and scale. Recent studies on literacy explore the complexities of how literacy learning takes place in digital contexts (e.g. Coiro, 2011; Kim, 2015). Beach and O'Brien (2015) use the term "ubiquitous" when describing ways in which technology is used for literacy purposes to describe how technology has become "so flexible and used in so many ways" (p. 9) that the means through which learning occurs have been fundamentally altered.

Conclusion

Schools and school systems function primarily under a traditional framework, while students increasingly operate in new ways. Teachers are at the fulcrum for integration and implementation, often required to operate in both systems simultaneously. In their position statement, professionals within ILA (2009) charge educators with moving toward contemporary literacies stating that, “Literacy educators have a responsibility to integrate these new literacies into the curriculum to prepare students for successful civic participation in a global environment.” Although there is research exploring the movement between traditional literacies and contemporary literacies (Scharber, 2009) there is very little research on how teachers of literacy are learning to teach new literacies in the contexts of their own schools and classrooms (Curwood, 2014). A primary goal of this study is to describe what teacher learning looks like as technologies are integrated more fully into the everyday lives of elementary classroom teachers.

Conclusion

In a time of rapidly changing technologies and reimagined ideas of literacy, the convergence of technology, literacy, and literacy instruction provides rich ground for research. Research has shown that technological innovations and cultural definitions of literacy influence each other, and this symbiosis has implications for teaching literacy. Although research clearly states that technology, literacy, and teaching are rapidly changing, additional research is warranted to illustrate how teachers learn to provide effective literacy instruction in light of contemporary conceptions of literacy. Literature

on specific processes of teacher learning, as well as conceptions of literacy provide a foundation from which to describe how teachers negotiate the intersection of technology, literacy, and teacher learning. My dissertation continues this discussion by focusing on how teachers learn to integrate technology for teaching literacy in situated contexts. In chapter three, I explain how the embedded case study design of my dissertation explores situated teacher learning, learning processes used by teachers and examines how teacher conceptions of literacy develop as technology is integrated into literacy instruction.

Chapter 3

Methods

Scholarship in literacy and teacher learning employs a variety of research methodologies, including quantitative, qualitative, and mixed methods. Dressman (2007) examines shifts in theoretical and methodological stances featured in premier literacy journals to explore how literacy is being conceptualized in the field, and notes an increase in qualitative methods in the past thirty years. Reutzel and Mohr (2014) report a balance of qualitative and quantitative methods in their golden anniversary trend analysis of articles published in *Reading Research Quarterly* (RRQ), the research journal of the International Literacy Association (ILA). Reutzel and Mohr (2014) also report a jump in the number of articles published in the area of technology and media in the past twenty years, and a continuing trend of studies conducted with teachers as the population studied. As the nature of literacy evolves in tandem with technological advances, we must make bridges connecting what we already know about literacy and the emerging ways in which literacy functions in society at large, and, more specific to this study, in the everyday activities of contemporary classrooms.

The purpose of this study was practical, aiming to describe real teachers in real contexts, and so pragmatic understandings were brought to this study. Pragmatism can be described as “engagement with inquiry that results in useful outcomes rather than in the discovery of knowledge that promotes one’s ideology or epistemology” (Unrau & Alvermann, 2013, p. 80). Methods selected for this study situate teacher learning in the

spaces in which teachers work, and results inform how teachers go about the daily activities of planning, instruction, and assessment.

The specific purpose of my dissertation was to better understand how teachers learn to teach literacy through the use of technology, and how teacher conceptions of literacy develop and are enacted in the classroom. The following questions guide this study:

1. What are ways in which elementary school teachers learn to integrate technology to teach literacy?
2. What learning processes support the integration of technology for literacy instruction?
3. How do teacher conceptions of literacy develop through the integration of technology into literacy instruction as evidenced through elements of teaching practice: planning, instruction, and assessment?

Due to the nature of my research questions, I employed methods of qualitative research and particular theoretical frameworks to help me understand established notions of literacy and teacher learning, while allowing space for the emergence of new ways of thinking about teacher learning in contemporary contexts.

Several calls for research were mentioned in my literature review that directly influenced the nature of these questions. First, I determined that studies were needed on relationships among professional development, teacher learning and technology integration (Curwood, 2014). The literature also indicated a need to understand how teachers learn to integrate technology in situated contexts (Benton-Borghini, 2016;

Schmidt-Crawford, Tai, Wang, Jin, 2016) and how conceptions of literacy impact instruction (Coiro, Knobel, Lankshear, & Leu, 2008; International Literacy Association, 2009; Street, 2013). The above purposes and questions address these research concerns through an exploration of how teachers learn to integrate technology to teach literacy as illustrated through the example of a specific school context.

In the following sections of Chapter 3, I describe ways in which sociocultural theory primarily informed by Lewis, Enciso, and Moje (2012), and as interpreted through Lave and Wenger's (1991) communities of practice, and social cognitive theory (Bandura, 1986) form the underlying structure of my exploration, as well as how these theories support my pragmatic stance to this inquiry. I then describe the case study methodology employed, my role as researcher, and the site and participants. Data collection instruments and methods of collection, including survey, interview, and observations, are described. I then turn to a detailed description of the analysis strategies used to organize and interpret data. I conclude Chapter 3 with a summary table aligning research questions, data collection, and analysis strategies.

Theoretical Framework

This study recognizes literacy and teacher learning as culturally and historically situated, and, as such, both influence and are influenced through cultural context. To investigate questions related to literacy teaching and learning, situated in a school where technology is a predominant focus, it is essential to draw from sociocultural perspectives of teacher learning and current understandings of literacy. The following section briefly reviews how sociocultural and social cognitive perspectives inform the conceptual

understandings for this study. A detailed description of communities of practice (Lave & Wenger, 1991) is included as this theory forms the structure for my interpretation and results section.

Sociocultural Perspectives

Sociocultural theory is foundational to a wide range of discussions on learning and literacy held together by a common view of “human action as mediated by language and other symbol systems within particular cultural contexts” (Lewis et al., 2012, p. 5). In my work, I use this theoretical work to help me think about how inquiry into learning, as a human action, must take into consideration the contexts in which said learning occurs. Additionally, as learning is mediated through language (Vygotsky, 1978), conceptions of language and literacy held by individual learners directly impact learning, and conceptions of literacy are necessarily developed and evidenced within sociocultural contexts. Sociocultural theory influences this study by allowing me to consider teacher learning and teacher conceptions of literacy as intricately bound to contexts of elementary schools, grade level teams, and classrooms, as well as the identities and relationships established in these contexts.

The National Board for Professional Teaching Standards’ catch phrase, “What teachers should know and be able to do,” links knowledge and practice and grounds teacher learning and expertise in the lived experience of teaching (National Board for Professional Teaching Standards, 2002). Exploring teacher learning through a sociocultural lens supports the contextual nature of teacher knowledge and practice, allowing for exploration of the “wisdom of practice” (Shulman, 1987). Sociocultural

theory offers tools for describing varying styles and degrees of increased participation in contemporary literacy teaching practices (Bransford, Brown, & Cocking, 2001; Lave & Wenger, 1991; Lewis, 2012), as well as for understanding connections between knowledge and practice in an ever-expanding cycle of learning (Engeström, 1987).

Sociocultural understandings help us to navigate contexts of space, such as classrooms and schools, and also contexts of time, such as traditional and emerging literacy contexts (Street, 2013). In the words of Gutierrez (2012), "In the domain of literacy, a sociocultural view helps us to conceive of the literacy practices as part of a toolkit that is socially and culturally shaped as individuals participate in a range of practices across familiar, new, and hybrid contexts and tasks" (p. 116). In concert with current research, this study takes the stance that contemporary literacy is an emerging context in need of further study (Bloome & Enciso, 2006; O'Brien & Scharber, 2008; Street, 2013). In his review of literacy perspectives over the past fifty years, Street (2013) suggests that teachers' views of literacy impact the literacy instruction that goes on in classrooms and argues for a focus on preparing students for literacy in diverse, multimodal, and complex settings. A better understanding of teacher conceptions of literacy in emerging literacy settings is a primary focus of the study I undertook.

In addition, The New London Group (1996) presents sociocultural theory as a way of understanding literacy, noting that, "Human knowledge, when it is applicable to practice, is primarily situated in sociocultural settings and heavily contextualized in specific knowledge domains and practices" (p. 84). In my study, I recognize that changing conceptions of literacy are often reflected differently in related contexts. Also,

conceptions of literacy appear at the social, or interpsychological, level before they are internalized (Vygotsky, 1978); conceptions that may be clearly seen at one level of inquiry may be emerging in another, and conceptions of literacy at different levels of context dialogically influence each other (Wegerif, 2013). Thus, sociocultural theory contributes methods to better understand relationships between the individual, group, and institutional layers of contexts.

Grounding my study in sociocultural theory facilitates ways in which I addressed “the elements of human action in context” through a “wide range of mediators in human literacy learning and practice” (Lewis et al., 2012, p. 3). Through analysis of a survey, interviews, and observations of teacher actions and conversations around literacy instruction, I describe the norms and values of literacy that shaped contemporary teacher learning in a specific school culture. Inquiry into ways in which teachers learn to integrate technology and conceive of literacy relevant to contemporary contexts was a primary focus of my study.

Communities of Practice. A communities of practice theory of learning is positioned within the larger body of sociocultural work, in that it holds learning to be situated in cultural and historical contexts, mediated through social activity, and is an active way of engaging with the world. Wertsch (2007) describes mediated activity as linking cultural and historical processes with the mental processes of individuals, a key concept in Vygotsky’s theoretical propositions (Vygotsky, 1978). Lave and Wenger (1991) propose that learning is “an integral and inseparable aspect of social practice” (p. 31), and that “becoming complex, full cultural-historical participants in the world” (p.

32) is the goal of learning. To these ends, Lave and Wenger (1991) describe legitimate peripheral participation, a way of learning derived from apprenticeship models of learning, as a lens through which to understand practices and processes of learning.

Wenger (1998) further develops this theory through considering communities of practice as the unit of analysis in understanding human cognition. Wenger (1998) introduces four premises that distinguish communities of practice theory: (a) communities are comprised of social beings; (b) knowledge is a matter of competence with respect to valued enterprises; (c) knowing is a matter of active engagement with the world; and (d) meaning is what learning is to produce. In alignment with broader conceptions of sociocultural traditions, Wenger (1998) recognizes that learning is a mutually transformative process. Individuals learn and create identities through social practice, which in turn reproduce and transform cultural historical structures.

In the previous chapter, three studies were reviewed to find commonalities related to teacher learning, specifically that teacher learning centers on knowledge of students and knowledge of content, is collaborative and situated, and connects knowledge to practice through conceptual processes. Wenger's (1998) premises reflect the ideas of the National Research Council (2001), Hammerness, Darling-Hammond, and Bransford (2005), and Dillon, O'Brien, Sato, and Kelly (2011). Wenger (1998) recognizes that communities define competence in relation to the "enterprise" valued by said community. In the case of teachers the knowledge base characterizing expert teaching, deep understanding of the interplay between pedagogical and content knowledge (Shulman & Shulman, 2004), is an indicator of competence. Lave and Wenger (1991) emphasize the

communal and situated nature of learning in their book, *Situated Learning: Legitimate Peripheral Participation*, a theme carried directly into Lave's later work on communities of practice (1998). Lastly, Wenger (1998) understands learning to involve "active engagement with the world," and that knowledge and practice dialogically interact to inform new ways of knowing and being.

A community of practice refers to a community bound through practice, in which practice serves to bring coherence to the community through mutual engagement, a joint enterprise, and a shared repertoire (Wenger, 1998). In common parlance, the term community is used broadly to describe a group of people living in the same area, or readers of a professional journal, while practice is a general term implying activity and learning. In a community of practice the terms mutually define each other and must be considered as a unit. A community of practice exists through mutual engagement in actions whose meanings are constantly negotiated. Participants are connected in diverse, complex, and sometimes contentious ways, where relationships are negotiated and renegotiated through engagement in practice. Communities of practice form around a joint enterprise developed in response to larger cultural and historical contexts. Participants negotiate practice in response to these larger contexts, where accountability to the enterprise becomes an integral aspect of practice. A shared repertoire provides resources for negotiating meaning through historical reference points and ambiguity as "a condition of negotiability and thus a condition for the very possibility of meaning" (Wenger, 1998, p. 83). A shared history simultaneously holds meaning and opens spaces for negotiated meaning through mutual engagement in a joint enterprise.

Communities of practice can be identified as a strand of sociocultural theories of learning in four ways that are pertinent to this work. First, legitimate peripheral participation provides a framework for describing how learners gain access to resources and knowledge, move between the periphery and the centrality of practice, and participate in knowledge building of the community. Second, learning holds meaning in relation to the community and is constantly negotiated. Third, learning is transformational, promoting a shift in identity which manifests in how learners relate and are recognized in the community. Fourth, learning is seen as interaction between individuals and the community, both of which are on learning trajectories, and mutually inform and transform each other. Through these concepts we are able to locate teacher learning as well as conceptualize processes involved in that learning. I describe each of the four concepts more thoroughly in the following paragraphs.

Legitimate peripheral participation. Legitimate peripheral participation is a concept derived from studies of apprenticeship. In this model, newcomers learn through practicing alongside others engaged in practice. Learning is legitimized through increasing access to resources and knowledge and through active participation in the activity. Participation is seen as relational, and involving “persons, actions, and world” (Lave & Wenger, 1991, p. 50). In communities of practice, “newcomers” also refers to those learning a new skill, even if they are considered old timers in the community. As individuals move from legitimate peripheral participation to full participation, the emphasis shifts from a focus on learning to a focus on practice, with learning embedded

as an aspect of practice. This shift is a key indicator that internalization of social practice is taking place.

Communities of practice have boundaries and an inner circle, although not necessarily a center point, and movement in, out, and at the boundaries of the community gives rise to motives and engaged learning (Lave & Wenger, 1991). Participation and marginalization are terms used to describe this movement, with participation referring to movement towards the inner circle and marginalization referring to movement directed out of the community. Marginalization in this sense refers to movement towards the boundaries of the community, and both participation and marginalization hold potential for learning motives for both the individual and the community. Work at the boundaries of a community of practice is valuable, often providing impetus for transformative practice.

Boundaries form around communities of practice, sometimes visible, sometimes hidden; yet boundaries also function as places of connection with the larger world. Boundary objects connect a community of practice with other communities and also with the larger context, however, meaning ascribed to the boundary object belongs to each constituent. For example, an iPad may be a boundary object, yet it holds significantly different meanings for retail stores, school district offices, and schools. In this scenario, the technology coordinator serves as a “broker” (Wenger, 1998, p. 108) to translate, coordinate and align individual and group perspectives.

Negotiated meaning. Wenger (1998) describes practice as “first and foremost, a process by which we can experience the world and our engagement with it as

meaningful” (p. 51). Meaning is created through dynamic interchange as we engage with the world. Meaningful learning refers to learning in relation to social practice, and is constantly negotiated through processes of participation and reification. Participation implies engagement of our whole beings in social activity, transforms experience and communities, and is constitutive of identity. Reification refers to the process of giving form to ideas, experience, and practices, creating a fixed form that is “given the status of an object” (p. 59). This term is used in a neutral, rather than value laden way to name a process by which humans negotiate meaning. However, it is important to realize that reified forms take on interpretations beyond their origin, and carry cultural and historical meanings across space and time. Participation and reification operate as a duality, interacting in different forms and degrees to negotiate meaning, and providing a means through which to understand motives, engagement, and formation of identity through social practice.

Identity. Communities of practice theory views learning as the construction of identities and constantly evolving forms of membership. In this process, learning is transformative, reforming concepts of self in relation to the community. Collective practice is often contradictory, and learning is part of living with and dealing with these contradictions. Motives for learning are often derived from these contradictions, such as might be the case of unclear divisions of labor in a school community. For example, a teacher may take on the responsibility for locating apps for certain teaching objectives and then share these apps with other teachers. Through this finding and sharing the individual teacher has a changed identity recognized by other teachers, who may then

view the teacher as more expert. The teacher then internalizes or rejects this new role, resulting in a shift in identity.

Identity is a process of negotiating experience through participation and reification, and is shaped through social interpretations of lived experience. Community is defined as mutual engagement in a joint enterprise with a shared repertoire (Wenger, 1998, p. 73), and identity creation occurs in relation to our sense of competence, understanding, and access to resources in the community. Identity is in constant flux, and defined “with respect to the interaction of multiple convergent and divergent trajectories” (p. 154). Trajectories serve identity formation temporally and also as a filter for that which is central and that which is marginal to the learning at hand. Determining learning that is central to meaning also supports our ability to reconcile conflicts arising through membership in multiple communities. Negotiating identity is a constant process consisting of active, engaged local moments interacting in multiple and global contexts.

Locality. Relations between individuals and the collective are central to communities of practice learning theory. Engeström (1987/2015) defines the zone of proximal development as “distance between the everyday actions of individuals and the historically new form of the societal activity that can be collectively generated” (p. 174). Engeström’s definition differs from more widely accepted interpretations of use of the zone of proximal development as “the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or with more capable peers” (Vygotsky, 1978, p. 86, as cited in Bransford, Derry, Berliner, & Hammerness, 2005).

Engeström's interpretation is valuable in that it embeds the role of community in the zone of proximal development, and is centered on professional practice, situating learning in a space negotiated through everyday practices, positioned between individuals and the collective. Communities of practice theory would consider this interactive space where meaning is negotiated, identity is created, and both individuals and communities are transformed, as a space where learning is located and processes of learning can be explored.

Social Cognitive Perspectives

Understanding how literacy teachers learn through interaction with technology, and how teacher conceptions of literacy develop and are enacted in the classroom is dependent on understanding cognitive processes, and this is a central idea for my research study. Vygotsky (1978) argues that humans derive meaning through the interaction of experience and ideas and in social interaction with others. In his development of social cognitive theory, Bandura (1986) considers human functioning as interaction between personal, behavioral, and environmental factors and that self-reflection is an essential process through which this happens. Social cognitive theories of learning contribute to my study through exploration of learning processes grounded in practice and embedded in social structures.

Elements of teacher learning described in the previous chapter (Dillon et al., 2011; Hammerness et al., 2005; NRC, 2001) preface social cognitive learning processes through basic assumptions that learning is (a) goal directed, (b) situated, and (c) connects knowledge and practice through conceptual tools and processes. As teachers negotiate

meaning regarding literacy and the impact of integrating technology into the classroom, commonly held instructional goals serve to define the “joint enterprise” of the community, determining the trajectories of teacher learning. Social cognitive theory provides structure through which to explore the conceptual tools and processes connecting knowledge to practice, an essential element of professional growth.

When describing learning, Bandura (1986) suggests a reciprocal relationship, where knowledge and action mutually inform each other. Projected outcomes impact current behavior, and humans self-regulate actions to move into new understandings and ways of being. Social cognitive theory suggests that conceptions underlying symbols, particularly language, impact human potentialities that are taught, modeled, and fostered in society, privileging certain knowledge bases and ways of being in community. This underlying conception has direct influence on what is taught and what is learned. As a community moves into new conceptions of literacy, social cognitive theory has potential for revealing ways of navigating new territories of literacy.

Bandura (1986) suggests that human functioning can be explained through the interplay of basic capabilities evidenced in the reciprocal interactions among behavior, cognition, and environment. Primary among these capabilities is the capacity of symbolization, which affords processes of transformation, communication, and advanced cognition. Grounded in the symbolizing capacity are capabilities of forethought, vicarious learning, self-regulation, and self-reflection. Social cognitive processes are well documented in the literature, holding foundational assumptions regarding the social nature of human thought and that thought contributes to human motivation, affect, and

motivation (Alderman, 2008; Bandura, 1986). In the following section I briefly describe cognitive processes grounded in social cognitive theory, including self-efficacy, goal setting, self-regulation, reflection, and modeling.

Self-efficacy. Social cognitive theories of motivation, including self-efficacy (Bandura, 1986), support understandings of teacher learning in complex and multidimensional environments. Influences of self-efficacy, or teachers' belief that they can have an impact on students (Colton & Sparks-Langer, 1993), and collective efficacy, or "the beliefs of teachers within a school that the faculty as a whole can enact the necessary steps to produce positive student outcomes," (Tschannen-Moran & Chen, 2011, p. 249) serve as conduits for learning about literacy in situations where many demands are placed on teachers and schools.

Goal setting. Goal setting (Alderman, 2008) may also provide avenues for navigating the complex and multiple tasks of teaching, and support metacognitive and self-regulatory abilities (Hammerness, Darling-Hammond, & Bransford, 2005). Bandura (1986) posits that behavior directed toward goals influences the acquisition of new knowledge.

Self-regulation. Social cognitive theory considers self-regulatory learning cycles as valuable tools in explaining, "how one adapts to changing conditions as a result of personal feedback," (Zimmerman & Cleary, 2009, p. 247). Feedback loops, including processes of self-observation, judgment, and self-reactions (Bandura, 1986) form recursive cycles of learning that may serve as mediating tools as teachers learn to integrate technology.

Reflection. Reflection plays a significant role in learning cycles through evaluation of outcomes against established criteria, or through attributional analysis (Alderman, 2008). Self-reflective thinking is a prerequisite to greater understanding and also fosters shifts in thought and behavior (Bandura, 1986). Through interpreting interviews and observations, my data analysis process is designed to reveal the role that reflective learning cycles play in technology integration.

Modeling. Vygotsky describes the zone of proximal development (ZPD) as the distance between “independent problem solving” and the level of potential development “in collaboration with more capable peers,” (Vygotsky, 1978, p. 86). Inside the ZPD are processes such as modeling and scaffolding that are useful in describing collaborative interactions between teachers or with a school technology coordinator. With technology in particular, when the context for implementation determines methods, resources, and support available, modeling in the context in which the technology is to be used may be a key determinant in effective teacher learning.

Pragmatism

John Dewey, Father of Pragmatism, calls us to listen to each other as society changes, finding unity through common societal goals and balance in educational aims (Dewey, 2012). It is in times of change that we most need to communicate and act through inquiry (Dewey, 1938). I approach this study as a pragmatist, intentionally selecting research methods congruent with the purpose of understanding how teachers learn to integrate technology, and how their conceptions of literacy manifest through collaboration and in practice. The study of contemporary literacies calls for a pragmatic

stance to research, in that in order to study evolving concepts researchers must be able to select tools appropriate to audience and purpose of the activity (Coiro et al., 2008).

Dillon, O'Brien, and Heilman (2013) suggest that, "Pragmatism explicitly critiques the dangers of decontextualized knowledge and of actions and ideological positions that stem from it," (p. 1120). Rather, they call for a "commitment to revision, reflection, and inquiry" leading to a "truth that is both useful and justifiable," (p. 1120). In my study I used methods tailored to the complexities of teaching through contemporary literacies with the purpose of clarifying problems, and also pointing toward possibilities for sustainable teacher learning processes.

Teacher learning is crucial to reimagining how literacy is interpreted in school settings, and researchers serve as intermediaries as schools and society dialogically interact to prepare literate citizens for democracy. Sociocultural perspectives allow foregrounding of schools and teachers interacting with tools in contexts of contemporary literacy, while social cognitive perspectives foreground processes of teacher learning. In my study I provide an interpretive picture of authentic teacher learning to bring perspective to the ongoing discussion of emerging practices of literacy instruction. The frameworks of sociocultural and social cognitive understandings situate teacher learning in context while providing structures to explore specific learning processes and developing conceptions of literacy.

Studies using sociocultural and social cognitive theoretical frameworks are supported through the use of qualitative methods (e.g. Grossman, Wineburg, & Woolworth, 2001, Lee, 2013). Through the use of qualitative methodology I was able to

better understand the processes teachers use to learn to teach literacy, and how teacher conceptions of literacy develop and are enacted in the classroom. Merriam (2009) describes the purposes of qualitative research as, “to achieve an *understanding* of how people make sense out of their lives, delineate the process (rather than the outcome or product) of meaning-making, and describe how people interpret what they experience” (p. 14; emphasis in original). Qualitative methodologies provided structure through which to inquire about how teachers learn to integrate technology for literacy instruction, processes through which this learning happens, and ways in which teacher conceptions of literacy develop. I turn now to a description of the research methods used in this research.

Case Study

An embedded single-case study design (Yin, 2014) was used for my study because it allowed me to explore teacher learning within the school context. This type of design is constructed from units of analysis at several levels, allowing for the investigation of “a contemporary phenomenon in its real-world context, especially when the boundaries between phenomenon and context may not be clearly evident,” (p. 2). The critical case in my study (Yin, 2014) sheds light on teacher learning in a school with a recent technology initiative; specifically, introducing Chromebooks to upper elementary school students in a 1:1 initiative. The embedded single-case study has been used effectively in studies of educational innovation (e.g. Gross, Bernstein, & Giacquinta, 1971), offering an increasingly detailed lens from which to explore the phenomenon. In my study, the case is comprised of the school as context, with an intermediate unit of a

grade level team, and the individual unit of analysis being a classroom teacher. Specifics of this case are described in the participant section.

Case study design holds the capacity for facilitating understanding of complex contexts, taking into account multiple variables and data sources (Merriam, 2009; Patton, 2002) and has potential for rich descriptions at the school, grade level team, and individual teacher level. Because case studies allow for multiple and flexible sources of data, they are ideal for making sense of complex contexts. Case studies have supported research in areas of teacher learning (e.g. Little, 2002), the introduction of new technology in schools (e.g. Kopcha, 2012), and “have a rich history in literacy research” (Baronne, 2011, p. 9). In order to authentically represent ways in which teachers learn to integrate technology in literacy instruction, I employed case study methods to describe real people in real situations.

Case boundaries are defined below and served to focus data collection and facilitate analysis among case levels. Each case in my study was purposively selected (Yin, 2014) to allow me to focus on teacher learning in the area of technology integration in literacy instruction. An emic, or insider’s perspective (Patton, 2002) was taken in order to describe and analyze data from the perspective of participants’ lived experiences as they more fully integrated technology into literacy instruction.

Researcher’s Role

I entered into this study in the role of “observer as participant” (Merriam, 2009). In this role, the balance between observer and participant leans more toward that of the observer, or as Merriam states, “The researcher’s observer activities are known to the

group; participation in the group is definitely secondary to the role of information gatherer” (p. 124). In this role I was able to observe school, grade level, and classroom interactions, as well as develop relationships with participants that allowed for deeper understanding of cognitive processes involved and conceptions of literacy brought to integrating technology. I brought my own experiences as a classroom teacher to this study, shaping my understandings of teacher actions and collaboration, and so examined my own positions and perceptions through a reflexive journal (Corbin & Strauss, 2008).

Participants and site

The study took place at North Lake Elementary School (pseudonyms used throughout), located in a suburban school district of a large Midwestern city. The district houses a total of twelve schools serving over 8,500 students with an average student to teacher ratio of 17:1. The district is over 80% percent white, with 9% of students qualifying for free and reduced lunch. Over 90% of seniors graduating from this district take the ACT, with an average ACT composite score of 26 (District website, February, 2016).

North Lake is one of six elementary schools in the district, which also houses two middle schools and a high school. The district as a whole promotes a vision for technology that aligns with the purpose of my study, in that it promotes the use of technology as a means of empowering teachers to teach in a digital society. North Lake was selected as an information rich case (Patton, 2002) for my study due to a recent technology initiative, an established school culture focused on literacy, continual and targeted professional development, and leadership for new initiatives. North Lake serves

just under 600 students in grades kindergarten through five, with a licensed teacher ratio of 14:1. Student proficiency ratings are consistently above both state and district levels.

Participants in the context level included classroom teachers in grades kindergarten through five, the media specialist, technology coordinator, a special education teacher, and the principal. Two teachers in the kindergarten through grade two category were not available to take the survey due to extended absences. One teacher in the third through fifth grade category was similarly unavailable, and one declined participation in the study. Out of a possible twenty-eight participants, twenty-four (86%) responded to the survey. Table 3.1 summarizes participant data categories of teaching position and average total number of years teaching. The table also reports which teachers responded to a survey I gave as part of the study (described in a forthcoming section).

K-2 classroom teacher	3-5 classroom teacher	Specialist/other
10 of a possible 12 responding to survey	10 of a possible 12 responding to survey	4 responding to survey
Average # of years teaching: 14.5	Average # of years teaching: 15.8	Average # of years teaching: 4.8

Table 3.1: Participant data

In order to allow a more detailed analysis of teacher learning, I define the intermediate unit of analysis (Yin, 2014) as a grade level team purposively selected to represent a team of classroom teachers directly involved with the technology initiative.

In this case the team of fourth grade teachers who were in their first year of the district wide 1:1 initiative were selected for the study. Support personnel, particularly the technology coordinator, play a role in teacher learning relating to technology integration, but it is the team of classroom teachers who form this unit of analysis.

For my case study, I considered the individual unit of analysis of this case study to be the individual teacher, specifically, a member of the grade level team demonstrating a growth mindset (Dweck, 2006) toward technology integration, practicing effective literacy instruction, and expressing interest in the study. In this study, Cynthia (see teacher introductions below) was the teacher participant selected for the individual level of analysis. Next I provide a brief introduction to these key individuals who participated in the study before I share more about the data I collected from, and about them.

Grade level team teacher introductions

Nikki: Nikki has been a classroom teacher for 10 years. She considers herself to be a leader in technology integration and positions herself in ways that further her own knowledge and the knowledge of her peers.

Tammy: Tammy has previously taught third grade at North Lake, and is joining the fourth grade team for the first time this year. She takes a more tentative stance toward technology integration and actively seeks support from both inside and outside the school.

Laurie: Laurie has taught in elementary classrooms in several local school districts. She has been a classroom teacher for 23 years. She takes a conservative stance

toward technology integration, keeping the needs of her students and her instructional goals as primary considerations in designing literacy lessons.

Cynthia: Cynthia is the most experienced teacher on this team, and has been a classroom teacher for 25 years. She takes a leadership role in technology integration and grounds instruction in nuanced understandings of literacy.

Data collection

My initial area of focus was to understand the school context in which teacher learning occurs. I collected data for context level analysis from three sources, a survey (Appendix A), interviews (Appendix B), and observations of monthly staff meetings. The primary data source at the context level consists of a survey constructed of both multiple choice and open-ended response questions that was administered to each grade level team or specialist area individually. I collected secondary data sources in the form of guided interviews with key individuals, including the technology coordinator, media specialist, and principal, and observations of monthly staff meetings. Triangulation of these data formed a “pattern of evidence” (Yin, 2014, p. 193), offering insight into the larger picture of school context in regards to how teachers were learning to integrate technology in literacy instruction.

Data sources at the intermediate level (Yin, 2014) included observations of weekly team meetings and guided interviews (Weiss, 1994) with grade level team members. Observations of team meetings occurred regularly one morning per week, allowing me the opportunity to see how the team made meaning of literacy and the

technologies involved. Guided interviews with each member of the grade level team provided a more fine grained look at teacher learning and conceptions of literacy.

As this study considers teacher learning to be directly connected to the act of teaching, “the wisdom of practice itself,” (Shulman, 1987), data collected directly from the classroom teacher formed the heart of this study, and includes classroom observations accompanied by conversational interviews with the teacher. Classroom observations occurred daily over the course of a three-week period directly following the winter holiday during a unit on reading comprehension. This unit was determined by the curriculum plan developed by the classroom teacher. During these observations I looked for teacher actions, language, and organization of materials specific to technology and literacy, including evidence of specific teacher learning processes enacted in the classroom. Daily communication with the teacher through email and in person supported continuity of data collection. Table 3.2 summarizes the boundaries of this embedded case study.

Case level	Boundaries	Data
Context level: Elementary school	School: <ul style="list-style-type: none"> • Recent technology initiative • Culture of literacy • Continual and relevant professional development 	<ul style="list-style-type: none"> • Survey • Interviews with media and tech specialists and principal • Observations of two staff meetings

	<ul style="list-style-type: none"> • Supportive leadership <p>Participants:</p> <ul style="list-style-type: none"> • Principal (1) • Specialists (4) • Classroom teachers (24) 	
Intermediary level: Grade level team	<p>Team:</p> <ul style="list-style-type: none"> • Direct involvement with recent technology initiative <p>Participants:</p> <ul style="list-style-type: none"> • Grade 4 classroom teachers (4) 	<ul style="list-style-type: none"> • Observations of five team meetings • Interviews with four teachers
Individual level: Classroom teacher	<p>Teacher:</p> <ul style="list-style-type: none"> • Member of grade level team • Growth mindset for technology integration • Secure in literacy 	<ul style="list-style-type: none"> • Eleven classroom observations • Conversational Interviews

	<p>instruction</p> <ul style="list-style-type: none"> • Expresses interest in the study 	
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Table 3.2: Case boundaries

This case was bounded geographically, temporally, and socially (Yin, 2014), because I considered only those behaviors and interactions occurring in the context of the school environment. For example, if teachers participated in professional development outside that provided by the school, such as conferences or online courses, I included this learning only as it was evidenced in the school setting. In this manner, the study prioritizes teacher learning that authentically impacts instruction. The next section describes instruments utilized for data collection, how they were designed and implemented during the study.

Data collection instruments

Survey. The survey conducted as part of context level data includes a mix of both multiple choice and open-ended questions (Cohen, Manion, & Morrison, 2011). Surveys are able to provide general characteristics of the population under consideration and aid in understanding the overall context of the study (Cohen et al., 2011). Survey questions were designed to generate descriptive data about participants’ current conceptions of literacy, beliefs regarding technology integration for teaching literacy, and ways in which teachers learn how to integrate technology. Data was triangulated with interviews and observations to increase credibility of results (Patton, 2002).

The survey was administered based on recommendations by the principal, who felt that teachers' responses would be more reliable if the survey was conducted on paper and in person. To that effect, I introduced the study to the entire staff during a November staff meeting through a brief presentation followed by a question and answer session. The introduction was accompanied by a handout describing the study (Appendix C) and concluded by requesting times to conduct the survey during regular grade level meetings. Arrangements were made through email and in person, and surveys were conducted with each grade level team during the month of November.

One concern in conducting the survey was to avoid preconditioned responses as to definitions of literacy and ways in which technology is integrated. In order to avoid this potentiality, the survey was conducted in two parts. The first part collected information on teaching position and number of years teaching as well as two open-ended response questions. These questions asked for definitions of literacy and ways in which teachers learn to integrate technology. Teachers completed the first part of the survey and then were handed the second part, which used wording more specific to technology and literacy. The two parts were collated through a numeric coding system. A copy of the survey is included in the appendices (Appendix A).

Interview. Interviews allow a researcher to explore “how a system works or fails to work” and how it “moves toward goals or is paralyzed by internal friction” (Weiss, 1994, p. 10). Interviews assist us in understanding the phenomena under study from the viewpoint of participants, and have the ability to provide rich description (Patton, 2002). Interview guides for my study were designed to delve more deeply into conceptions of

literacy and ways in which teachers learn. Sensitizing concepts were generated from the interviews that were then used to support team meeting and classroom observations and analysis.

Interviews were conducted with focus participants, the media specialist, technology coordinator, principal, and the four grade level team members. Lines of inquiry (Weiss, 1994) were derived for each level of the case: (a) Context level participant interviews contributing to understandings of how the school community interacted as a whole and with the district; (b) intermediary interviews providing windows into the thinking of individual teachers; and (c) conversational interviews at the individual level contributing understanding of specific instances of teacher learning. Interview guides are included in the appendices (Appendix C).

Interviews were recorded, and also accompanied by hand-written notes taken during the interviews. Recordings were transcribed and checked against the hand written notes. I then uploaded interview transcripts into NVivo (QSR International) qualitative data analysis software for coding during my analysis process. After my data analysis, I returned to participants to check my findings and to ask follow up questions.

Observations. Patton (2002) describes strengths of observations as allowing the researcher to “understand and capture the context within which people interact,” provides “firsthand experience with a setting and the people in the setting,” and allows the researcher “the opportunity to see things that may routinely escape awareness among the people in the setting” (p. 262). For these reasons, observations were essential to gaining insight into my research questions. Observations identify specific incidents that serve as

reference points for subsequent interviews (Merriam, 2009) and illustrate study findings. Concepts of literacy, literacy instruction, and technology integration drove my initial observations, with subsequent observations shifting in response to my growing sensitivity toward teacher learning and conceptions of literacy as determined through the survey, interviews, and continuing observations.

I observed two monthly staff meetings during the course of my study. These observations provided insight into the larger school context, including norms of interaction, ways in which learning is legitimized, and relations between individuals and the collective. Grade level meeting observations were more frequent. School teams met regularly on Tuesday mornings and I observed five meetings. Observations at this level allowed a deeper look into communities of practice concepts such as legitimate peripheral participation, negotiated meaning, identity, and locality. Grade level interactions also allowed access to shared repertoires that included teachers' thinking around the integration of technology for literacy instruction.

However, it was at the individual teacher level of observations and accompanying conversational interviews that I was most able to collect data toward understanding the cognitive processes or teachers' thinking and understandings that influenced teacher learning and developing conceptions of literacy.

Observational notes were typed rather than visually recorded when I observed the focal teacher of my study, as I was sensitive to intruding into the classroom activities (Patton, 2002). Also, students were not included as participants in this study and by taking typed notes I was able to avoid accidentally including student data. Typed

observational notes were reviewed and uploaded into NVivo software. During my analysis of data, I moved between interviews and observations using the annotations tool in NVivo to help me locate similarities and connections between emerging patterns. I turn now to describing my specific analysis procedures used to organize and make sense of these data.

Analysis

Data were collected and analyzed in stages, beginning with the survey. The survey included both multiple-choice and open-ended response questions, which were analyzed in the following manner. Multiple-choice questions were collated by question to shed light on school level culture regarding teacher learning, technology integration, and the nature of literacy instruction. For example, all responses to question #9, which asked about professional activities teachers participated in during the past year, were organized into a single page in NVivo. I was able to count responses under each category to arrive at a general statement regarding professional development activities of teachers at North Lake Elementary.

Open-ended response survey questions served to “shed some empirical light” (Yin, 2014, p. 40) on the general “attitudes, perceptions, and opinions” (Cohen et al., 2011, p. 390) of school culture in similar areas. Open-ended responses to each survey question were placed into “nodes” by research question within the NVivo program. This allowed me to view responses associated with each question on a single page. I continued to analyze responses using the annotations function in NVivo to generate

identifiable patterns. An example of the codes derived from this process includes a response to survey question # 11 as shown in Table 3.3.

Survey Question #11	Participant response	Codes
How else might you describe teacher learning in the area of technology integration for literacy instruction?	So much available – too much for us to sort/apply at an individual level – and it is ever changing. Tough to keep up and use effectively – but we keep trying. (smiley face)	Overwhelmed Rate of change Efficacy

Table 3.3: Excerpt from coding of open-ended survey responses

Interviews were coded similarly to the open-ended response survey questions however, each interview was initially coded as a whole piece. Nodes were created by placing a “teacher interviews” node under each research question. I proceeded to annotate each interview by selecting portions of text to create nodes corresponding to research questions, which then created a single page of interview responses for each research question organized by respondent. The NVivo annotations tool was then used to derive codes from multiple data sources. An example of this coding scheme is illustrated in Table 3.4.

Grade 4 teacher response to interview	Codes
<p>And, you know, the mindset to shift between the systematic issues that we have with the technology and we jump forward. So we have the devices – just use them. And if you are familiar with the SAMR model or the RAT model, which I like. The neighboring district has adopted the RAT model and I am blanking on exactly what they are. And the kids get them and it is pure S – clearly let’s just supplement. Let’s change this to - not really use it as a tool. I am super techy, and it takes me – every year I add something new.</p>	<p>Processes Conceptual models Identity</p>

Table 3.4: Excerpt from coding of interviews

To arrive at context level themes, I first analyzed open-ended survey questions 3 and 4, which required participants to characterize their meaning of literacy in the 21st century, and ways in which teachers learn to integrate technology for literacy instruction, respectively. These were the key areas of interest for my study, and my data analysis focused on examining participant responses to these queries. I coded each survey question separately, initially through open-coding in order to delineate concepts (Corbin & Strauss, 2008). I then collapsed codes into categories that allowed sufficient data to develop each theme, while accounting for variation (Corbin & Strauss, 2008). I added these codes to my codebook, including a definition for each code. This process facilitated further exploration of themes in my ongoing data collection and analysis. In the following section I explain how codes were derived from each open-ended survey

question in turn. This section is followed by an explanation of how I triangulated this data with context level interviews and observations to arrive at overall findings regarding literacy, and how teachers learned about technology integration for literacy instruction at North Lake Elementary.

Codes pertaining to survey question 3 included: the purpose of literacy, components of literacy, higher order thinking, elements of contemporary literacy, and traditional literacy. Table 3.5 illustrates how the original codes derived through open-coding were collapsed into categories, and then defined.

Responses (24 participants) to survey question 3: What do you think it means to be literate in the 21st century? Respond in a couple of sentences.		
Annotations	Collapsed code (abbreviation)	Definition of code
Communicate Communication Work readiness Collaborate	Purpose of literacy (purpose)	What participants understand to be the purposes of literacy.
Read Skills Literacy essentials Write Speak	Components of Literacy (Components)	Those components of being literate that are directly taught and measured. This code includes both general components, such as

<p>Audience and purpose</p> <p>Listen</p> <p>Oral and written</p>		<p>reading, writing, speaking, and listening, as well as more specific components such as word structure, fluency, comprehension, etc.</p>
<p>Higher order thinking</p>	<p>Higher order thinking (HOT)</p>	<p>The more complex thinking skills categorized by Bloom as: analyze, evaluate, and create.</p>
<p>Tech</p> <p>Digital contexts</p> <p>Multimodal</p> <p>Associate 21st century with technology</p> <p>Global outlook</p> <p>Collaboration</p>	<p>Elements of contemporary literacy (Con.lit)</p>	<p>Understandings of literacy that include: names of specific technologies associated with the 21st century, literacy in digital contexts, multimodality, global contexts, and collaboration.</p>
<p>Traditionally focused</p> <p>Push back</p>	<p>Traditional literacy (Trad.lit)</p>	<p>Indications of traditional perspectives toward literacy instruction, including push back against the influx of</p>

		technology.
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Table 3:5. Excerpt from code book (survey question 3)

Codes pertaining to survey question 4 included: formal professional learning, informal professional learning, learning through practice, conceptual tools, models, and frameworks, and tech tools. Table 3.6 illustrates how the original codes derived through open coding were collapsed into categories, and then defined.

Responses (24 participants) to survey question 4: Describe ways in which you learn how to integrate technology for literacy instruction.		
Annotations	Collapsed code (abbreviation)	Definition of code
TIES District Learning Institute Tech cohort	Formal professional learning (formal pl)	Forms of professional learning that are organized by an outside source, including: the district, universities, institutes, and professional organizations.
Initiative Each other Teach others Accountability	Informal professional learning (informal pl)	Forms of professional learning that are not organized through an outside source. These

<p>Social media</p> <p>Peers</p> <p>Trial and error</p> <p>Curiosity</p> <p>Self-study</p>		<p>forms of learning include learning from each other, trial and error, and self-study. Included in this theme are those dispositions mentioned in relation to learning (curiosity, initiative, sense of accountability, and reflection).</p>
<p>Tech in practice</p> <p>Learn through students</p> <p>Learn by teaching</p> <p>In practice</p> <p>How tech is used</p> <p>Teacher behaviors</p> <p>Assessment</p>	<p>Learning through practice (practice)</p>	<p>Professional learning that takes place in and through the act of teaching. This category includes professional learning that is both recognized by participants and unrecognized by participants.</p>
<p>RAT</p> <p>SAMR</p>	<p>Conceptual tools, models, and frameworks (con.tools)</p>	<p>Professional learning that is mediated through the use of conceptual tools, models,</p>

		theories and frameworks, in both conceptual and practical ways (Hammerness et al. (2005).
Type of tech iPad Chromebook Apps Twitter	Tech tools (tech tools)	Participant mentions of specific tools of technology, such as Smartboards, iPads, Chromebooks, or the name of an app.

Table 3:6. Excerpt from code book (survey question 4)

To analyze interviews from the media specialist, technology coordinator, and the principal, as well as observations of staff meetings, I first coded each individual source. This allowed me to note themes specific to each person I interviewed that may not have surfaced in the survey data. From there, I selected portions of the text corresponding to each research question, and organized sources into specific nodes in NVivo. I then compared these codes with codes previously defined through survey data analysis to verify consistency across data sources.

Original codes from context level interviews and observations were added to the code book in order to account for variations across sources (Corbin & Strauss, 2008). Table 3.7 is an excerpt showing how the additional codes added nuance to the codes from survey question 3.

Tech	Elements of contemporary	Understandings of literacy
Digital contexts	literacy (Con.lit)	that include: naming
Multimodal		specific technologies
Associate 21 st century with		associated with the 21 st
technology		century, literacy in digital
Global outlook		contexts, multimodality,
Collaboration		global contexts, and
Interactive		collaboration.
Freedom to choose format		
Constant change		
Shift in competencies		
Balance		
Overload		
Multiple formats		
Computer literacy		
Ethics		
Equity		

Table 3.7: Excerpt of code book showing additions to survey codes

Codes derived from interviews and observations that are in addition to the codes derived from open-ended survey questions were added to the code book under a separate heading. For the category of *conceptions of literacy*, these codes included the social nature of literacy, philosophy, and district communication. For the category of *teacher*

learning they included district push, the social cultural nature of learning, district initiative, and other learning. An example of codes corresponding to for *teacher conceptions of literacy* is shown in Table 3.8.

Conceptions of literacy: codes from interviews with media specialist, technology coordinator, and principal.		
Literacy as social Tech in society Social piece of literacy Parents Unknown impacts of screen time Access	Social nature of literacy (social)	Participant comments that include the social nature of literacy.
Philosophy Differences in vision Dissonance	Philosophy (philosophy)	Indications of an underlying philosophy that guides technology integration.
Codes from observations of staff meetings.		
Next Generation Information System Infinite Campus Email IT specialist	District Communication	These codes refer to communication systems at the district level.

Table 3.8: Excerpt of code book showing codes added from context level interviews and observations

Data analysis at the context level included triangulation of data from survey questions 3 and 4, participant interviews, and staff meeting observations to form a general understanding of conceptions of literacy and how teachers learned to integrate technology for literacy instruction at North Lake Elementary. The paragraphs below summarize this information, and the Findings Chapter explores these concepts in depth.

Conceptions of literacy. The staff at North Lake Elementary are united in thinking of the purpose of literacy to be communication. They considered components of literacy to be reading, writing, speaking, and listening, and referred to these components as “learning targets,” or “learning competencies.” Higher order thinking is included in conceptions of literacy, as are elements of contemporary literacy. Participants acknowledged the social nature of literacy, and recognized that underlying philosophies play an important part in how literacy is understood.

Teacher learning. From this analysis, I determined that teachers learn to integrate technology in formal and informal ways, and that professional learning occurred in and through practice. At North Lake, the district had a guiding philosophy that influenced much of the teacher learning. The recently passed district referendum was a primary influence on teacher learning during the time of my study.

This general understanding of the context level of inquiry guided further data collection and analysis at the intermediate and individual levels of inquiry. First, I was able to design an observation guide to more deeply explore the ideas of teacher

conceptions of literacy and teacher learning at a finer grain level of inquiry. Second, context level understandings created sensitizing concepts through which to analyze intermediate level data (Table 3. 9).

Sensitizing concept	Observation	Codes
Teacher collaboration	Nikki comes in with her computer to do teacher observations. This is Cynthia’s lesson that she has chosen for her evaluation.	Observation Teacher evaluation

Table 3.9: Excerpt of observations coded through sensitizing concepts

Data were triangulated to look specifically at connections between levels of the embedded case study. I went through the entire data set rather than relying on previously created codes in order to ensure that I was including all pieces of data in the analysis.

Table 3.10 includes an example of between case level codes.

Between case level connections	Codes
We’re doing these little 90 second Newberry Awards and there was a contest and so we are doing that right now so I invited someone from TIES to come in and teach us how, and I invited the district technology integration specialist to come in too, and so the kids last week all learned a little iPad, how to use iMovie, how to take pictures, take video, copy, cut you know and just kind of add	Outside resource District

some music and special effects a little bit.	
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Table 3.10: Excerpt from coding among case levels

In summary, my analysis process allowed me to develop patterns, categories and themes leading to assertions on teacher learning - in this particular context - in regards to technology integration and conceptions of literacy. Table 3.11 summarizes data sources and analysis strategies by research questions.

Research Question	Data	Analysis
RQ 1: What are ways in which elementary school teachers learn to integrate technology to teach literacy?	Survey Observations of staff meetings Guided interviews	Transcription of interviews Coding through NVivo data analysis software
RQ 2: What learning processes support the integration of technology for literacy instruction?	Observations at intermediate and individual levels of analysis Guided interviews Conversational interviews	Transcription of interviews Coding through NVivo data analysis software Development of sensitizing concepts
RQ 3: How do teacher conceptions of literacy develop through the integration of technology	Observations at individual level of analysis Guided interviews Conversational interviews	Coding through NVivo data analysis software

<p>into literacy instruction as evidenced through elements of teaching practice: planning, instruction, and assessment?</p>		
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Table 3.11: Summary of data collection and analysis

Chapter 4

Findings and Discussion

This chapter commences with a description of the views held by teachers at North Lake Elementary regarding literacy practices, the integration of technology to teach literacy, and conceptions about literacy that are part of the overall culture of North Lake Elementary School. This is followed by a description of the fourth grade team, particularly the ways in which this team worked together as a community of practice. Within this community of practice, the experience of one teacher, and how technology integration and conceptions of literacy were interpreted in her classroom, illustrate teacher learning processes and developing conceptions of literacy.

Survey results from the broadest level of study-- the school as a whole-- illustrate overall characteristics regarding perceptions and beliefs about literacy, use of technology when teaching literacy, and access to and engagement in professional development activities regarding integration of technology for literacy instruction. Survey results were triangulated with observations of school wide staff meetings and interviews with the media specialist, technology coordinator, and principal to describe school characteristics regarding literacy.

The intermediary level of this case study, the grade level team, serves to mediate between context and individual levels of inquiry. This grade level team forms a community of practice (Wenger, 1998) in that it is bound by those teachers at a specified grade level who are mutually engaged in developing the literacy of fourth grade students

at North Lake. These teachers were engaged in working as a team, creating a shared repertoire that was situated contextually and historically. Meaning was negotiated formally in weekly team meetings and informally through daily interaction. Interviews with each member of the team and observations of weekly team meetings formed the data set from which findings were derived. The findings that follow are presented through a community of practice frame.

At the level of the individual teacher, daily observations and conversational interviews formed the data set. Findings from the grade level team are illuminated through the practice of one teacher in the context of her classroom. This more focused look allowed closer exploration of specific processes involved in learning to integrate technology and the ways that the meaning of literacy developed through practice.

The embedded case study method (Yin, 2014) allowed me a telescoping view on how teachers learned within the complex contexts of teaching. In the final section of this chapter I present findings organized by research question, presenting themes at each level of the embedded case study as well as the unique characteristics found at each level. The findings and supporting data illustrate how the teachers in this study learned to integrate technology to teach literacy, the processes involved in this integration, and how teachers' conceptions of literacy developed through practice.

Context Level: North Lake Elementary School

North Lake Elementary School serves just over 600 students in grades kindergarten to grade five. Each classroom has a teacher of record (two classrooms have a pair of teachers in a job sharing arrangement) who works closely with specialists and

paraprofessionals throughout the day. North Lake is a neighborhood school in a suburban district that recently passed a referendum to update facilities, one goal being the “creation of a variety of learning spaces to compliment current educational environments and meet the needs of diverse learning and instruction” (District website, March 2016). Electronic means of communication are the norm, with websites used for communication, organization of resources, and teaching. The school has an established reputation of academic success, having received a “Reward School” designation from the state department of education.

In the introductory phase of my study I sought to better understand perceptions and beliefs toward literacy and general ways in which the school community approaches professional development toward literacy and technology integration. Findings from this context level serve to situate findings from the intermediary level, which in turn helped me to better understand findings from the individual level of study. Descriptions of teacher learning and conceptions of literacy at North Lake Elementary are structured through findings from the survey interwoven with data from interviews and staff meeting observations.

The survey was given in two parts. The first part was designed to gather information on teaching position and number of years teaching, as well as to elicit initial understandings regarding conceptions of literacy and teacher learning in the teachers’ own words. Two open-ended response questions served to prompt responses.

In the following findings section, I begin with the first open-ended question, “What do you think it means to be literate in the 21st century?” which provides grounding

for research question 3, “How do teacher conceptions of literacy develop through the integration of technology into literacy instruction as evidenced through elements of teaching practice: planning, instruction, and assessment?” Results were then triangulated with results from interviews and staff meeting observation to form a general sense of how literacy is understood by the North Lake community at large.

Conceptions of Literacy

In survey question 3, seven teachers (42%) used the word “communicate” or a derivative to define literacy. For example, one teacher responded, “Being literate in the 21st Century includes being able to communicate with others through reading, writing, and using technology.” Fifteen teachers (63%) defined literacy using modes of reading, writing, speaking, and listening, in variations such as: “read/write/speak,” “reading, writing,” “read, write, search, and navigate,” and “reading, writing, listening, speaking in receptive and expressive means.” The principal also mentioned the foundational elements of the Common Core, reading, writing, speaking, and listening. Five survey responses (21%) mentioned only reading, such as in, “To be literate is to be able to Read text from printed material and Read text digitally” (emphasis in the original).

Interviews with context level participants suggest that reading is the mode of literacy considered to be most important. When discussing literacy, the media and technology specialists used the word “read” (or a derivative) eight times, “write” was used once, and “speaking” and “listening” not at all. Specialists considered communication to be an essential component in literacy, as evidenced by the comment, “Literacy for me means that you have to be able to comprehend and prove your

knowledge of what you are learning and be able to communicate it, whether it is from a book, from your teacher, from the internet, [or] from programs” (Interview, 11/10/2015). These results suggest that reading and communication are prominent in conceptions of literacy found at North Lake Elementary.

To further define what is meant by “reading” at North Lake, I analyzed observations from a staff meeting in which district personnel presented on curriculum goals. I then triangulated these results with evidence from survey question three. For example, during the January staff meeting (Observation, 1/7/2016), personnel presented on district learning targets, which are derived from state board of teaching standards, and include foundations of reading: oral and written language, phonological and phonemic awareness, concepts about print, phonics, fluency, vocabulary, comprehension, content-area literacy, literary response and analysis, and structures of the English language (Minnesota Administrative Rules 8710.3200). It is clear from the district emphasis, and an interjection by the principal reminding teachers to put learning targets on whiteboards as opposed to slides, and the nodding of heads by the teachers, that these learning targets are an integral aspect of literacy definitions at North Lake. In the survey, seven teachers (29%) mentioned literacy essentials and skills, with four mentions of comprehension, three mentions of fluency, and one mention of vocabulary. Interestingly, word structure was not mentioned. The influence of state policy on local definitions of literacy is seen through these results.

Along with foundations of reading, understandings of what it means to be literate in contemporary society also included thinking and problem solving capabilities. Higher

order thinking was included in the definition of literacy by five teachers (21%). For example, in response to survey question three, one teacher stated, “To be literate is to understand how to access, comprehend, and form judgments and conclusions,” while another mentioned the ability to “critically think and question, understand different perspectives and clearly share your ideas.” Objectives of literacy instruction also included one mention of global communication and one mention of literacy as growth over a lifetime. Interviews with context level participant indicate that creativity is a component of literacy, emphasizing that students need spaces to “cut and color and create” alongside learning to read and write.

In response to survey question 3, teachers mentioned flexible use of technology as a means of communicating nine times (38%), while 21 teachers (88%) referenced the ability to communicate using technology or communicate in digital spaces as important to being literate. A typical statement was, “Adults and students alike should be able to read, follow, manipulate, and utilize sites and applications on all types of devices and programs in order to maintain the ability to communicate, process, and compete in the workforce and life.” Perhaps the most telling response came from a teacher who wrote, “21st Century literacy means knowing how to use relevant types of technology and knowing when which forms of tech/communication is appropriate for what audience.” This response indicates an understanding of purpose and audience as essential aspects of literacy.

Interview comments provided a broader view on multiple forms of communication, indicating that teachers value literacy experiences both in digital and

non-digital spaces. One specialist lamented the lack of hands-on literacy experiences by saying, “I see time after time those kindergarteners coming in and touching the screen trying to... they can’t figure out how to use a mouse. And they don’t paint, or cut or glue or color or write.” Communication through multiple formats is theoretically valued at North Lake, although translation into practice appears to be a point of contention.

One teacher felt that technology was being imposed into reading, saying, “I think it is a catch phrase to impose technology into reading. Good literature and instruction should be done using good books.” Although this view was an outlier in the survey results, statements from interviews echoed this opinion. For example, one specialist said, “When we are teaching literacy I think technology is used as a supplement to human/book contact;” and again later in the conversation, “There is nothing like the tactile interaction between a book and a person.” Valuing tactile interaction with books was clearly seen in the context of the media center, which was set up for “Camp Read-a-lot,” with students reading books in tents using flashlights.

.Overall, the community of North Lake Elementary considers literacy in the 21st century as including reading, writing, speaking and listening, with an emphasis on reading. Teachers consider comprehension, fluency, and vocabulary as well as higher order thinking skills to be essentials of literacy. Multiple forms and vehicles for literacy are valued, although articulation and practice of these values may hold conflicts for the community. Finally, communication appears to be a primary goal of literacy held by this particular school. These findings are based on results from survey question 3, interviews with the media specialist, technology coordinator, and the principal, and supported by

observations of staff meetings. I now turn to discussing findings derived from the multiple choice and rank order survey questions that correspond with research question 3 at the context level of inquiry.

Closed response survey questions. Survey question 5 asked teachers for their “perspectives, philosophies, or beliefs toward the teaching and learning of reading.” Teachers were asked to check up to three of seven descriptors. There was a decided split in responses (Figure 4.1). Descriptors receiving a high number of responses included: “I believe in a balanced approach to reading instruction, which combines skills development with literature and language-rich activities” (21/24 responses, 88%); “I have an “eclectic” attitude toward reading instruction, which means that I would draw from multiple perspectives and sets of materials when teaching reading” (15/24 responses, 63%); and “I believe students need to be immersed in literature and literacy experiences in order to become fluent readers” (15/24, 63%). Descriptors receiving a low number of responses include: “I would describe myself as a “traditionalist” when it comes to reading methods and materials” (3/24 responses, 12%); “I would describe myself as a whole language teacher” (3/24 responses, 12%); and “I believe that basal reading materials are useful tools for teaching students to read, either as the primary instructional material or along with trade books (i.e., children’s books or library books)” (2/24 responses, 8%).

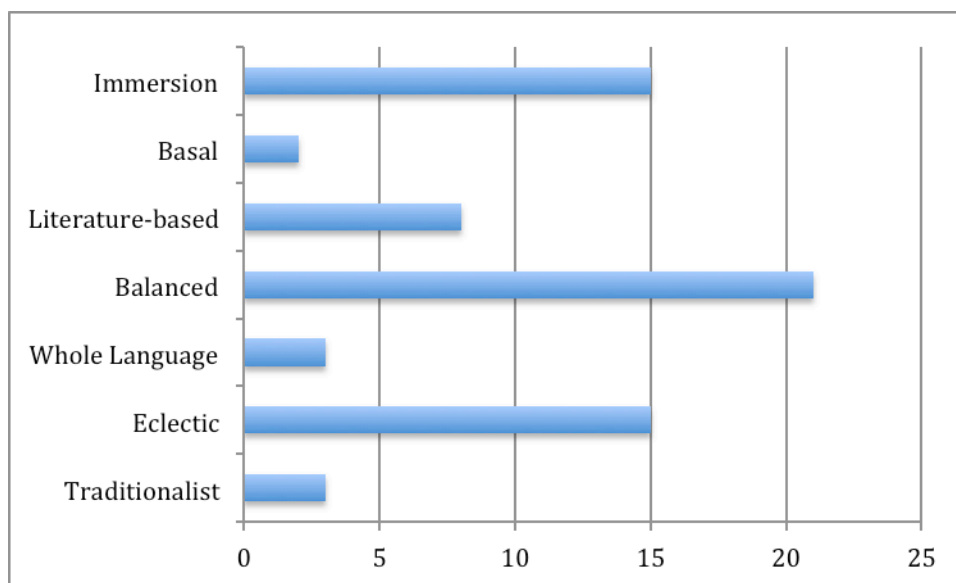


Figure 4.1: Perspectives, philosophies, and beliefs toward reading instruction

These results indicate that a balanced approach to reading instruction, with a variety of methods and materials, are highly valued at North Lake, while traditional, whole language, and basal reading materials are not valued. Although observations of the media center and classrooms confirm that a balanced approach to literacy is taught at North Lake, the Houghton-Mifflin basal reading program forms the base of instruction, providing cohesion and structure for reading instruction across the school.

Survey question six asked participants to rank goals for a reading program from one to four, with one denoting responses as the top priority (Figure 4.2). Responses indicated that most teachers felt that “It is my goal to develop readers who are critical and thoughtful in using reading and writing to learn about people and ideas, and how they might use literacy to positively affect the world in which they live” (16 responding with either a 1 or a 2 ranking or 67%) as their primary goal for a reading program; while very few teachers responded that “It is my goal to develop readers who are knowledgeable

about literacy forms or genres and about different text types or structures” (3 responding with either a 1 or a 2, or 13%) as a primary goal. Goals of “It is my goal to develop readers who are skillful and strategic in word identification, fluency, and reading comprehension” (13 responding with either a 1 or a 2, 54%) and “It is my goal to develop readers who are independent and motivated to choose, appreciate and enjoy literature” (14 responding with either a 1 or a 2, 58%) received very similar frequency of responses. It is clear from these findings that teachers do not consider knowledge about genres as a goal (19 responding with either a 3 or a 4, 79%).

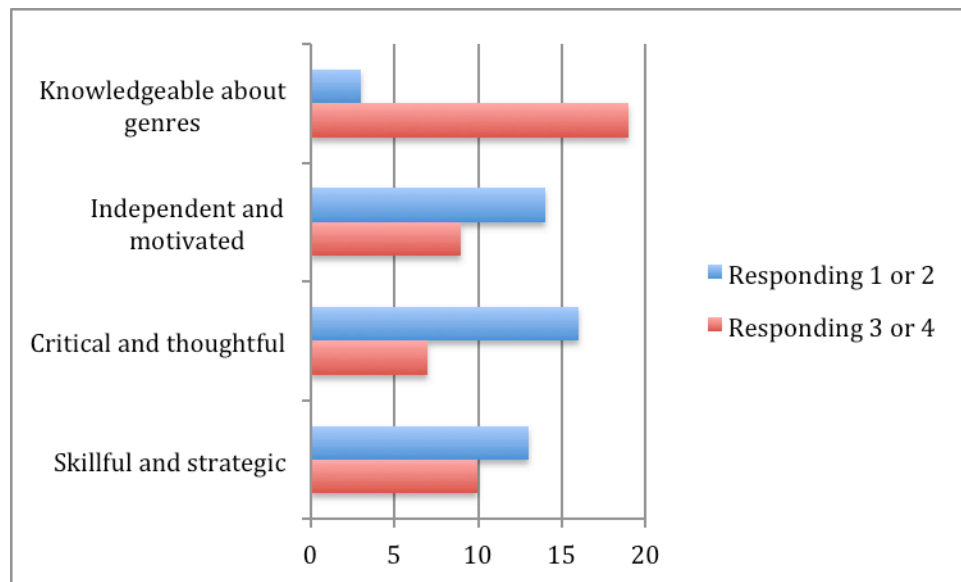


Figure 4.2: Goals for reading program

Results align with context level interviews and open-ended responses to question 3, in that teachers stated that they value higher order thinking skills as part of literacy instruction. However, open-ended response questions also indicated definitions of literacy that included multiple formats and genres. Understandings about “literacy forms

or genres and about different text types or structures” may be an area in which teacher conceptions shift as this school moves more deeply into contemporary understandings of literacy.

When asking about goals for integrating technology for literacy instruction in survey question seven, my aim was to generate a data set that provided a general idea of teacher perceptions of current technology integration. The Replacement, Amplification, and Transformation Framework (RAT) (Hughes, 2006) was selected for this purpose, and also because on an early visit to the school this framework was part of a conversation I had with colleagues on technology integration. I concluded that it was a framework familiar to the teachers. Results overwhelmingly indicated that most teachers felt that they are using technology to “amplify instructional practices” (20/24, 83%). Five (5/24, 21%) teachers indicated that they used technology primarily to “transform” instruction. One teacher checked both “amplify” and “transform.” No respondents indicated that technology should be used to “replace” traditional learning tools (Figure 4.3).

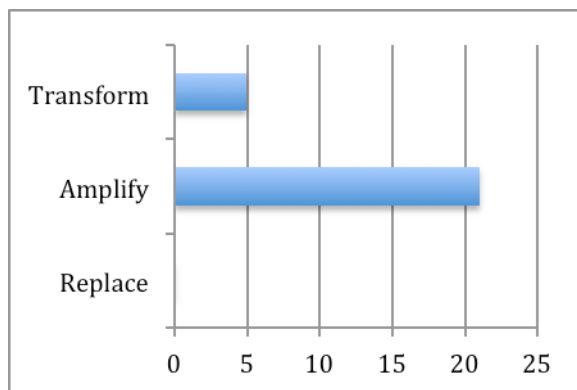


Figure 4.3: RAT Framework classification of technology integration

Although teachers viewed their overall use of technology to be an amplification of instruction, context level interviews indicated that much technology integration replaces traditional instruction. Observations revealed that context plays an important role in determining whether technology was used by these teachers to replace, amplify, or transform instruction, and that most teachers moved fluidly between the three.

Intermediate level findings explore this more fully.

Survey question 8 was designed in order to generate data indicating alignment with one of the leading literacy professional organizations in regards to conceptions of literacy in contemporary society. In 2013, the National Council for Teachers of English (NCTE) published a position statement defining 21st Century literacies (NCTE, 2013).

Authors of this document described literacy as:

Literacy has always been a collection of cultural and communicative practices shared among members of particular groups. As society and technology change, so does literacy. Because technology has increased the intensity and complexity of literate environments, the 21st century demands that a literate person possess a wide range of abilities and competencies, many literacies. These literacies are multiple, dynamic, and malleable. As in the past, they are inextricably linked with particular histories, life possibilities, and social trajectories of individuals and groups. (NCTE, 2013)

This statement is followed by six descriptors, from which survey question 8 was derived.

Survey question descriptors include: It is my goal to develop readers and writers who are proficient and fluent with the tools of technology; It is my goal to develop readers and

writers who intentionally collaborate with others to pose and solve problems; It is my goal to develop readers and writers who design and share information for global communities; It is my goal to develop readers and writers who manage, analyze, and synthesize multiple streams of simultaneous information; It is my goal to develop readers and writers who create, critique, analyze and evaluate multimedia texts; and It is my goal to develop readers and writers who attend to the ethical responsibilities required by complex environments. Results from each descriptor are displayed in figure 4. 4 with survey respondents ranking each descriptor from most important to least important.

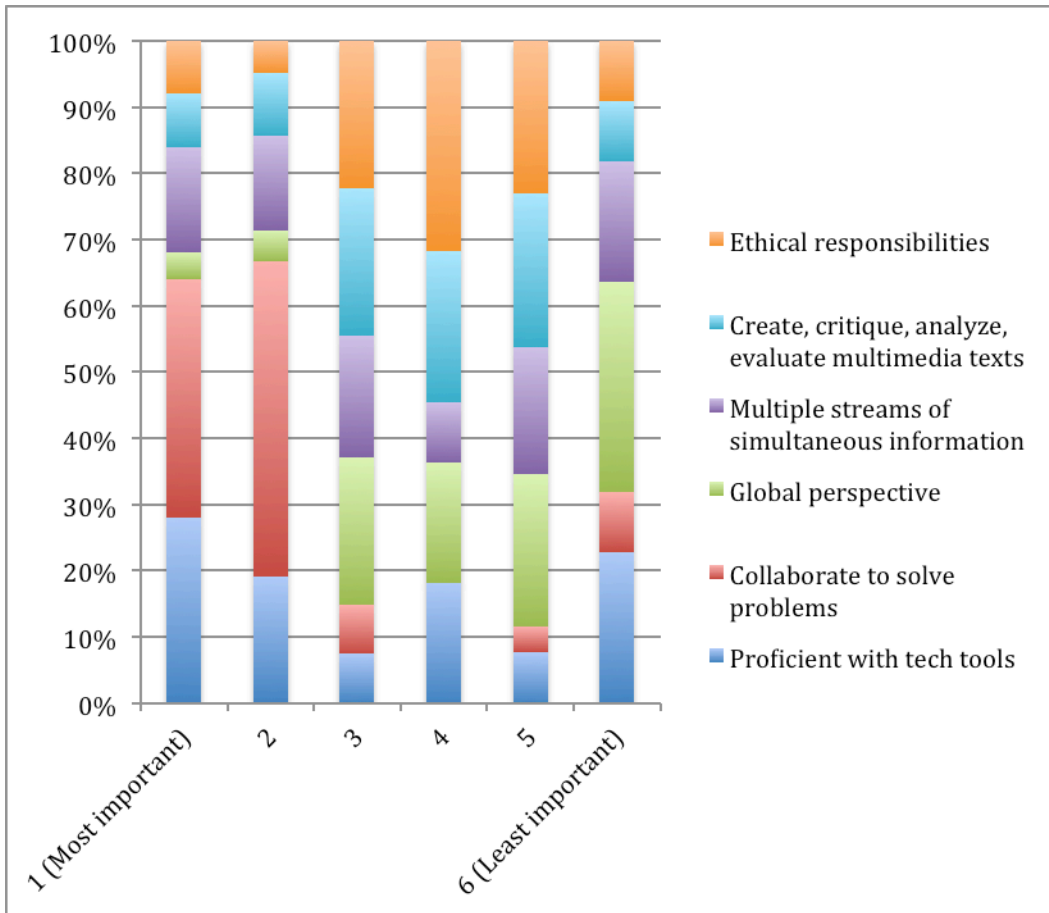


Figure 4.4: Survey question 8

The findings generated from these survey responses indicate that intentional collaboration intended to pose and solve problems was a primary goal of technology integration for literacy instruction at North Lake (19/24, 79% of respondents selecting this response as either 1 or 2), while global communities was the goal selected the least often (13/24, 54% selecting it as either 5 or 6). A point of interest is that although in the open-ended response questions teachers mentioned both higher order thinking skills and fluency in multiple text formats as important, no teachers selected the goal of developing “readers and writers who create, critique, analyze and evaluate multimedia texts” as their first goal, only four selected it as their second goal, and eight respondents selected this as either a five or a six on the rating scale. Applying higher order thinking skills in digital formats may be another area of shift in contemporary literacy thinking by teachers at North Lake.

Summarizing context level results revealed several themes underlying a communal understanding of literacy at North Lake. First, communication is a recognized goal of literacy instruction. Second, literacy is defined through nationally recognized modes of reading, writing, speaking, and listening, with an emphasis placed on reading, and interpreted through state and local standards. Third, literacy essentials, particularly fluency, vocabulary, and comprehension, are emphasized, and higher order thinking skills, as well as fluency in multiple text formats, are valued. Possible areas calling for clarification among North Lake staff include: ideas around genre and text format, teaching materials such as basal readers, perceptions on levels of technology integration,

and ways in which higher order thinking skills are included in technology integration for literacy instruction.

The second open-ended question, “Describe ways in which you learn how to integrate technology for literacy instruction,” provided findings related to research question 1, “What are ways in which elementary school teachers learn to integrate technology to teach literacy?”

Teacher Learning

Teachers at North Lake Elementary learned to integrate technology through formal and informal means. Formal means included district offerings and participation in a state wide collaborative professional development entity called Technology and Information Educational Services (TIES), as well as classes taken by individual teachers. Participation in professional organizations did not seem to be a significant method of professional learning at this particular school.

Formal learning. The district provided formal training in a variety of ways as was evidenced during the January staff meeting. During this meeting, district personnel presented an overview of the upcoming changes in technology connected with the recently passed bond referendum. This included a 1:1 Chromebook initiative in grades three through five. District personnel specifically mentioned training opportunities available to teachers in a tiered format. The first level of training included paid, intensive training, with the expectation that participants would then be resources in the schools. The basic level of training would happen during the week before school started in the fall. Other options included online classes or summer options. All teachers were expected to

participate in this district-wide training at some level. Professional coaching was also an option offered by the district but was not mentioned in context level data.

In addition, the district sponsored a Technology Cohort in partnership with a neighboring district. Teachers participated in the Tech Cohort for a year, earning 15 credits through a local university. In the survey, six teachers mentioned district training, with the Tech Cohort being specifically mentioned four times. The influence of this Tech Cohort was felt throughout the school, as exemplified by the following response to how teachers learn: “Colleagues – especially those in the tech cohort.” During a follow up conversation with the principal, the tech cohort was also mentioned as having school-wide influence.

In survey question 4, I posed an open-ended response question linked to research question 1. I asked participants to describe ways in which they learn to integrate technology into literacy instruction. Results from this question included six teachers who mentioned (25%) participation in district training but these individuals did not elaborate on this training. However, interviews with specialists indicated that there is a definite “push from the district” that is much broader than just the one-to-one initiative. In the words of one specialist:

We are standing on this cliff of change and it is huge because of this referendum that has just passed in our district. We aren’t just facing a couple of iPads in a classroom. We are facing major change in every building of the entire school district. And shift in philosophy. (Interview, 11/10/2015)

This shift in philosophy appeared to drive every aspect of district professional development opportunities, including more informal methods of learning. These opportunities are further explored during my discussion of the intermediary level findings.

Participation in TIES included attendance at the annual conference, as well as presenting at the conference. Open-ended responses to survey question 4 included four mentions (17%) of participation in TIES offerings. The specialists also mentioned TIES specifically when discussing ways in which individual teachers found professional development specific to individual curiosities, saying, “There’s the people who will seek out other classes that we can take, like TIES classes, or take online courses over the summer.” The teachers who actively participated in optional district and external professional development related to technology integration were positioned as leaders or “hubs” in the school. This idea will be further developed in the intermediary section of this chapter.

Informal learning. Although the district provided informal, classroom based professional development, there were no mentions of this in any of the context level data. However, other ways of informal learning were mentioned, particularly through social media, trying ideas out in the classroom, and, most significantly, teachers learning from each other.

Teachers referenced social media three times (13%) when responding to survey question 4, with Twitter, at two mentions, being the only social media specified. Survey respondents described ways of learning from social media as, “I follow numerous Twitter

accounts of tech gurus as well!” and “From online platforms (esp. Twitter – links and ideas shared by other educators)” and by simply writing “social media” when asked how participants learn to integrate technology to teach literacy. Although the specialists at North Lake did not mention social media specifically, they did discuss learning how to solve technology problems through Google. For example, when helping teachers trouble shoot, Google is a primary resource, as noted in the following response, “My answer to a lot of teachers is let me do some research and I will get back to you. And I am usually on Google asking the same exact question.” While social media played a role in teacher learning at North Lake, the results from context level data are not sensitive enough to draw conclusions as to their influence on teacher learning to integrate technology for literacy instruction.

Many teachers seemed to learn how to integrate technology through trial and error, by simply trying something and paying attention to what happened. This method of learning is certainly valued at North Lake, as evidenced in the following statement from the media specialist, “There are people who will just dive in and try it out. And they aren’t afraid to fail and let the kids see them fail. You know, they just kind of make it work. And that’s kind of what I do.” Survey results also suggested that trial and error is an important way of learning. Teachers indicated learned via: “self-teaching through trial and error,” “From exploring and trying things on my own,” and “Personal curiosity – seek and find.” One survey response in particular illustrated why a teacher might integrate technology without formal training:

My own curiosity often leads me to try and integrate technology into my practice when appropriate. I'll read about or see someone using technology in inventive and/or efficient ways that improve instruction and/or learning, not just for the sake of doing the same thing differently.

The school climate at North Lake allowed risk-taking in order to promote innovation.

The principal considered it part of her role to support and help teachers and did this primarily through connecting teachers to resources. Informal conversations indicated that teachers felt supported by their principal in their efforts to integrate technology.

The principal also supported teachers learning from each other. This was mentioned eight times (33%), and was the most frequently mentioned method of informal learning when teacher responded to survey question 4. For example, the principal designed schedules and budgets to include grade level team collaborative work times. The word "colleagues" was mentioned seven times (29%) in survey results, as in, "From colleagues' experience and sharing," or "Collaboration with colleagues." During observations of staff meetings, I witnessed this collaboration first hand. During the January staff meeting teachers were introduced to new district procedures and technology upgrades. At each table, teachers could be seen helping each other navigate the website and sharing computers. Although not an example specifically related to teaching literacy, it does provide evidence that the culture at North Lake Elementary was collaborative in regards to the use of technology. The specialists described teachers who have a balance of experience and initiative as, "The people who are really going to help us," specifying

that the unique combination of experience and initiative are “key” qualities of teacher collaboration in the area of technology integration.

Closed response survey questions. Two closed response survey questions were important to helping me obtain results associated with research question 1. This question is focused on teacher learning at the context level of inquiry. The first question corresponded with formal methods of professional learning while the second was linked to informal methods of learning. These questions generated general categories of how teachers learn, and provided a sense of the school wide professional development activities. The role that this participation in professional development played in teacher learning will be further explored in the intermediate and individual level findings.

In survey question 9 I asked participants to indicate their professional development participation levels related to literacy and/or technology integration during the past year in the categories of district, professional organizations, classes, or other professional learning (Figure 4.5). Twenty-one out of 22 participants (95%) indicated that they had participated in district or school professional development. A high response to this option was not surprising because the district requires a minimum level of professional development. Teachers also reported a high level of participation in either online or in person classes pertaining to literacy and/or technology integration (13/22, 59%). My survey instrument was not sensitive enough for a full description but findings do indicate that teachers sought out professional development outside of required district offerings. Six out of 22 participants (27%) named other professional development activities, with participation in TIES, the Tech Cohort, and the District Design Team

Writing Trainer named specifically. Membership in professional organizations was the option with the least number of responses (2/22, 9%).

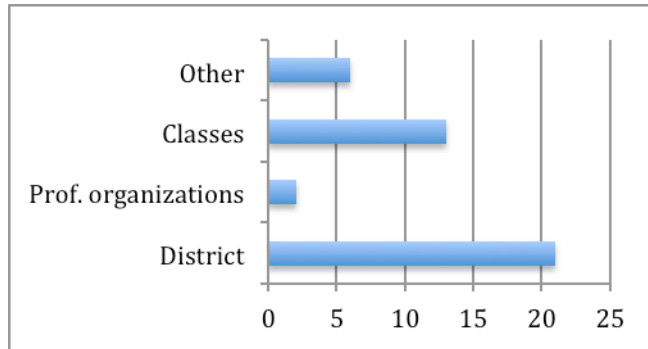


Figure 4.5: Formal professional development participation

Responses to survey question 10 provide a snapshot of informal professional development that participants engaged in when learning to integrate technology for literacy instruction. Teachers were asked to rate categories of: other teachers, specialists, professional organizations, teaching materials, and social media using the options: always, frequently, occasionally, or never. Responses verified findings from the open-ended response question that sought to measure a similar construct in that the most frequently used resource rated was other classroom teachers (20/23, 87% of participants responding with either “always” or “frequently”). Online resources (16/23, 70%) and school or district technology specialists (15/23, 65%) also received a high number of responses for options “always” or “frequently.” Twelve out of 23 teachers (52%) selected social media as a resource, while 11 out of 23 (48%) indicated teaching manuals. It is interesting to note that social media, such as blogs or Pinterest, ranked higher than teaching materials as a resource for teachers. As was seen in the open-ended response

question, professional organizations did not seem to be a resource for teacher learning at North Lake. None of the participants indicated that they always use this resource, while 21/22 (95%) indicated that they occasionally or never use professional organizations as learning resources. One participant did not respond to this selection at all. Figure 4.6 provides a visual summary of results from survey question 10.

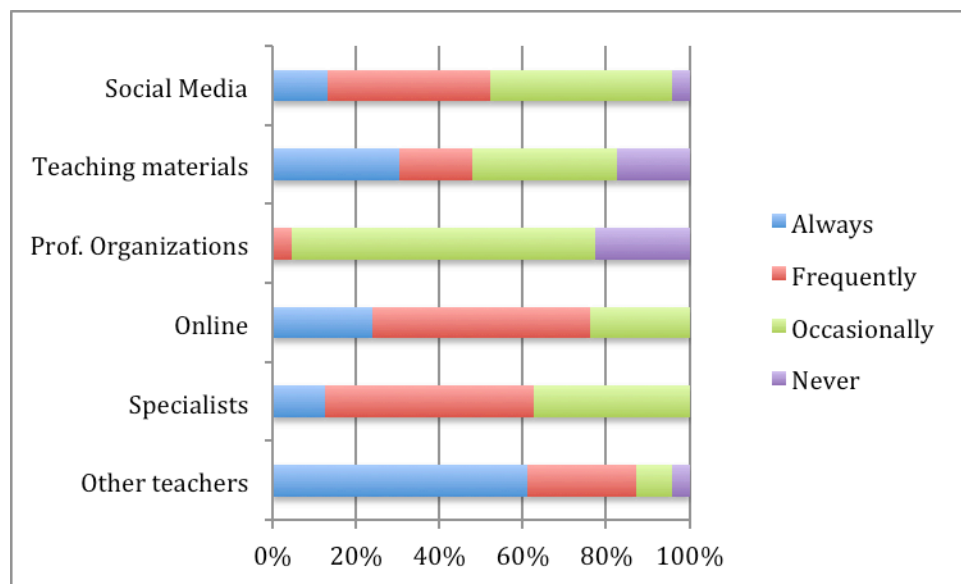


Figure 4.6: Informal professional development participation

Summary

As I summarize findings at the context level, I determined that North Lake Elementary sits in the midst of a district-wide initiative encompassing buildings, technology upgrades, increased use of Chromebooks and iPads, and professional development, driven by a philosophical shift. Teachers learned to integrate technology for literacy instruction both formally and informally. Formal means valued by this community included required district inservice, optional district sponsored opportunities,

or classes that teachers sought out independently. Informal means included social media, trial and error, and, most importantly, learning from each other. The latter will be explored more fully in the following section on intermediate level teacher learning.

Intermediary Level: Fourth Grade Team

The fourth grade team is composed of four teachers, all white women with 78 combined years of experience. The teachers worked together closely to teach their 100+ fourth graders. Three members of this team, Nikki, Laurie, and Cynthia, have taught together for many years, but this particular team has been together only for a year, with Tammy a newcomer to fourth grade. Nikki, Laurie, and Cynthia have rooms in the same pod, while Tammy's classroom remains in the third grade pod. Teachers were briefly introduced in the Methods section, and I add to this introduction in the following paragraphs.

Nikki: Nikki has been a classroom teacher for 10 years. She considers herself to be a leader in technology integration and positions herself in ways that further her own knowledge and the knowledge of her peers. She actively sought out professional development in regards to technology integration through both formal and informal means, and shared this knowledge purposefully with other teachers.

Nikki referenced standards and literacy essentials when defining literacy and considers communication to be the purpose of literacy. Balance is important to her and although she is very self-efficacious in regards to technology integration, she values traditional formats as well. She mentioned that, "If we changed everything to have some

kind of technology integration we would be missing out on the beauty of being in a classroom.”

Tammy: Tammy previously taught third grade at North Lake and joined the fourth grade team for the first time this year. She has been a teacher for 20 years, takes a more tentative stance toward technology integration, and does not feel as though she has mastered technology integration to meet school expectations. She actively sought support from both inside and outside the grade level team.

Tammy defined literacy as being able to read grade level texts, mentioning fiction, non-fiction, and online texts, and also mentioning specific skills. Test results figure heavily into her definition. Despite feeling less efficacious, Tammy integrated technology into her literacy instruction in multiple ways. She described ways technology is embedded into her literacy instruction: “Right now some of the kids are writing play scripts and so some of the kids are sharing through a Google doc writing while some kids are reading and they are writing or sharing their script.”

Laurie: Laurie has taught in elementary classrooms in several local school districts. She has been a classroom teacher for 23 years. She took a conservative stance toward technology integration, keeping the needs of her students and her instructional goals as primary considerations in designing literacy lessons. She preferred to learn through trial and error because it felt closer to practice than more formal professional development.

When defining what it means to be literate, Laurie described developmental expectations and emphasized dispositions of persistence and growth mindset along with

reading and writing and communicating. She shared her ambivalence toward technology integration through the following statement: “I call myself old fashioned. But at the same time I don’t know the direction that I want to go. Sometimes I want them to be able to share that picture that they hand drew to their group.”

Cynthia: Cynthia is the most experienced teacher on this team and has been a classroom teacher for 25 years. She took a leadership role in technology integration and based her literacy instruction in nuanced understandings of literacy. She learned to integrate technology through both formal and informal means, taking the stance of a learner in most contexts.

Cynthia described literacy through a historic lens, mentioning that the basics are the same but that students now need to be able to access and comprehend a greater variety of texts through multiple formats. Her vision for one-to-one Chromebook initiative included this statement, “I want my Chromebooks to be meaningful, powerful tools. They are a means to an end and open up possibilities. They help to personalize learning.”

Wenger (1998) defined a community of practice as a community bound through practice, in which practice serves to bring coherence to the community through mutual engagement, a joint enterprise, and a shared repertoire (p.73). I consider the fourth grade team at North Lake a community of practice grounded in this definition. These teachers are bound by practice through their work with fourth grade students. Each teacher is the teacher of record for a particular class, but students were shared between teachers for

math and occasionally for special projects. The fourth grade team held each other mutually accountable for teaching the entire class of fourth grade students.

The grade level team was mutually engaged in designing and implementing curriculum and caring for students' overall learning. They sat together during staff meetings and positioned themselves as a team when negotiating within the larger school community. They did not agree on many things, but held the joint enterprise of teaching fourth grade to the very best of their combined ability in common. These teachers share a repertoire that involves curriculum materials, practices, and ways of interaction that have been developed over the course of many years. The following section uses concepts of communities of practice, legitimate peripheral participation, negotiated meaning, identity, and locality, to illustrate how this team learned to integrate technology for teaching literacy and how concepts of literacy developed in community.

Legitimate Peripheral Participation

Lave and Wenger (1991) describe legitimate peripheral participation as a learning model in which newcomers learn by practicing alongside others who are more expert. Concepts particularly relevant to this work are that a newcomer describes a person who is new to the task, not necessarily someone who is new to the community. Learning is legitimized through increased access to resources and knowledge, and we recognize that learning is taking place as learning becomes more embedded in practice. Participation, movement towards the center of practice, and marginalization, movement toward the boundaries, creates learning opportunities for individuals and communities alike.

In the following example I use concepts of legitimate peripheral participation as a means of showing how a newcomer at North Lake Elementary gained access to resources and knowledge and began to embed that knowledge into practice. We can see evidence that this teacher is participating, and moving toward the center of practice, as she becomes more self-efficacious toward integrating technology. She also begins to use reflective thought patterns indicating knowledge embedded in practice.

Although she is a long-standing member of the fourth grade team, Laurie regarded herself as a newcomer when it came to teaching with technology. She began the interview with a comment on her feelings of self-efficacy in using Chromebooks saying, “This is my first year having a class set, so I am probably in a different place than others. I’m still kind of that...um... I worry about that.”

Shared documents have been an area of negotiation for the entire team, and Laurie was concerned about how to do this in developmentally appropriate ways grounded in essential literacy skills:

I think for me it is beginning to catch up on how do I teach it in a way that they can be sharing a document, there is the ability for everyone in the class to have the same document open and be making comments or writing something on it, but teaching the skill of how to do that in a successful way. (Interview, 12/15/2015)

Laurie actively sought support from her team members, particularly Nikki and Cynthia. In one instance, Laurie had previously watched her teammates use Google slides for students to share results of a science experiment. She had access to the set of created slides and was using them as an exemplar both for herself and for the students. She had

access to enough knowledge in order to begin, but did not understand all of the ramifications of using shared documents with students. As she shared:

So Nikki, she had them put a slide they were going to present on it. They share the document. I had some opened up and we were sharing with Nikki's water project, and then the kids had it open, and then kids were deleting other people's because it was a shared document between them. Oh my gosh! Yesterday I don't even know what happened. (Interview, 12/15/2015)

In this example we see how Laurie gained access to knowledge through the model of her teammates, and we can recognize that learning is happening as Laurie begins to embed the practice of shared documents into her instructional plans. She continued to move toward the centrality of this practice, which aligned with her values of collaboration and community building as essential to literacy, by asking Cynthia to show her the next steps in working with shared documents. She intended to participate in this practice, reflecting that, "I am working on it. They could share their document and they could do that. So I am still trying to figure that out. It is finding a balance." Laurie's willingness to give things a try, and her feeling that she was capable of learning new practices with the help of her teammates helped her move forward.

In the next example, we see how Laurie also moved toward the boundaries of practice through a process of marginalization. This movement caused friction between the individual and the rest of the team, creating a learning experience for all involved. Both the individual and the grade level team developed deeper understandings of literacy through this experience.

Laurie took a conservative stance on using Chromebooks for literacy activities. She carefully considered the literacy needs of her students and her goals for literacy when making instructional decisions. School values of literacy as evidenced in context level results, particularly communication and the tactile value of book/person interaction, were fundamental aspects of her reflective process. She mentions how Chromebooks interrupted time normally spent reading, saying, “I think it is impacting just picking up books and reading in the sense of, ‘Oh – there is always something we could be doing on our Chromebooks!’” Laurie was also conflicted about having the Chromebooks so available to her students. Unlike her fourth grade counterparts, Laurie often chose to design literacy instruction without the use of technology and hesitated in using the Chromebooks. She did not hesitate in bringing her perspectives to conversations regarding literacy, which sometimes created tension during team meetings, but also furthered discussion around the meaning of literacy with her colleagues.

Laurie shared her thoughts on using Chromebooks for a project in which students were to make posters. She considered the way in which electronically shared documents affected community building goals and the oral language development of her students as she compared the way students worked collaboratively on the project last year with how they completed the project this year, saying:

I am still holding onto things like when I could walk around and I had a piece of paper and I could see writing and I could see them writing on the ground and both writing or pointing to the screen and I could hear the conversations and see.

Whereas, it is harder this way. I think those conversations can happen, I just haven't decided if it's age appropriate yet. (Interview, 12/15/2016)

In her comments we see that Laurie considered what she knew about students and her understanding of literacy as communication and specific activities that she felt fostered communication for fourth graders. In this instance she was decidedly moving toward the border of the practice of embedding digital writing into the curriculum.

However, Laurie was also considering values of contemporary literacy, such as working through multiple formats and sharing information for the larger community. During a team meeting, discussion centered on how to balance books and electronic resources for the service project, as well as how to assess the final product. The teachers decided on a balance of materials and formats; Laurie shared a set of books while Tammy shared several websites. The rest of the team recognized the value of multiple formats, as mentioned by Cynthia, "Each class had a different way of presenting it. You should step down the hall to see Laurie's. They made big posters - really beautiful! We each did something different to show how we could do different things. The visitors were impressed." In this way, both the individual and the community entered into discussion regarding the meaning of literacy and how it played out with their group of fourth graders.

As the full fourth grade team moved into a deeper understanding of literacy and practices fostering an engaged literacy community, the team needed to negotiate the meaning of literacy, as is described in the next section.

Negotiated Meaning

Wenger (1998) proposes that learning holds meaning in relation to the community and is constantly negotiated. According to Wenger (1998), participation and reification “offer two kinds of lever available for attempts to shape the future” (p. 91). Participation refers to the active process of engaging in the community, while reification is a way of remembering and connecting with shared history through making tangible an experience or concept. It is through participation in negotiations of meaning around evolving reifications that learning occurs.

The fourth grade team was continually negotiating meaning regarding conceptions of writing over the school year due to the combined disruption of new curriculum and new technology tools. The new writing curriculum was more involved than what they previously used. Pacing was an issue with this curriculum, as was the increased amount and depth of material to cover. District expectations that Chromebooks would be integrated as part of writing instruction came with its own set of changes. The team had a shared repertoire for teaching writing but now needed to negotiate how to adapt this repertoire to new contexts. The following example illustrates ideas of participation and reification related to how teachers planned instruction to meet district expectations designed to promote contemporary literacy.

In the first week of February the grade level team discussed an upcoming project on cultures around the world that would integrate writing and social studies. This was a traditional fourth grade project aligned with writing and social studies standards for fourth grade. The project was taught collaboratively with the media specialist, who

taught research skills and coordinated materials as part of whole school literacy goals for research. As the conversation opens in this program planning excerpt, the teachers were reading through the new writing curriculum manuals trying to envision the final product.

Tammy began by sharing a project plan she used in the past in which each student was asked to write a paragraph and put it together for a presentation. The teachers then discussed pedagogy surrounding the project, wondering if students should be paired or work individually. They continually referenced the writing curriculum, learning objectives, and previous experiences, reifying the central role of standards in the evolution of this project. In the middle of this rather circular discussion, Laurie interjected, “We have lost all of our fun stuff. We could have them dress up.” There is a pause, and then Cynthia brightens and adds, “Yeah! We could video and then they could read their piece, so then we would also have the oral piece.” The media specialist reminded the teachers of the timeframe saying, “What you are describing sounds great, but would probably take an entire semester to complete. It is more than what they can do.” All agreed, looking a bit disappointed.

The teachers’ discussion turned to finding aspects of the project that were important to bring forward, or reify. They agreed on social studies content involving world cultures in order to meet social studies learning targets and looked to the media specialist for her thoughts on research. She studied the curriculum learning goals for research, then said, “This is a new curriculum and doesn’t fit what we have usually done in media as far as research report writing. This is a little different” and asked her colleagues for time to think about it. She turned the topic towards finding electronic

resources students needed in order to gather information. The question of reading levels arose, and the teachers negotiated the role that reading should play in this project. They agreed that the reading material shared by the media specialist was appropriate for the majority of their students and made a few adaptations to particular components of the project. These actions show that the teachers reified gathering information through reading (as opposed to watching videos or using personal experience) as an essential part of this project.

The teachers returned to the teaching manual throughout the conversation, looking specifically at learning goals. The process of moving between the historical form this project had taken and the one into which it was evolving meant that some pieces had to be let go while other parts were maintained or reified in the new context. Teachers noted that they wanted students to engage in research using reading material that supported skill development, and the media specialist led participation in looking through the electronic materials already available through the media center that might serve that purpose. Teachers decided on a set of electronic magazines that provided the information necessary for the reports. However, as the meeting ended teachers continued to discuss how the new writing curriculum meshed with projects historically part of fourth grade at North Lake.

Negotiating meaning in this illustration involved envisioning as a team what reading and writing in digital spaces could be like with fourth graders. The new writing curriculum and 1:1 Chromebooks introduced seismic disruptions to the teachers' established practices. Teachers drew from their distributed knowledge of students and of

literacy to reimagine a treasured research project. Participation by the media specialist, a peripheral member of the team, was an invaluable part of this process.

Identity

The concept of identity serves to situate an individual in social and historical contexts. Identity focuses on the individual while acknowledging the social aspects of learning (Wenger, 1998). Practice is an integral aspect of identity, and as we move along learning trajectories as part of that practice our identity is constantly negotiated.

Likewise, the ways in which members of a community engage in action and relate to one another serve to negotiate identities. Shifts in identity manifest in how learners relate to and are recognized in the community. The concept of identity serves to understand the role of teacher leaders in evolving contexts, as well as explore negotiations of power, efficacy, and membership. The following example from my research illustrates how a teacher on a deliberate and powerful learning trajectory negotiated identity within the community.

Nikki deliberately positioned herself as a technology expert in the North Lake community. She actively pursued professional development and stated, “I beg to go to tech training!” Nikki identified ways in which she purposefully engaged in continuous learning as: teaching teachers, engaging purposefully with TIES and district professional development, staying connected through social media and other teachers. She also mentioned discussing technology with students as a way of taking the pulse of how families in the community are using technology. She and Cynthia collaborated in many

of these activities; Nikki described it this way: “I try to teach so I stay on top of it. Cynthia and I, we pair up and we do sessions ourselves so we can stay on top of it.”

Other educators recognized Nikki as being knowledgeable and having access to resources. She received an award at the 2015 TIES conference, an award celebrated by the district technology specialist. Comments such as, “Nikki is really good about everything being done on the Chromebooks and having all the kids on there,” or “Nikki and Cynthia are helping me,” “Or, Nikki would know about that” resonated with the community. Nikki herself was self-efficacious when it came to technology integration and stated, “You have to be prepared for the cycle. And you have to be prepared to take it in. It’s the attitude too. How can you take it in – not complain about it not just balk at it.... I think the biggest thing is that I try. I hear of something and I try it out. I am never afraid to try.”

Through this intentional self-positioning and clear recognition by the community, Nikki’s identity as a technology expert was strengthened. Although she was the least experienced teacher on the team, her voice had power in discussions on technology, and she functioned as a hub (Toll, 2014) for technology expertise in the school.

Through my interactions with the teachers it became clear that the recent district initiative changed values for the school and upset the balance of identities. Use of technology had increased, and identities involving knowledge of technology integration were carried along with this wave. Self-efficacy for teaching literacy in the ways valued by the district was shifting. For example, Laurie tried to send a shared document out to her students and felt that she had done everything right. She was, in her words, “So

proud that she had done it all by herself.” And then when the time came, the link did not process correctly and students did not have access. Laurie ran over to Cynthia’s room asking for help, and between the two of them they solved the problem. However, Laurie, who identified as a strong literacy teacher, was left feeling less self-efficacious in her abilities to teach literacy in the emerging context.

A third example shows how Tammy, as the newcomer to the team, was still working out her identity as a fourth grade teacher. In December she invited the district technology specialist to come in and help her make a movie with her students. Creating this movie addressed many of the identified literacy goals revealed in context level data, such as higher order thinking in multiple platforms. Tammy described the project as follows:

We’re doing these little 90 second Newberry Awards and there was a contest and so we are doing that right now so I invited someone from TIES to come in and teach us how, and I invited the district technology integration specialist to come in too, and so the kids last week all learned a little iPad, how to use iMovie, how to take pictures, take video, copy, cut you know and just kind of add some music and special effects a little bit. (Interview, 12/15/2015)

In the team meeting previous to this experience, Tammy invited the other teachers to come observe, sharing her access to resources with the team. The other teachers showed no evidence of responding. Earlier in the meeting teachers had been comparing notes on Chromebook, and Tammy seemed to not have access to the knowledge commonly held by the rest of the teachers. In looking at monitoring student work through Chromebooks,

she commented, “I didn’t even know about this,” and later when discussing resources she requested help navigating the shared website.

By February, although Tammy still actively sought access to knowledge and resources, the rest of the community responded more positively as shown in the following conversation regarding a specific app for reading comprehension:

Cynthia: As to Read Theory, I signed up on a whim. It was easy and there is a pretest.

Nikki: The kids are bouncing around as to levels.

Cynthia: Yeah – mine are too. I’m not quite sure...

Nikki: I think it has to do with how well they read the passage

Laurie: and if they have time to finish the passage or are hurrying through to get done.

Tammy: What is Read Theory?

Laurie: It can help answer the comprehension piece because there are questions they answer.

Tammy: Well, I have been looking for something for comprehension. I’m signing up for Read Theory to help work with those comprehension kids. Others agree that it does fill that need.

Laurie: Have them do the initial sign up together. That way they take it more seriously. And it takes a little bit longer so you want to get them all started fairly.

Nikki: I found Read Theory last year and fell in love with it. I have kids doing it at home. I like that it shows them questions – the comprehension piece.

(Observation, 2/2/2016)

In this excerpt I found that there were noticeable shifts in how the community was relating with Tammy, recognizing her as an insider in the fourth grade community, a shift in identity for Tammy. Access to knowledge and resources were sources of power in which participants negotiated identity through processes of marginalization and participation.

Individuals have identity, and communities of practice also have distinct identities within social historical contexts. Lave's (1998) concept of locality helps us to explore collective identity more deeply.

Locality. A community of practice exists within a constellation, or related set of other communities. In this embedded case, the fourth grade team was one of six grade level teams at North Lake. The school itself is one of six elementary schools in the district configuration. Interactions among constellations affect the practices and identities of other constellations within the larger configuration of the school, as well as the configuration of the school district as a whole. In this interaction Wenger (1998) suggests that boundaries, boundary objects, and brokers, those members of the community that cross boundaries, produce a shared repertoire that transforms the entire system. North Lake is part of a system undergoing intentional transformation through the recent referendum, and the communities of practice concept of locality plays a large role in helping us understand how this transformation happens.

An illustration of how ideas of locality informed understanding of system wide transformation can be found in the example of design and construction of classroom space. The referendum included renovation of learning spaces, including the purchase of flexible use furniture, to better meet the needs of 21st century learning environments. One of the third grade classrooms was piloting new furniture styles, with the furniture serving as a boundary object in the larger community. The furniture was an item of interest, drawing attention from visitors both in and out of the school. The teacher served as a broker, reporting back to the district on how the furniture met the needs of this specific school environment.

The fourth grade team discussed furniture specifically regarding the needs of their students. They wonder about how to provide students with a “space of their own” if there are no desks. Teachers also noted that students needed flat surfaces to work. Laurie mentioned that when her students used Chromebooks they “use the countertops – not something I told them to do specifically. They just do it and it works.” Part of building reconstruction also involved moving classroom walls to create spaces of different sizes. The team reflected together on use of space in very practical ways, things such as what happens to storage space? How do we get in and out of the classroom if there is meeting space at our door? They were unsure of how the district vision would play out in their specific setting. The brokering role of the third grade teacher was mentioned, and they pepper her with questions and comments during their combined lunch. Her report would carry their voices back to the district for inclusion in the decision making process.

Shifts in the large configuration of the school district created opportunities for learning in and amongst constellations, in this case schools and grade level teams. Teachers collaborated with brokers and paid attention to boundary objects. As teachers gained access to information and resources (often through brokers), they were better able to negotiate meaning in specific contexts. For example, Tammy crossed boundaries between third and fourth grade when she commented, “This is the first year I have had desks so each student has their own space.” This comment changed the direction of the conversation to include the possibility that flexible space might support the literacy goals of the school. She continued with a comment verifying that flexible space can work at the fourth grade level when she shared, “I like a big open space in the middle of my classroom. Not necessarily due to tech. Just a more flexible use of space.” Cynthia followed with the comment, “I love my standing desk.” Fourth grade teachers negotiated understandings of literacy in spaces that the district envisions will support 21st century learning with a bit more receptivity through interactions in which brokers participate.

Summary

Communities of practice theory illuminates ways in which teachers learn as part of social and historical communities. The four fourth grade teachers at North Lake illustrated this as they took up new knowledge and practices. Disruptions to established practice, such as the district’s technology initiative, open learning spaces where the meaning of literacy must be negotiated in order for the team to function cohesively. I saw this with the struggle particular teachers such as Laurie had with integrating shared documents into writing instruction. Boundary objects and brokers facilitate this

negotiation of meaning, such as the role played by the media specialist. Access to resources and knowledge create self-efficacy for teaching literacy in contemporary contexts. Teachers positioned as technology hubs, such as Nikki, offer access through active communication in both face-to-face and virtual settings, as well as modeling how contemporary literacy practices can be translated for the specific school context. In my research, I also observed how teachers rely on accepted definitions of literacy, such as those espoused in state standards or published curriculum. They ground evaluations of specific technology related activities in personally held conceptions of literacy as well as collective knowledge of pedagogy and content. This is particularly evident in Cynthia's thinking and actions.

Individual Level: Classroom Teacher

The individual level of inquiry within my study explored teacher learning in action in the unique context of one classroom. Cynthia was the fourth grade teacher selected for this level because of her experience as a literacy teacher and her initiative in integrating technology. The principal recommended her as an ideal participant, and Cynthia was eager to be a part of this research. I observed 12 times in Cynthia's classroom over three weeks, which included a unit of study as defined by the basal reader. Initially I spent several full days in the classroom getting a sense of classroom routines and the best times to collect data. Literacy was embedded across the curriculum in Cynthia's room, and I found that the best times to observe her learning in action were during independent work time (WIN), Social Studies, and teacher prep time.

Cynthia was proficient with technology and was an experienced literacy teacher. For example, she used the basal text as a guide, embellishing it with a variety of reading materials, including assorted versions of *Cinderella*. Assessments were completed electronically and included standardized testing, end of unit tests, and regular fluency measures. Most whole group lessons were taught from Smart slides projected onto the Smartboard. Cynthia had a standing desk for her desktop computer, which facilitated her movement between students and computer.

When walking into Cynthia's classroom, I immediately sensed an atmosphere of respect and self-responsibility. Students greeted each other quietly and began to work independently as the day began. Cynthia took time to visit with each student before the class switched for math --about ten minutes into the school day. The school followed a five-day rotating schedule, but most days in fourth grade had math and WIN time in the morning, followed by music, physical education, media, and art, writing three days per week, lunch, and recess. Afternoons were reserved for reading instruction, WIN, and social studies/science. The fourth grade team had common planning time, and they regularly met for lunch. Para professionals and specialists, as well as other teachers, freely moved in and out of the room throughout the day. The students soon got to know me and felt comfortable with me in the classroom, and when I was not collecting data Cynthia invited me to work with them.

I focused my attention on noticing points of technology integration, particularly teacher learning processes in evidence. Observations were followed with conversational interviews during which Cynthia clarified what was happening, explained her thought

processes, and responded to my questions. Several learning processes, modeling, building self-efficacy, goal setting, and visioning were clearly evident following my analyses of the data. I describe each of these as they happened in the context of Cynthia's classroom.

Modeling

At North Lake teachers are evaluated through a district wide evaluation system, showing evidence of meeting 15 standards over the course of three years. A colleague can do the second evaluation, and Cynthia and Nikki agreed to exchange evaluations this year. Cynthia was evaluated first, and she taught a lesson using Google Maps to compare temperatures across geographic regions. During the lunch following, Nikki shared with me how much she learns from doing colleague evaluations, learning about what to teach and how to teach it.

The following week, Cynthia went to Nikki's room to evaluate a writing lesson. When Cynthia returned an hour later, she was animated and excited. She talked to me while making adjustments to her slides for the next lesson, immediately putting into place what she had seen modeled in Nikki's lesson. Cynthia's immediate instructional adjustments were to slow the pace of instruction to allow more writing time for students. Cynthia left to go get students from music, still thinking out loud about how Nikki's modeling changed her thinking about writing instruction.

Beyond the immediate learning, Cynthia thought ahead to the upcoming arrival of a student teacher. She hoped to model some lessons on writing while the student teacher was with the class. Writing has been a point of negotiated meaning within the grade level team, and Cynthia has struggled with implementing the new curriculum. Modeling of

writing has added to and clarified Cynthia's understanding of literacy through both seeing a model and planning to model a similar lesson for a student teacher.

Self-efficacy

Context level data revealed that access to knowledge and resources builds self-efficacy for embedding technology into literacy instruction. Cynthia actively sought both knowledge and resources through formal and informal professional development. Cynthia applied this knowledge to her instruction, anticipating that she would be able to use the technology to teach toward literacy learning targets. One example of this was her recognition of a need for a comprehension measure of student learning. She heard about a program called Read Theory, experimented with the program, then decided not only to use it with her students, but also to use it as an example during her TIES presentation. She was clearly confident in her ability to use Read Theory as part of her reading curriculum.

Small mastery experiences also build self-efficacy, as seen in Cynthia's decision to use Google Maps as part of a social studies lesson. The literacy aspect of this lesson was to teach students how to navigate websites more proficiently. Cynthia drew from her knowledge of pedagogy, the current abilities of her students as far as website navigation, and her knowledge of content, based on learning targets, to model an interactive lesson using the Smartboard, Chromebooks, and a set of websites. As the lesson progressed she made adjustments. The lesson didn't go as smoothly as planned; but the short-term learning targets were met, and Cynthia was pleased with her students' work. Cynthia's

closing comment was, “I am learning so many things! I have never done Google Maps with kids before.”

Goal-setting

Negotiating meaning around writing instruction was a constant activity during the time I spent at North Lake. Teachers were thinking about the writing process, how writing in digital spaces required emphases in different places, and what sort of products were best for certain learning targets. During one meeting the teachers were restructuring schedules to allow more time for writing. As we left the meeting, Cynthia went directly to her plan book and plotted out her writing goals for the next several weeks. As she wrote she commented on the parts of the manual she would study and how to work in certain elements of Chromebook use along the way. She shared, “I’ve been layering in what we do with them [Chromebooks]. Like first just learning how to get online and how to search. We have specific sites for research topics. I put them on my website.” Small steps to reaching the larger goal of writing a research paper were clearly evident in Cynthia’s thinking and practices.

Cynthia also uses student learning goals to help her remain current with technology. She stated, “Technology changes so fast. It isn’t worth it to find just the right tool because a year or two down the line it will change again. It’s more about what my objective is.” She continued by saying that by keeping her learning targets in mind she is able to make decisions regarding technology: “You just can’t get stuck on one and think you have found the answer. It changes all the time.” She, like Nikki, has a stated goal of trying new technology regularly in order to keep up with the rate of change. But

the choice of particular technologies is always tempered by the overall learning goals for students, and what is best for their literacy learning processes in particular.

Visioning

Literacy in digital spaces requires grounding in established literacy practices, but it also requires visioning new possibilities. At one point during her interview, Cynthia questioned, “I don’t even know what it is supposed to look like. What does it look like when they are all using technology for literacy?” Cynthia articulated her larger vision for the use of Chromebooks, acknowledging that it is a work in progress:

I want my Chromebooks to be meaningful, powerful tools. They are a means to an end and open up possibilities. They help to personalize learning – opportunities to individualize. I want them to be integrated into what we are doing. It’s about how we do the thing – I want the Chromebooks to be seamless. We aren’t there yet. I still have to structure it, but eventually I want them to see it as a resource. (Interview, 12/9/2015)

At the individual level of inquiry, incidences of learning embedded in a specific context illustrated how conceptual processes supported teacher learning and provided ways for teachers to enact evolving conceptions of literacy. Peer modeling of writing lessons helped Cynthia enact her new understandings of the writing process that the team had been discussing during weekly meetings. Small, mastery experiences and drawing from pedagogical and content knowledge built self-efficacy. Goal setting made implementation of new understandings of writing more manageable, while visioning helped her to see possibilities for Chromebook use aligned with contemporary literacy

practices. Through these processes, Cynthia continued to learn how to integrate technology for teaching literacy. Overall, I found many examples that indicated that Cynthia placed emphasis on using technologies as tools for learning—not as the focus on learning

A further indication of visioning was evident in actions taken by school leadership. At North Lake, time for planning was set aside by the principal. In the spring, the fourth grade level team took a day and planned out the following year. They arranged practical matters, such as setting up field trips, scheduling, and preparing copies for the office. The team also took this day to create a vision for the upcoming year, with goals and themes in mind. The vision created on this day will carry over into the next school year, with the practical matters arranged ahead of time. This sets up the possibility for creating conceptual space for negotiating meaning around aspects of literacy, such as ways in which writing changes when done on Chromebooks.

Summary

The findings from survey data, interviews, and observation presented in this chapter (Table 4.1) hold implications for school leaders, teachers, professional development, and for teacher educators. These implications and directions for future inquiry will be discussed in Chapter 5.

	RQ 1: What are ways in which elementary school teachers learn to	RQ 2: What learning processes support the integration of technology for	RQ 3: How do teacher conceptions of literacy develop
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	integrate technology to teach literacy?	literacy instruction?	through the integration of technology into literacy instruction as evidenced through elements of teaching practice: planning, instruction, and assessment?
Context level: North Lake Elementary School	Formal modes: District inservice, TIES, and Tech Cohort, as well as independent classes. Informal modes: social media, trial and error, learn from other teachers	N/A	N/A

Intermediary level: Fourth grade team	In community as part of social practice	Processes of participation/reification and locality	Negotiating meaning
Individual level: Classroom teacher	In action	Processes of modeling, self-efficacy, goal setting, and visioning	Enactment of literacy practices Reflection

Table 4.1: Summary of findings

Chapter 5

Overall Findings, Conclusions, and Implications

In this dissertation study I sought to better understand how teachers in one unit in an elementary school learned to integrate technology for literacy instruction in a district undergoing a technology initiative. I also explored how these teachers' conceptions of literacy shifted in response to the technology initiative, and how those shifts were evident in their classrooms. My purpose was to better understand how the teachers learned to integrate technology for literacy instruction. To address this purpose I designed my study around the following three research questions:

1. What are ways in which elementary school teachers learn to integrate technology to teach literacy?
2. What learning processes support the integration of technology for literacy instruction?
3. How do teacher conceptions of literacy develop through the integration of technology into literacy instruction as evidenced through elements of teaching practice, planning, instruction, and assessment?

Framing this study through a combination of sociocultural and sociocognitive lenses, I employed qualitative methods to survey, interview, and observe participants in an embedded case study. The case was composed of three levels, an elementary school, a grade level team within that school, and a teacher from the grade level team. This telescoping view, with one case emerging from the previous case, allowed me to

continually narrow the focus of my questions in order to present findings in situated contexts.

Data collection occurred in three phases. The first phase, the school context level, involved classroom teachers in grades kindergarten through five, the media and technology specialists, and the principal. Data collected at this level provided a general overview of how teachers at this school learned to integrate technology and what general philosophies of literacy undergirded the school's literacy instruction. Data at the intermediary level, the fourth grade team, provided a more focused look at teacher interactions at the intersection of contemporary literacies and the complexities of everyday teaching. The individual level, the classroom teacher, focused on one teacher in action as she integrated new technologies and new understandings of literacy in her daily literacy instruction.

I analyzed multiple choice and rank order survey questions using descriptive statistics supported through Excel software. I analyzed open response survey questions, interviews, and observations using open coding and axial coding (Corbin & Strauss, 2008) facilitated by NVivo analysis software. Data at each level of inquiry were continually analyzed, moving back and forth across data sources to identify themes. I now turn to findings organized by research question.

Research Question 1

Findings at the context level indicated that teachers learned to integrate technology for teaching literacy through formal professional development and informal means of learning. Formal professional development included required district inservice

and also optional district sponsored professional opportunities, which were varied and layered. Teachers also participated in Technology and Information Educational Services (TIES) offerings or sought out classes on their own. Participation in professional organizations did not appear to be a source of professional development at this school. Informal means included social media, particularly Twitter, trial and error, and learning from other teachers. Teacher learning at the context level of inquiry can be summarized as having a common base provided by the district, with input from TIES, classes, and the teaching community at large through social media. Learning from other teachers within this context was an essential form of teacher learning. The district presence was primary, but other influences were also present as the school moved forward with learning how to integrate technology to teach literacy. Figure 5.1 provides a visual reference of influences on professional learning at North Lake.

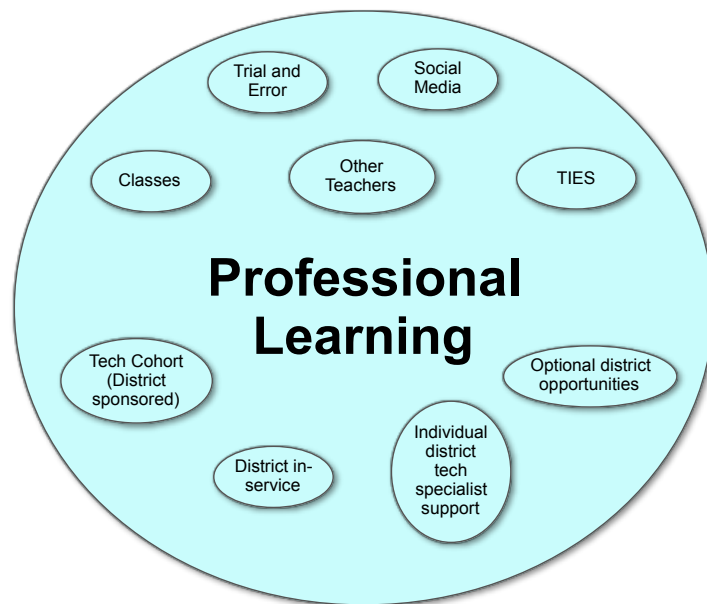


Figure 5.1: Professional development influences at North Lake Elementary

Intermediary and individual level results indicated that fourth grade team teachers learned through access to knowledge and resources, with the influence of both district and outside professional learning clearly evident. This finding aligns with concepts of legitimate peripheral participation (Lave & Wenger, 1991) through describing movement toward greater participation due to increased access to knowledge and resources. This access came through the fourth grade teachers' participation in professional development beyond district requirements, particularly TIES and the Tech Cohort.

Teachers also learned through legitimate peripheral participation in school, particularly when gaining technology knowledge, as was shown when Laurie learned to work with Google slides. During team meetings, teachers often modeled website navigation or app functions and shared experiences when implementing the technology with students. Perhaps the most vivid example of learning through peer modeling was when Cynthia and Nikki evaluated each other as part of district teacher evaluation requirements.

Data from the intermediary group revealed learning as teachers struggled with deciding what to reify and what to let go of in established curriculum, particularly when they are faced with disruptions. Although the duration of this study did not allow me to show measurable shifts in understandings of literacy across an extended time period, I was able to capture tangible evidence of learning in the duality of participation and reification as teachers wrestled with the combination of a new writing curriculum and new expectations for digital writing. The media specialist served as a broker as teachers negotiated meaning around fourth grade research. This individual reminded the team of

what other grade levels teach, helped her colleagues set realistic expectations, and connected teachers with school held resources. Evidence of teacher learning was also revealed in the actions of Cynthia as she set goals for the writing process that included Chromebooks and immediately enacted these goals by changing the Smart slide directions for students.

Cynthia's self-efficacy derived from that rare combination of "experience and initiative" described by the media specialist. Cynthia combined deep understanding of pedagogy with knowledge of content, which she grounds in traditional definitions of literacy. Recognition from the community supported her identity as a teacher leader. Nikki was also recognized as a teacher leader, particularly in the area of technology integration. She deliberately positioned herself as a hub at North Lake and as a technology broker between school, district, and TIES. The role played by Nikki was an invaluable resource during this district initiative. She not only brought new ideas into the community, but she also modeled how new ways of teaching could be enacted in the specific context of North Lake. Identity shifts were an inevitable part of change, with some identities, such as Nikki's, aligning with the change, and some identities, such as Laurie's, becoming marginalized. In the case of this team, the teachers expressed genuine respect for each other's strengths and weaknesses, as evidenced in this description by Cynthia:

We just finished a service project. Laurie organized so much – she really took the lead. Then someone else will take the lead for the next project. We each take the lead on something we feel passionate about. It's like a flock of geese breaking the

air for the rest of us. We just follow along and then take the lead for the next project. (Interview, 12/9/2016)

Communities of practice (Wenger, 1998) that recognize identity, have structures for negotiating meaning, and are able to form a cohesive team identity support balanced integration of technology. These findings on teacher learning hold implications that will be further discussed in the implications and further directions portion of this chapter.

Research Question 2

Intermediary results pointed to more specific learning processes, as illustrated in the actions of Cynthia, the individual level participant for this study. Findings suggest that learning processes of modeling, goal setting, building efficacy, and reflecting on assessments influenced the integration of technology and the development of literacy conceptions in this teacher's classroom.

Modeling

Legitimate peripheral participation, teachers gaining access to knowledge and resources through working side by side with other and more knowledgeable teachers (Wenger, 1998), were perhaps the most valuable and accessible learning opportunities for fourth grade teachers at North Lake. A shared responsibility for student learning formed a cohesive bond, allowing an environment of trust and respect. Teacher evaluations, often an area of contention and vulnerability, were valued in this grade level team as opportunities to learn from each other. Cynthia's response to watching Nikki teach a writing lesson was a turning point in Cynthia's understanding of how to implement the new curriculum, and she enacted her new understanding immediately when teaching

writing with her own class later in the day. Cynthia also modeled for other teachers, as in when she shared Read Theory with the special education teacher. Modeling between teachers was often quick, informal, and addressed a specific need. When learning how to teach shared documents, for example, Cynthia modeled the technical aspects for Laurie while also commenting on student responses and the end goals of the project. The situated modeling enabled a nuanced understanding, supporting efficacy in other team members.

Goal Setting

As teachers negotiate meaning regarding the implementation of curriculum, goal setting was shown to be a conceptual process supporting enactment and the efficacy of teachers. The fourth grade team was struggling particularly with the writing curriculum this year, due to the combined disruptions of new curriculum materials and new expectations for digital writing. During the meeting described in intermediary findings, teachers began to reify certain aspects of the writing curriculum, such as the structure of the world cultures report and the need for developmentally appropriate reading material, while continuing to negotiate grade level goals for research skills. With the guidance of the media specialist, they were able to find digital access to appropriate reading material and also set some pacing goals for the report. Cynthia, at the individual level, enacted the collective thinking directly and tangibly in her plan book. Her planning included proximal goals, such as having drafts completed by the end of the week, and distal goals, such as project presentation day. Also included in Cynthia's planning were notes on portions of the new curriculum that she needed to study. Findings from this portion of

my research suggest that goal setting is an essential piece in enacting the negotiated meaning of literacy.

Efficacy

As described in the intermediary findings, efficacy and identity were closely linked in learning to integrate technology and enacting new understandings of literacy in this setting. Participation and marginalization played heavily into how teachers were identified as those educators who embed technology into literacy instruction. Cynthia, although recognized as an insider regarding tech use by the community of North Lake, moved between participation and marginalization when it came to literacy instruction. She placed high value on students reading paper books, and grounded her reading instruction in the Houghton Mifflin basal reading series. However, she took initiative with implementing technology when it made sense for her specific context. Decisions regarding literacy instruction were filtered through her experience as a teacher, such as when she explained affordances of the app Socrative in regards to vocabulary instruction.

Cynthia approached technology integration through a stance of curiosity and a disposition toward learning. She actively posed and sought answers to instructional questions, maintaining access to knowledge and resources through involvement in district and TIES offerings, as well as serving as mentor and model for other team members. In this way, her identity as an instructional leader was recognized by the community, and her self-efficacy for teaching contemporary literacies was enhanced.

Reflection

In this study, Cynthia reflected on her teaching in a variety of ways, the most visible of which was her thinking about assessments for literacy instruction. Students were assessed through standardized tests, fluency timed tests, and a new comprehension assessment in electronic form during the time that I was in the classroom. They also took one paper/pencil test at the end of the reading unit. Cynthia reflected on the results of these assessments as they directly pertained to instructional decision-making and selection of assessment tools. When asked about the number of assessment data points accumulated for each student, she reflected that there were so many of them that she feels as though her relationship with students changed by taking time away from working directly with them: “The scores are just one more thing to monitor and the results do not always merit the time and energy” (Observation 1/6/2016). As Cynthia reflected on the uses of assessments in her classroom, her understanding of what it meant to teach literacy in a context where most assessments are electronically administered, monitored, and reported shifted.

Research Question 3

Results at the context level generate a picture of literacy defined through reading, writing, speaking, and listening, with a strong emphasis on reading. Higher order thinking skills and the ability to work across multiple formats were marked as valued outcomes of literacy programs. Teachers generally considered themselves as providing balanced literacy instruction that immersed students in literature, and worked to cultivate

readers who were critical, thoughtful, independent, and motivated. Results indicated a cohesive school-wide purpose for literacy instruction focused on communication.

North Lake sits in the midst of a district undergoing significant changes due to a recent bond referendum. These changes cause disruption in the day-to-day operations of literacy instruction through the introduction of new technology and professional development designed to shift district culture towards twenty-first century learning. This disruption created learning opportunities for all involved, often in unanticipated ways.

Intermediary data indicated that teachers relied heavily on district professional development to learn about the tools of technology, such as the new web based communications platform being introduced in the fall of 2016. Teachers also employed both formal and informal modes when learning instructional practices to integrate Chromebooks. These methods served the immediate goal of motivating teachers to integrate technology into regular, everyday use during literacy instruction. They did not necessarily shift conceptions of literacy as envisioned by leaders of contemporary thought.

There were a few incidences, however, that did induce a shift. Curiously, these incidences were not anticipated by the teachers and were not part of the professional development in which they participated. Several examples follow:

1. During Tammy's interview, she mentioned that one of her students used the speech to text function as an adaptation for dysgraphia. She noticed that the way she taught him to write is much different because of a greater need for the student to revise, edit, and to understand word meanings that the technology gets wrong.

She lamented that now all of her students have figured out speech to text, and her usual writing instruction no longer meets their needs. Her conceptions of writing in an age of speech to text composing will certainly require new understandings of what it means to be literate.

2. The fourth grade team embraced twenty-first understandings of literacy as collaborative. To reify, or make tangible, this belief, they have been designing instruction using shared documents. Laurie approached collaboration in a different way than the rest of the team, asking students to create tag board posters instead of shared slides. She noticed that group interaction was much different when students work in electronic environments and was hesitant to move group activities online. Nikki agreed with this sentiment when she mentioned, “At elementary it is all about relationships.” The team continued to negotiate meaning around contemporary literacy as collaborative, considering what that looks and sounds like with fourth grade students.
3. Teachers also noted that even with the electronic portal on their desktop computers, it was next to impossible to monitor what students were actually doing on the computers. In the above example of using shared documents, students discovered the chat function in Google and took “note passing” to an entirely new level. Other examples included students being on websites not needed for the task at hand, or spending time on Chromebooks when their attention was needed for non-electronic tasks. As a team, fourth grade teachers were struggling with how to “attend to the ethical responsibilities required by complex environments”

(NCTE, 2013). Shifts in classroom management, responsibility for learning, and time on task required different understandings of literacy.

4. Cynthia's lesson for her evaluation required students to navigate several websites in order to gather data about geographic regions of North America. As part of this lesson she deliberately modeled how to look for URLs and click on certain links to find the necessary information. In contemporary literacies, website navigation could be compared to concepts of print in traditional literacies. Cynthia's TPACK understanding assisted her in targeting the website navigation print concepts her students needed in order to complete this assignment. An additional aspect of this lesson was its presentation of geographic regions across North America, for example, presenting the Rocky Mountains as a region undivided by political boundaries. Cynthia included global perspectives in innovative ways in her teaching.

In conclusion, North Lake teacher conceptions of literacy developed through a combination of district initiatives and day-to-day interactions with students. Expectations for literacy were established by the district and promoted through professional development and performance expectations. Technology was delivered and teachers were expected to integrate it. School culture interpreted the district initiative through staff meetings and as teachers engaged in professional development offerings. The guidance of a skilled principal was essential in facilitating school-wide interpretation of such an initiative. Students, although always an aspect of such discussions, become the central focus at the team level of inquiry, and here is where deep shifts in understanding

literacy began to occur. Teachers wrestled with the immediacy of student literacy needs in an environment between worlds. In order to succeed in their joint enterprise of teaching the fourth grade class, the teachers continued to negotiate meaning around what it means to be literate in contemporary society.

From these findings I am able to draw conclusions about how teachers learn to integrate technology for literacy instruction, processes valuable to this learning, and ways in which teacher conceptions of literacy develop. Implications for school leaders, teachers, teacher educators, and researchers are included in these conclusions, with an eye toward teacher learning in order to structure experiences fostering contemporary literacy practices.

Conclusions and Implications for Teacher Learning

Formal Teacher Learning

Findings from this study suggest that formal professional development in the area of integrating technology for teaching literacy is instrumental in providing access to resources and knowledge and sets the stage for further learning. Formal professional development occurs both inside and outside of the district. I begin with district conclusions and implications, followed by conclusions and implications for opportunities outside the district.

District professional development. North Lake teachers were required to attend entry-level training on specific technologies, including district-wide platforms and specific 1:1 technology tools, Chromebooks in the case of the fourth grade teachers. Additional professional development was offered through layered options. Optional

district sponsored professional development in which the fourth grade teachers participated included: Tech Cohort (Cynthia and Nikki), district technology specialist classroom support (Tammy), and Global Savvy (Cynthia and Nikki). The required professional development established groundwork and common discourse across the district, as well as establishing district philosophy and expectations stemming from the recent initiative. Further participation in district professional development was left to the initiative of individual teachers. Teachers participating in supplemental district professional development opportunities brought access to additional resources and knowledge back to North Lake, where the team negotiated meaning of the knowledge as it pertained to the specific context of North Lake fourth grade. Further dissemination of the new knowledge occurred through more informal methods.

Concluding that district professional development is instrumental in teacher learning suggests several implications for school leaders. First and foremost, an effective technology initiative is supported through a cohesive, multi-layered, and responsive professional development plan that is grounded securely in the foundations of district philosophy. District philosophy provides the impetus for teachers to reach for contextually connected learning that thrives through administrative support, the development of efficacy for technology integration, and opportunities for teachers who identify as technology implementation leaders in schools. At North Lake, teachers access district professional development at multiple layers, from the yearlong cohort to an hour of classroom modeling. The district technology specialist is accessible through phone or email, and the school has a technology support paraprofessional on site. As suggested by

professional organizations (International Literacy Association (ILA), International Society for Technology in Education (ISTE)) school leaders should create budgets allowing for sustainable, accessible professional development. I suggest that this model of formal district professional development encourages teachers toward further learning and deeper understandings of contemporary literacy.

A second implication for school leaders lies in establishing minimum requirements for professional development that are aligned with the initiative. Establishing common discourse and expectations fosters school level and grade level abilities to negotiate meaning for individual contexts. During the January staff meeting at North Lake, district representatives presented information on the new communications platform being adopted by the district. During this meeting they described opportunities for training on the new system, with layers of professional development including in-person intensive training with compensation, online training with compensation, and the minimum opening week workshops that all salaried teachers in the district were expected to attend. District representatives named themselves as access points and provided website links for more information, alerting teachers to look for more information in the spring. Clearly, the expectation was that all teachers would participate at some level and were responsible for basic information. Grade level team discussions following this meeting involved some discussion as to levels of participation each teacher was considering. Teachers also considered aspects from the current platform they hoped that the new platform would support, such as when Cynthia asked how the new platform would engage parents. District information and expectations provided tangible material

for teachers to begin the process of participation and reification regarding new tools of communication.

A third implication for school leaders beyond establishing groundwork for the initiative is to ensure sustainable opportunities for continued teacher learning. These opportunities should become more flexible as teachers begin to implement technology during instruction, allowing space for teachers to learn at increasingly independent levels as instructional practice shifts. This was evident at North Lake when Tammy, who was new to fourth grade, requested district support specific to fourth grade literacy learning targets. Her needs were more individualized and already beyond district requirements.

Implications for teachers regarding formal district professional development related to technology initiatives include approaching required inservice with an open mind. I suggest methods of participation that are particularly helpful including, 1) attend to underlying connections to district philosophy, 2) reflect on how individual conceptions of literacy and technology integration are in alignment or in conflict with district goals, 3) note access information for follow up questions, and 4) consider possibilities for further participation in professional development in a similar vein and possible influence on teacher identity.

Teacher preparation efforts to support continued professional learning in an age where conceptions of literacy change quickly and contexts are increasingly complex (Coiro, Knobel, Lankshear, & Leu, 2008) should consider fostering dispositions to encourage continual formal professional learning (Hammerness, Darling-Hammond, & Bransford, 2005). When asked about qualities new teachers should have on entering the

teaching profession, Cynthia remarked on the ability to deal with being overwhelmed. Nikki corroborated this idea when she mentioned that new teachers need to be able to keep up with the rate of change. Processes and habits of reflection are instrumental in managing the feelings of being overwhelmed with the tasks and requirements of teaching. These feelings can be addressed in part by targeting access to knowledge and resources within individual zones of proximal development and aligning with individual interests. By including conceptual tools and processes of reflection in teacher education programs, teacher candidates are better equipped to learn in the complex and changing environments of contemporary literacy (Bransford, Darling-Hammond, & LePage, 2005).

Non-district professional development. Professional development outside of the district provides important avenues for teacher learning. At North Lake, formal professional development outside of district offerings occurred through participation in TIES and in taking classes (unspecified sources). For example, Cynthia's and Nikki's participation as TIES presenters created learning for the entire team as they brought perspectives beyond those of the district into the meaning making process at North Lake.

Implications for school leaders include making allowances for teachers to attend non-district learning opportunities by providing substitutes and covering costs of participation where possible. North Lake has access to Super Subs, substitute teachers with school specific training, and through proactive budgeting and ensuring that classes are being covered by competent substitute teachers, the principal supports teachers in attending professional development. Encouragement is embedded into sustainable school policy as well as being verbally supported.

One option for professional learning that was not in evidence at North Lake was participation in professional literacy organizations, such as ILA or NCTE at the state and national levels. These organizations provide access to the leading edge of contemporary thought around literacy and are a valuable resource in teacher learning. I suggest that professional organizations at the state level in particular closely examine communication with intended membership to explore how to best meet learning needs of a changing population. Implications for teachers also include exploring websites, journals, and attending conferences of professional organizations as they evolve in tandem with societal advances. Teacher educators would do well to introduce teacher candidates to professional organizations, providing access and expectations for participation in the learning opportunities afforded through professional literacy organizations.

Informal Teacher Learning

This study found that informal teacher learning included social media, trial and error, and, most importantly, learning from other teachers. Informal teacher learning plays a vital role in a teacher's ability to learn in situated contexts and to enact learning, and I put forth implications for teacher leaders, teachers, and teacher educators. I begin with social media, proceed to trial and error, and conclude with learning from other teachers.

Social media. Social media can be a valuable way for teachers to connect with, participate in, and learn about literacy instruction. Twitter was the most common social media tool mentioned by North Lake teachers, with blogs by other teachers and Pinterest also receiving mentions. Whether reliable or not, social media is a source of teacher

learning. I propose that educators embrace social media as a valid learning tool and explore avenues that build on the affordances, such as accessibility, affordability, portability, and immediacy. Embracing also requires that teachers respectfully critique the content of information shared, examining ideas for their basis in research and evidence of best practices. The large networks that can be created support learning and thoughtful critique of ideas across a wide range of influences and perspectives on contemporary literacies.

Implications grounded in this conclusion are primarily for teacher educators. Like the caution indicated above, social media is an effective tool for teacher learning when teachers filter the accumulated information through sound pedagogical and content understandings. The charge for teacher educators is to build pedagogical and content knowledge with teacher candidates, enhance candidates' abilities to critique a variety of resources for their quality, and design mastery experiences (Tschannen-Moran, Hoy & Hoy, 1998) in which teacher candidates apply this knowledge to decision making using a wide variety of instructional resources. Mastery experiences create efficacy (Tschannen-Moran et al., 1998), and include experiences that are part of the formation of teacher identity and support novice teachers as they move into the profession. Teacher educators who provide mastery experiences in making instructional decisions grounded in pedagogical and content knowledge also supports teacher candidates' self efficacy for future selection of instructional materials.

Another way that teacher preparation programs foster technology integration is through modeling organization of electronic resources. This can be done through

modeling of specific tools, such as Evernote or PDF organizers, but I suggest a more effective approach is to explore categories of tools to manage electronic resources such as those suggested by Beach and O'Brien (2015). Teacher candidates' abilities to manage the flood of electronic resources available is an essential skill that supports efficacy.

Implications are also offered for professional organizations and school leaders, as well as for teacher educators. I suggest that accessibility through social media may be an avenue for learning that could be used to greater advantage. For example, The International Society for Technology in Education (ISTE) fosters member participation through a variety of flexible, interactive portals. NCTE and ILA also include connections through Twitter, Facebook, and informative blogs. Active engagement in these social media tools by teacher educators models effective use of social media as well as inviting teacher candidates to connect with reliable sources for learning. Implications for school leaders and professional organizations are to consider ways in which district sponsored social media can be designed in order to foster informal engagement with literacy learning.

Trial and error. Teachers learn in and through action. This was in evidence in Cynthia's learning as she worked with implementing Read Theory to build her students' comprehension. Cynthia found the app through the suggestion of a peer, researched it online, and began using it in her classroom experimentally. She learned best methods for implementation through a process of continual reflection on student engagement and electronic score results. Cynthia's initiative in searching out and implementing Read Theory points to a sense of efficacy that is indicative of her teacher identity. It also

points to a school culture fostering risk taking and teacher initiative. In concert with understandings that teacher learning should be embedded in practice (Dillon, O'Brien, Sato, & Kelly, 2011) findings from this study support trial and error as a situated method of teacher learning, and hold implications for the creation of a school culture supporting inquiry as a valued method of learning.

Implications for teacher education include embedding inquiry practices into programs, including the ability to ask questions, access reliable resources, and evaluate progress using reliable data. Engagement in examining practice through cycles of inquiry has been shown to influence teacher learning (Sato, Wei, Darling-Hammond, 2008), and as evidenced by the implementation of performance assessments such as the edTPA. Findings from my study align with these practices, in that engaging in cycles of inquiry holds affordances for managing the rate of change and supporting the ability of teachers to effectively learn in complex environments.

Implications for school leaders include finding a place in district professional development to support cycles of inquiry. Literacy coaches with expertise in inquiry methods are a valuable resource, as demonstrated in Cynthia's teaching evaluation. Her debriefing session included Nikki, who had completed the evaluation, and also a district instructional coach. The lesson centered on Cynthia's implementation of website navigation and research strategies, something she was trying for the first time with her students. Although I do not have data from the evaluation follow up meeting itself, Cynthia later commented on how the reflective conversation assisted her learning. Perhaps the most important implication for teacher leaders is the value of establishing a

school culture in which risk taking is supported and teachers are encouraged to try novel approaches grounded in processes of inquiry.

Learning from other teachers. Studies of novice teacher mentorship and the student teaching apprenticeship model attest to the understanding that teachers learn from other teachers. Results from my study concur with the generally accepted value of teachers learning from their peers. In the case of situated learning for the integration of technology in literacy instruction, my findings are presented through a Communities of Practice model (Wenger, 1998). In this model a community of practice is identified as a community formed around a specific practice being mutually engaged in a joint enterprise and sharing a common repertoire. This definition assists in identifying conclusions and implications specific to developing conceptions of literacy in situated contexts. Teachers engage in legitimate peripheral participation by gaining access to resources and knowledge when working side by side with other teachers. This process is particularly supportive when gaining technological knowledge such as learning how to use technological tools of literacy such as shared documents or specific assessment applications. Teachers negotiate the meaning of literacy instruction through processes of participation and reification, as when making curriculum adaptations in alignment with new district philosophy. Teachers also negotiate meaning regarding translations and interpretations of practice, such as during team meetings centered on how to interpret fourth grade writing standards in light of new curriculum. Movement connecting the community with other communities and the larger constellation of the district is facilitated through brokers, such as the role the school media specialist played in

redesigning the fourth grade research project. I theorize that the Communities of Practice Model (Wenger, 1998) is an effective framework through which to study teacher integration of technology and developing conceptions of literacy. Coiro, Knobel, Lankshear, and Leu (2008) suggest that new literacy practices require an openness toward reinterpreting research methods to meet the needs of new literacy paradigms. This holds implications for researchers in considering Communities of Practice (Wenger, 1998) as a valid methodology for the study of teacher practice around contemporary literacy.

Further, Communities of Practice (Wenger, 1998) can identify specific processes in which teacher communities engage when learning together. Findings from my study support the conclusion that concepts included in the Communities of Practice Model effectively describe teacher learning in the following ways: 1) processes of legitimate peripheral participation, 2) negotiating meaning through participation and reification, 3) movement toward and away from the center of practice through processes of participation and marginalization, and 4) connecting with the larger community through practices of globalization.

Implications for school leaders, particularly principals, include intentionally creating balanced teams of teachers to blend experience, interest, and expertise. Principals generally are responsible for scheduling, and designing schedules that allow for collaborative teacher planning time. This practice is reemphasized through the results of my study. North Lake teachers participated in regular weekly meetings on the same day of the week, allowing the principal the opportunity to visit each grade level team in

turn. In addition, the fourth grade team held common planning time on either side of the lunch hour, enabling opportunities for informal learning. At this school, the team also takes one full day each spring to plan for the following year. The teachers commented vigorously on how this day supported technology integration and establishing goals for literacy by envisioning themes and projects for the upcoming year.

Implications for teachers include an awareness of one's own teaching identity and how the different identities in the community interact. A well- functioning community respects each other and shares responsibilities. Mutual accountability for a larger goal, such as the learning of students at a specific grade level, unites teachers in common purpose (Engeström, 1987/2015). Keeping this purpose in mind, along with district and school expectations, can form a structure in which the community operates. Dispositions of collaborative inquiry support successful community learning. This was observed as teachers in the fourth grade team wondered about the impact speech to text applications would have on writing instruction.

Additional implications for teachers include awareness of communities of practice concepts. Modeling successful practice and sharing access to knowledge and resources support learning through legitimate peripheral participation. Little (2001) suggests that by making artifacts of teaching visible, teachers are able to reflect on the essentiality of the artifacts, thereby reifying valued aspects and changing others. As seen in the example of Laurie's understanding of collaborative writing, often marginalization or moving away from the center, can deepen understanding as teachers struggle with a central concept of contemporary literacy. Findings also point to the value of inviting a broker to participate

in discussions, a strategy that communities of practice may want to engage in at certain times.

Implications for teacher educators stem from findings pertaining to teachers. Awareness of teacher identity and dispositions of reflective practice supporting the development of teacher identities may facilitate newcomer entry into a school community (Bransford, Darling-Hammond, & LePage, 2005). As mentioned previously, reflection on identity is a commonly accepted practice at many institutions of teacher preparation, and findings from my study nuance this practice toward awareness of how identity interacts with efficacy for technology integration. Teacher education programs can support development of the elements of communities of practice through embedding collaborative practices and reflecting on group dynamics.

Conclusions from this study regarding formal and informal methods of teacher learning fostering technology integration for literacy instruction hold implications for school leaders, teachers, teacher educators, and researchers. I turn now to learning processes.

Conclusions and Implications for Teacher Learning Processes

Sociocognitive concepts of modeling, goal setting, efficacy, and reflection were found to support enactment of the integration of technology in literacy instruction. The situated individual level of this case study generated results pointing to the value of these cognitive processes for technology integration and new understandings of literacy. Not only did findings indicate that these processes supported Cynthia's learning, they also showed ways in which she enacted her learning, thereby moving more fully into the

learning process. From the results of my study in conjunction with sociocognitive understandings of learning (Bandura, 1986), I conclude that cognitive processes support teacher learning in contexts of contemporary literacy.

Cognitive processes involved in shifting conceptions of literacy call for further investigation by researchers. Implications point to a need for research in the area of how these processes support shift, including additional examples in a variety of teacher learning contexts. As societal understandings adapt in conjunction with technological advances, teaching for literacy must keep pace. The study of cognitive processes may hold answers to how teachers can adapt to changing contexts with efficacy and assurance that instruction is aligned with objectives for student learning. Cognitive processes may also shed light on the enactment of learning. Cynthia illustrated this when, following a rather intense fourth grade meeting centered on writing instruction, she wrote both proximal and distal goals in her planner and immediately changed instructional materials to meet those goals. Implications for school leaders, teachers, and teacher educators follow a similar trajectory. Awareness of cognitive processes, and how this awareness can shift a teacher to take up new practices, should be considered as part of literacy teacher learning. School leaders, teachers, and teacher educators all play a part in incorporating these processes into practice.

Reflection on identity, efficacy, and associated motivations are essential aspects in shifting teacher beliefs in many areas. Unique to this study is the applicability of cognitive processes to “managing multiple streams of simultaneous information” (NCTE, 2013) in dealing with feelings of being overwhelmed. I suggest a particular emphasis on

introducing cognitive tools, such as the inquiry cycle of teaching, TPACK, or the RAT framework to assist teachers in both individual and collective reflective processes. Among the teachers at North Lake, these tools were mentioned in the survey but I did not witness their use in my observations or as part of personal learning discussed in interviews. Continued exploration into how these tools might help teachers connect learning to practice is an area of interest.

Continuing to consider implications for ways in which conceptual processes influence teacher learning, I turn now to developing conceptions of literacy.

Conclusions and Implications for Developing Conceptions of Literacy

Several conclusions regarding developing teacher conceptions of literacy at North Lake Elementary can be drawn from the findings of this study. First, teacher conceptions of literacy tend to be grounded in policy, district philosophy, and published teaching materials. Secondly, motivations for shifts in conceptions of literacy often come from unintended and unanticipated sources, particularly students. Expert teachers with a stable knowledge base are able to adapt to unexpected situations arising from technology integration, and learn from these experiences (Snow, Griffin, & Burns, 2005). Third, visioning of contemporary literacy is essential for moving into practice (Bransford et al., 2005). I suggest implications for these conclusions in the following section.

Teacher Understandings of Literacy

At North Lake, the underlying purpose of literacy was communication. This was evidenced in data at all three levels of the case. Teachers further described literacy through language used in the Common Core State Standards (CCSS), including reading,

writing, speaking, and listening. I found this interesting because standards for the state in which North Lake resides include viewing and media literacy as additions to CCSS definitions of literacy, yet these strands were not part of understandings of literacy as revealed in my data. Implications for school leaders include promoting the full spectrum of literacy practices through professional development and teaching resources, particularly curriculum materials. A comprehensive philosophy of literacy undergirding district expectations for student learning would guide implementation of literacy goals more directly connected to digital environments, such as viewing and media literacy.

Implications for teachers include broadening definitions of literacy to include multimodality and the ability to analyze and critically evaluate texts for multiple purposes. Most teachers at North Lake regarded literacy as synonymous to reading, specifically in areas of fluency, vocabulary, and comprehension. I would suggest that teachers engage in inquiry around how these understandings of literacy can be applied in literacy environments that include technology. Cynthia gives us a clear example as she taught students the skills needed to navigate websites and search for specific information through a process that could be compared to teaching concepts of print with emergent readers and writers. Similar explorations would create bridges between traditional and contemporary understandings of literacy instruction. Teacher educators are instrumental not only in establishing grounding in literacy foundations, particularly word structure, fluency, vocabulary, comprehension, oral language, and motivation, but also in providing mastery experiences and tools through which teacher candidates can expand their repertoire with efficacy.

As with school leaders, teacher educators are charged with establishing frameworks through which novice teachers develop an expanded definition of literacy. Moreover, as research continues to explore contemporary literacy, institutions of teacher preparation hold the responsibility for interpreting and translating this research into practice. Collectively, institutions of teacher preparation and literacy education hold an expanded view of literacy, seeing the broader social and historical contexts through which conceptions of literacy develop and are enacted. Engagement in processes of negotiated meaning, participation and reification, and globalization are areas particularly relevant to researchers and teacher educators alike as societal understandings of literacy mutually interact with advances in technology. This expertise must move out of the institutions themselves (Darling-Hammond, 2016) to influence policy, district philosophies, and the development of curricular materials, the primary tools through which teachers ground their practice.

Conceptual Shifts

Good teachers learn as much from their students as the students learn from their teachers. Nowhere in my data was this more in evidence than in the unanticipated consequences of implementing one-to-one Chromebooks with the fourth graders at North Lake. The teachers in my study were experienced and innovative, ideally situated with access to resources and knowledge, and a well-functioning, balanced team with supportive administration. They were engaged with implementation of Chromebooks and had a collective identity as literacy and technology leaders at the school. These teachers were well versed in district philosophy and expectations and were moving

toward fuller participation in district efforts to create environments complimenting current educational contexts. However, their conceptions of literacy were not shaken until the students entered the picture. As teachers wrestled with the meaning of collaborative writing, students pushed boundaries past the intended outcome of the task. Monitoring of student time on task and ability to self-regulate in digital spaces generated much discussion about the purposes of literacy. And, finally, digital affordances, such as speech to text functions, shift understandings of what it means to be literate (e.g. Is composing a narrative through the speech to text function considered writing or speech?) and the associated implications for instruction.

A conclusion that has implications for teachers and school leaders is that motivation for conceptual shifts in literacy understandings often emerges through the act of integrating technology tools for literacy, particularly in the necessity of creating school climates of trust and inquiry based thinking. In addition, these instances did not occur in a vacuum. Teachers were well equipped to recognize the unintended consequences and had access to resources as well as to the support of engagement in communities of practice processes toward the mutual goal of teaching fourth grade literacy. Cynthia commented on the importance of humility when in new situations. She, and the rest of the fourth grade team, approached unintended consequences with a great deal of humility balanced with efficacy for problem solving. I suggest that this balance is an essential component of shifting conceptions of literacy.

Implications for teacher educators include embedding experiences with technology integration in real contexts with real students, complimented with

opportunities for collective and individual reflection. Novice teachers who have the dispositions and ability to anticipate student responses will be better equipped to recognize and learn from technology integration experiences (Snow et al., 2005). Institutions of teacher preparation can support this learning through research exploring patterns emerging from student responses to contemporary literacy instruction that motivate shifts in teacher conceptions of literacy. Noting changes in classroom environments might be one example. I explore this further in the future directions section.

Visioning

A comment often made by teachers at North Lake as they were designing literacy experiences was, “I just can’t see it.” Teachers had the learning goals, curricular tools, and the technology tools, but struggled with envisioning the actual lesson in action. This is not surprising, since there are very few models of elementary teaching and learning that embrace contemporary understandings of literacy. Implications are similar across interest groups. Teachers need access to models of contemporary literacies in action in order to imagine their own classrooms in such contexts. Professional development centered on knowledge building and philosophical discussions lays the groundwork for developing teacher conceptions of literacy, while models, such as observing expert teachers in person or through videos, bring theory to life. I suggest that embedding such models is essential to professional development experiences at all levels of teacher learning.

Implications also include ensuring time and processes of visioning literacy instruction in the situated contexts of individual classrooms. Research suggests that learning takes place in the situated contexts of teaching and learning (Dillon et al., 2011; Hammerness et al., 2005; & NRC, 2001) and teacher learning benefits from envisioning possibilities for new literacy practices in their daily routines. Instructional leaders, such as principals and literacy coaches, are key individuals in this endeavor. At North Lake I observed teachers engaged in mental struggles that could have been facilitated by a skilled coach or a set of structured questions that the team could work through collectively. Teacher education courses should also include opportunities for visioning as well as fostering collaborative reflective structures and peer coaching methods.

The development and continual negotiation of meaning surrounding literacy instruction and what it means to be literate in contemporary society is grounded in policy and curricular materials, motivated by reflection on the consequences of implementation, and developed through visioning. These conclusions suggest implications for those involved in teacher learning from preservice to experienced practitioner levels. They also hold implications for those responsible for creating school environments and fostering dispositions in the teaching profession. The following section puts forth directions for future research.

Future Directions for Research

This study concludes with several remaining questions and suggestions for future research. Literacy and technology inform each other today as they have throughout history; however, the pace of present day technological advances creates urgency for

literacy educators to consider ways to study teacher learning for contemporary literacy contexts and the accompanying processes that facilitate situated enactment.

Communities of Practice

This study demonstrated that Communities of Practice (Wenger, 1998) is a theoretical frame holding much promise for the study of contemporary literacy instruction. Concepts including participation and reification are effective lenses for exploring how teachers negotiate the essentialities of literacy instruction and modify their teaching according to new understandings or expectations. My data analyses revealed the importance of brokers in teachers' ability to negotiate meaning, and in accessing and evaluating resources and knowledge. In addition, processes of legitimate peripheral participation, including modeling and working side-by-side, hold promise for understanding situated enactment of technology integration.

Data and findings from my study were sufficient only to scratch the surface of specific ways in which communities of practice concepts can be used to explore teacher learning. Further research may include more directed studies following the example of researchers who have used this framework in the past to better understand how teacher interactions create learning experiences (e.g. Grossman, Wineburg, & Woolworth, 2001). Cynthia hinted that the fourth grade team was a critical element of her efficacy and ability to adapt to new district expectations. Deeper exploration of this topic provides direction for future research.

In addition to holding promise as a research framework, the Communities of Practice Model (Wenger, 1998) provides a definition for collaborative teacher growth.

Learning communities are common in many schools, but often do not fulfill the need inherent in the moniker, “learning community.” At North Lake I observed teachers immersed in practical and logistical responsibilities, such as reviewing assessment data or scheduling field trips. I also observed problem solving around some of the issues emerging from practice, and teachers engaged in meaningful discussions regarding the goals of literacy and how to accomplish those goals. Future research may seek to better understand how communities of practice elements of mutual engagement, joint enterprise, and shared repertoire support teacher learning.

Teacher Learning in Action

Additional questions arising from this research relate to ways in which teachers learn in and through the act of teaching. Schön (1983) suggests that the process of reflecting in action produces learning, and I wonder what this looks like in contemporary classrooms. During my observations I was able to watch as Cynthia moved from a team discussion on writing, to her planner, to changing instructional materials, to instruction. However, my instruments were not sensitive enough to capture a clear picture of her enactment, or of her thought processes as she was engaged in the act of teaching.

Conceptual processes guiding enactment of literacy understandings, such as the response Cynthia had to Nikki’s modeling of a writing lesson, or the goal setting described in the above paragraph, may also be an area for further research.

Guided by my studies in other areas of my graduate work, I suspect that activity theory (Engeström, 1987/2015) may provide the concepts and tools necessary for further study. Other researchers (Lee, 2013) have used activity theory successfully to study

situated contemporary literacies in explicit and detailed ways. The result of such studies may generate patterns of enactment used by successful teachers to create theories and models for use by teacher educators and school leaders.

Learning Environments

My research took place in a school in the midst of a district-wide initiative. This ambitious initiative featured building construction and redesign, including the purchase of flexible furniture, a new communications platform, layered professional development, and one-to-one implementation of technology. The goal of creating learning environments for contemporary teaching and learning is of great interest to me, particularly in how it might create opportunities to find patterns and models of technology integration in practice that could be instructive for other teachers. Conclusions from my study are not generalizable but are transferable to similar sites. The possibility of studying a change of this scope as it occurs is an opportunity not to be missed.

Practical Applications

As a teacher educator, practical insights from this research inform my work with teacher candidates. This research provided a model of how technology instruction for literacy education happens in schools. Above all, this research supports the critical importance of building strong pedagogy and literacy content knowledge with teacher candidates as a foundation for further learning (Dillon et al., 2011; Hammerness et al., 2005; NRC, 2001). Additionally, efforts to embed mastery experiences (Tschannen-Moran et al., 1998) in applying that knowledge to instructional decision making and

practical experiences mirror the processes I observed in the teachers at North Lake. Conceptual processes, such as motivational processes of modeling, goal setting, identity formation, and especially reflection, as well as tools such as the inquiry cycle, TPACK, and RAT Framework, foster efficacy in novice teachers and are an area of continual study in my own practice.

On a closing note, during one observation involving a discussion on student teachers, Cynthia remarked:

New teachers may be more comfortable with the technology but the successful integration of tech has more to do with dispositions of being able to deal with overwhelm, to adapt to change, to be able to think on your feet, and to be willing to try. The most important thing for new team members to come in with is humility. (Interview, 1/21/2016)

This statement remains with me as I work with future teachers and continue in research to inform the work of teacher education.

In conclusion, given the increasing importance of technology in everyday literacy practices, it is imperative that literacy researchers explore ways to develop teachers' abilities to meet the learning needs of students in contemporary society. Research methodologies and theoretical concepts must be applied in fresh ways in attempts to build bridges between currently held conceptions of literacy and emerging conceptions of literacy. Implications for preservice and practicing teacher learning call for models and

ways of interacting to create situated opportunities for learning. As John Dewey (1938) suggests:

We always live at the time we live and not at some other time, and only by extracting at each present time the full meaning of each present experience are we prepared for doing the same thing in the future. This is the only preparation, which in the long run amounts to anything. (p. 49)

This study points to ways in which we might capture experiences of teacher learning for the time in which we live and in preparation for the future. We hold this common enterprise as a community of learners, in trust for future generations.

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Appendix A
Context Level Survey

**Survey of 21st Century Literacy Teacher Learning and Integration of Technology
for Literacy Instruction Part 1**

Directions: Please respond to the following questions.

Demographic Information

1. What category best describes your current teaching position?

_____ K – 2 classroom teacher

_____ 3 – 5 classroom teacher

_____ Specialist

_____ Other

2. How many total years have you spent as a teacher? (Include current year.)

3. What do you think it means to be literate in the 21st century? Respond in a couple of sentences.

4. Describe ways in which you learn how to integrate technology for literacy instruction.

**Survey of 21st Century Literacy Teacher Learning and Integration of Technology
for Literacy Instruction Part 2**

Reading Instruction

5. The following statements represent various perspectives, philosophies, or beliefs toward the teaching and learning of reading. Check up to 3 of the following statements that apply to you personally.

_____ I would describe myself as a “traditionalist” when it comes to reading methods and materials.

_____ I have an “eclectic” attitude toward reading instruction, which means that I would draw from multiple perspectives and sets of materials when teaching reading.

_____ I would describe myself as a whole language teacher.

_____ I believe in a balanced approach to reading instruction, which combines skills development with literature and language-rich activities.

_____ I believe in a literature-based approach to reading instruction in which trade books (i.e., children’s books or library books) would be used exclusively or heavily.

_____ I believe that basal reading materials are useful tools for teaching students to read, either as the primary instructional material or along with trade books (i.e., children’s books or library books).

_____ I believe students need to be immersed in literature and literacy experiences in order to become fluent readers.

6. The following statements represent various goals that teachers might have for a reading program. Rank the following statements from 1 – 4, with 1 being the most important goal and 4 being the least important goal.

_____ It is my goal to develop readers who are skillful and strategic in word identification, fluency, and reading comprehension.

_____ It is my goal to develop readers who are critical and thoughtful in using reading and writing to learn about people and ideas, and how they might use literacy to positively affect the world in which they live.

_____ It is my goal to develop readers who are independent and motivated to choose, appreciate and enjoy literature.

_____ It is my goal to develop readers who are knowledgeable about literacy forms or genres and about different text types or structures.

Technology Integration

7. Which statement best describes your use of technology in literacy instruction?

Check one.

_____ I use technology as a replacement of traditional learning tools. My instructional practices now use technology tools instead of paper, white boards, manipulative or other traditional materials.

_____ I use technology to amplify my instructional practices. My instructional is more effective through the use of technology. While my instructional goals have not changed, my capability to meet my goals has increased.

_____ I use technology to transform my instruction. My instruction has new goals, new roles or new structures than before I began using technology tools.

8. The following statements represent various goals that teachers might have for integrating technology into a literacy program. Rank the following statements from 1 – 6, with 1 being the most important goal and 6 being the least important goal.

_____ It is my goal to develop readers and writers who are proficient and fluent with the tools of technology.

_____ It is my goal to develop readers and writers who intentionally collaborate with others to pose and solve problems.

_____ It is my goal to develop readers and writers who design and share information for global communities.

_____ It is my goal to develop readers and writers who manage, analyze, and synthesize multiple streams of simultaneous information.

_____ It is my goal to develop readers and writers who create, critique, analyze and evaluate multimedia texts.

_____ It is my goal to develop readers and writers who attend to the ethical responsibilities required by complex environments.

Learning and Professional Development

9. In which of the following professional development activities have you participated during the past year? Check all that apply.

_____ District or school level professional development related to literacy and/or technology integration.

_____ Membership in literacy professional organizations (i.e. International Literacy Association, National Council for Teachers of English, Minnesota Reading Association)

_____ Classes pertaining to literacy (online or in person)

_____ Other professional development activities related to literacy instruction:

10. Check the response indicating how often you consult each resource when learning to integrate technology for literacy instruction.

	Always	Frequently	Occasionally	Never
Other classroom teachers				
School or district technology specialists				
On-line resources (websites, videos)				
Professional organizations				
Teaching materials (i.e. basal teaching manual).				
Social media (blogs, Pinterest)				

11. How else might you describe teacher learning in the area of technology integration for literacy instruction?

Appendix B
Interview Guides

Context Level (Principal and Technology Coordinator)

1. Historically, what has been the role of technology in literacy instruction in XXX Public Schools in general and at North Lake in particular?
2. Societal understandings of what it means to be literate are changing along with technologies used for literacy. How might you characterize literacy in the 21st century? What elements are important for elementary schools to incorporate?
3. How might you characterize teacher learning around technology integration for literacy instruction that is currently happening at North Lake?
4. What is your vision for the implementation of 1:1 Chromebooks in the upper elementary grades?
5. What do you see as your role in this implementation?
6. What else do you think might be important for this study to focus on, keeping in mind the context of North Lake?

Intermediate level (Grade level team members)

1. Societal understandings of what it means to be literate are changing along with technologies used for literacy. How might you characterize literacy in the 21st century? What elements are important for elementary schools to incorporate?
2. What is your vision for the implementation of 1:1 Chromebooks in your literacy instruction?
3. What are some ways in which you learn to integrate technology into literacy instruction?
4. What are some frustrations/barriers to routine integration of technology during literacy instruction?
5. What are some highlights/supports to routine integration of technology during literacy instruction?
6. Is there anything else that you think might be valuable for me to know in terms of the purpose for this research?

Appendix C

Study Introduction

The Integration of Technology in the Teaching of Literacy: A Study of Teacher Learning

The study purpose is to explore ways in which teachers learn to integrate technology into the teaching of literacy.

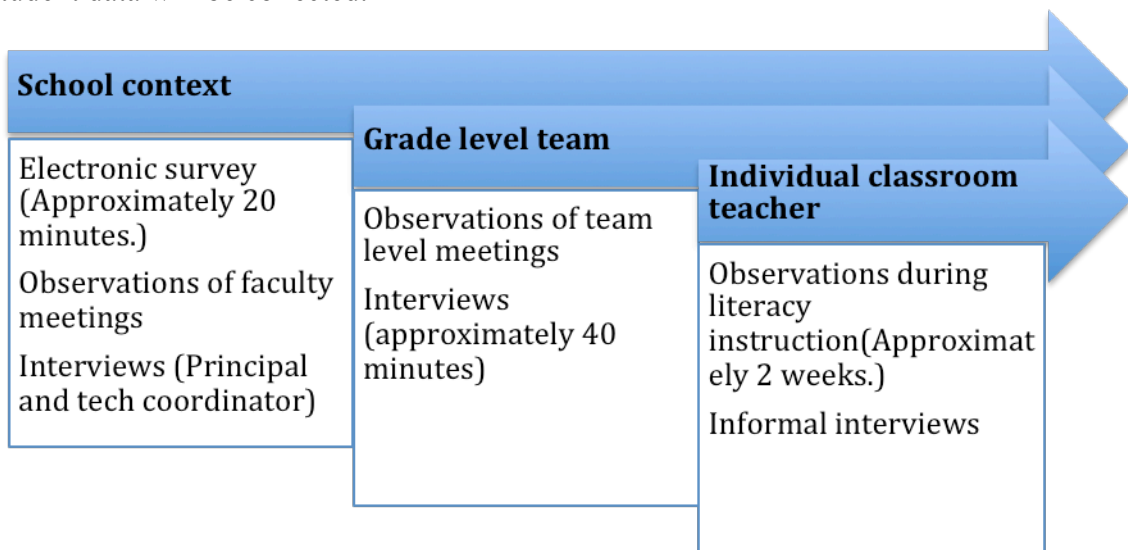
Why North Lake?

- established school culture embracing literacy
- recent technology initiative (Chromebooks)
- empowering leadership and vision

How does this study benefit North Lake?

Focus on how school communities collaborate.	Focus on processes that support technology integration.
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Data Collection occurs at three levels: School context, grade level team, and one teacher volunteer. All data will be confidential and secured according to University protocol. No student data will be collected.





Contact information:
Kathryn Allen
Email
xxx-xxx-xxxx