An examination of teachers' planning processes as they seek to integrate technology into literacy instruction

Lindsay Woodward

Iowa State University

Follow this and additional works at: https://lib.dr.iastate.edu/etd

Part of the Education Commons, and the English Language and Literature Commons

Recommended Citation

Woodward, Lindsay, 'An examination of teachers' planning processes as they seek to integrate technology into literacy instruction' (2016). Graduate Theses and Dissertations. 15220.
https://lib.dr.iastate.edu/etd/15220

This Dissertation is brought to you for free and open access by the Iowa State University Capstones, Theses and Dissertations at Iowa State University Digital Repository. It has been accepted for inclusion in Graduate Theses and Dissertations by an authorized administrator of Iowa State University Digital Repository. For more information, please contact digirep@iastate.edu.
An examination of teachers’ planning processes as they seek to integrate technology into literacy instruction

by

Lindsay Woodward

A dissertation submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Major: Education

Program of Study Committee:
Amy C. Hutchison, Major Professor
Donald Bear
Byeong-Young Cho
Isaac Gottesman
Donna Niday

Iowa State University
Ames, Iowa

2016

Copyright © Lindsay Woodward, 2016. All rights reserved.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIST OF FIGURES</td>
<td>iv</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>v</td>
</tr>
<tr>
<td>ACKNOWLEDGMENTS</td>
<td>vi</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>viii</td>
</tr>
<tr>
<td>CHAPTER 1 NATURE OF THE PROBLEM</td>
<td>1</td>
</tr>
<tr>
<td>Background</td>
<td>1</td>
</tr>
<tr>
<td>Significance of the Problem</td>
<td>3</td>
</tr>
<tr>
<td>Purpose of the Study</td>
<td>4</td>
</tr>
<tr>
<td>Research Questions</td>
<td>5</td>
</tr>
<tr>
<td>Theoretical Perspectives</td>
<td>5</td>
</tr>
<tr>
<td>Definition of Terms</td>
<td>8</td>
</tr>
<tr>
<td>Overview of the Study</td>
<td>9</td>
</tr>
<tr>
<td>CHAPTER 2 REVIEW OF THE LITERATURE</td>
<td>12</td>
</tr>
<tr>
<td>Introduction</td>
<td>12</td>
</tr>
<tr>
<td>Conceptual Framework</td>
<td>13</td>
</tr>
<tr>
<td>Technology Integration in Literacy</td>
<td>24</td>
</tr>
<tr>
<td>Teacher Lesson Planning</td>
<td>30</td>
</tr>
<tr>
<td>Summary</td>
<td>33</td>
</tr>
<tr>
<td>CHAPTER 3 METHODS</td>
<td>35</td>
</tr>
<tr>
<td>Introduction</td>
<td>35</td>
</tr>
<tr>
<td>Verbal Reporting Design</td>
<td>36</td>
</tr>
<tr>
<td>Participants</td>
<td>39</td>
</tr>
<tr>
<td>Methods and Data Collection</td>
<td>42</td>
</tr>
<tr>
<td>Data Analysis</td>
<td>50</td>
</tr>
<tr>
<td>Summary</td>
<td>55</td>
</tr>
<tr>
<td>CHAPTER 4 FINDINGS</td>
<td>56</td>
</tr>
<tr>
<td>Introduction</td>
<td>56</td>
</tr>
<tr>
<td>Teacher-Participant Profiles</td>
<td>57</td>
</tr>
<tr>
<td>Thematic Findings</td>
<td>67</td>
</tr>
<tr>
<td>Complexity of Teacher Knowledge</td>
<td>68</td>
</tr>
</tbody>
</table>
Orientation to Integrating Technology .......................................................... 82
Enactment of the Elements of the TIPC ...................................................... 92

CHAPTER 5 DISCUSSION AND IMPLICATIONS .............................................. 114

Introduction ...................................................................................................... 114
Conceptual Implications .................................................................................... 114
Methodological Implications ........................................................................... 120
Instructional Considerations ............................................................................ 121
Limitations ......................................................................................................... 123
Future Research ................................................................................................. 125

REFERENCES ..................................................................................................... 128

APPENDIX A: INSTITUTIONAL REVIEW BOARD APPROVAL ......................... 136
APPENDIX B: EMAIL INVITATION .................................................................. 137
APPENDIX C: PRACTICE THINK-ALOUD & TASK ....................................... 138
APPENDIX D: RETROSPECTIVE VERBAL REPORT .................................. 139
APPENDIX E: PRE-INTERVIEW ...................................................................... 140
APPENDIX F: POST-INTERVIEW ................................................................. 141
APPENDIX G: OBSERVATION RUBRIC ....................................................... 142
APPENDIX H: OBSERVATION PLANNING CYCLE RUBRIC ......................... 144
APPENDIX I: WEEKLY TECHNOLOGY USE QUESTIONS .............................. 146
iv

LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 2.1</td>
<td>The Technology Integration Planning Cycle for Literacy and Language Arts</td>
<td>29</td>
</tr>
<tr>
<td>Figure 3.1</td>
<td>Weekly Technology Daily Diary Selections</td>
<td>48</td>
</tr>
</tbody>
</table>
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Participant Demographic Information</td>
<td>42</td>
</tr>
<tr>
<td>3.2</td>
<td>Example Retrospective Verbal Protocol Questions</td>
<td>45</td>
</tr>
<tr>
<td>3.3</td>
<td>Document and Photo Data</td>
<td>50</td>
</tr>
<tr>
<td>3.4</td>
<td>First Cycle Data Analysis</td>
<td>52</td>
</tr>
<tr>
<td>3.5</td>
<td>Second Cycle Data Analysis</td>
<td>53</td>
</tr>
<tr>
<td>4.1</td>
<td>Teacher-Participant Information</td>
<td>58</td>
</tr>
<tr>
<td>4.2</td>
<td>Technology Integration Planning Cycle Codes</td>
<td>92</td>
</tr>
</tbody>
</table>
ACKNOWLEDGMENTS

I would like to acknowledge several people who have guided and supported me throughout my graduate work. First, the members of my committee have been invaluable to shaping who I am as a scholar. Dr. Donna Niday was the first faculty member I met from Iowa State, and her warmth and passion for her work inspired me to pursue my doctorate at ISU. Dr. Donald Bear has been an important mentor to me as I think about how to support students’ learning and has shaped my approach to teaching pre-service teachers about literacy, something that will resonate in my work for years to come. Dr. Isaac Gottesman challenged my thinking in important ways, and it is often questions that he posed in my first doctoral class that guide my reading and writing about research. Dr. Byeong-Young Cho took a chance on a doctoral student who showed up in his office one day asking about a research assistantship, which resulted in meaningful collaborations. Finally, I am simply very grateful to know my major professor, Dr. Amy Hutchison. Not only has she been an exceptional mentor to me, carefully reviewing my work, including me in exciting research projects, and guiding me as a doctoral student, but she has been a personal mentor as well. Dr. Hutchison’s remarkable work as a scholar, when coupled with her honest and approachable demeanor, has served to inspire me as I begin my own career.

I have had so many rich experiences as a member of the ISU community, not the least of which are the colleagues I gained and the friends I made. I had the pleasure of working with Chuck Achter in his Foundations of Education course for two years. I looked forward to our weekly meetings, as Chuck not only shared his work, but his life experiences and perspectives as well, and I thank him for that. I would also like to
acknowledge Drs. Beth Beschorner and Sarah Wilson for their friendship throughout graduate school, and now beyond. Your support and guidance was often a breath of fresh air during demanding times, and I am grateful for you both.

To my parents-Floyd and Evelyn Baker, you have both inspired me since before I put your picture on a Wheaties box in middle school and gave a presentation about how you were my heroes. The encouragement and support you have given me my whole life has made me the person I am today, and I am all the better for it. You are models for me, and I hope to be the kind of parent that you are to me.

To my sweet Olivia-you are the most wonderful thing to have ever happened to me. I look forward each day to seeing what new joke, dance move, or timed racing event you will have developed. You inspire me with your desire and capacity to learn, and you make me want to be the happiest, best me that I can be. I especially appreciate your hourly check-ins and the additions you made to this dissertation each time you stopped by.

To my husband-John, it is to you that I am most grateful, as none of this work would have been possible without you. From starting my doctoral program with late night classes and scrambled egg dinners at 9:30pm to days where you ran our household on your own while I worked, you have worked tirelessly in your support of my efforts. I truly don’t know how I’ll ever thank you enough for helping to make this dream of mine a reality.
This study examined the processes used by literacy teachers when planning to integrate technology into their instruction and the usefulness of the Technology Integration Planning Cycle (TIPC; Hutchison & Woodward, 2014a) for framing teachers’ planning processes. Three participants from a larger technology integration project completed a think-aloud session as they planned an upcoming literacy lesson in which they anticipated using technology. This study was designed as a think-aloud study (Pressley & Afflerbach, 1995; Cho & Woodward, 2014) with extensive complementary data (Cho, 2014; Coiro & Dobler, 2007; Zhang & Duke, 2011). In addition to concurrent and retrospective verbal protocols, data sources included: interviews, surveys and questionnaires, observations, and documents and photos. Analysis of data collected from these sources was conducted in two cycles, open-ended coding (Corbin & Strauss, 2008) then hypothesis coding (Saldaña, 2016). Findings indicated that participants utilized pedagogical content knowledge and technological pedagogical content knowledge in different ways when planning. Notably, misunderstandings about content knowledge may be somewhat accommodated by integrating technology into literacy instruction. Further, teachers each had different stances towards integrating technology that influenced their planned instruction. Finally, while most elements of the TIPC were found in the participants’ planning, teachers varied in their ability to focus on the instructional goal. Conceptual, methodological, and instructional implications are discussed.
CHAPTER 1

NATURE OF THE PROBLEM

Background

As teachers continue to work towards integrating the Common Core State Standards (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010), it is important to understand what influences teachers’ instructional planning decisions when they are situated within authentic classroom contexts. Because the Common Core draws increased attention to multimodal reading and writing (Dalton, 2012; Hutchison & Colwell, 2014; McLaughlin & Oveturf, 2012; Yim, Warschauer, Zheng, & Lawrence, 2014), exploring teachers’ planning for integrating technology into literacy instruction is especially important. While recent research about professional development on integrating technology and high-quality literacy instruction using technology has provided much needed insights into best practices in these areas, little is known about how a teacher translates what is learned during professional development into instructional planning.

Additionally, teacher perspectives and approaches to integrating technology are recognized as important influences on the extent to which they seek to integrate technology (Ertmer, 1999; Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012; Kopcha, 2012). Their orientation to using technology is an important part of the multiple systems of knowledge used to inform instructional design (Putnam & Borko, 2000). In literacy classrooms, incorporating digital tools into instruction calls into consideration the concept of new literacies (Leu, Kinzer, Coiro & Cammack, 2004),
which are those strategies and skills necessary to read, write, and communicate in digital environments. Leu et al. (2013) claim that due to the new social practices that arise with new literacies, teachers need to modify their role in the classroom to facilitate student learning in a digital environment.

One approach to supporting teachers as they plan to incorporate new literacies into their instruction is the Technology Integration Planning Cycle for Literacy and Language Arts ([TIPC]; Hutchison & Woodward, 2014a). This cycle is designed to support teachers as they plan to integrate technology meaningfully into their literacy instruction. The TIPC invites teachers to consider the following elements in their instructional planning: instructional goal, instructional approach, tool selection, contributions to instruction, constraints, and instruction. These elements should be reflected on and considered in connection to each other as a teacher is planning.

Teachers’ lesson plans are of particular interest, as they directly relate to the cognitive processes teachers use when planning and reflect important aspects of the systems of knowledge they use when planning (Jacobs, 2008; Janssen & Lazonder, 2015). Multiple approaches have been used to explore the specific planning process of teachers. Studies in higher education (Eley, 2006) and math (Leinhardt, 1989) have focused on teacher explanations of thinking after a lesson has been planned and taught. Studies in language instruction (Gatbonton, 1999) and literacy (Cho & Woodward, 2014) have focused on teachers’ verbal reports just after or during specific elements of lesson planning to gain insights into the processes used when planning.
Significance of the Problem

Currently there exists a paucity of research on teacher lesson planning for literacy instruction. Research addressing teacher thinking and planning has contributed useful insights into the systems of knowledge and perspectives teachers draw upon to design literacy instruction for their students (Borko, Shavelson, & Stern, 1981; Peterson, Marx, & Clark, 1978). Yet, recent research has not focused on the particular types of knowledge and decisions made by literacy teachers as they seek to integrate technology into instruction. This lack of understanding of how teachers plan exposes an important need in the area of supporting teachers’ technology integration efforts in literacy instruction, as the current body of research indicates that multiple factors influence teachers’ integration of technology into literacy instruction.

Teachers’ perceptions about their own facility with integrating technology (Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009; Hutchison & Reinking, 2011; Polly & Hannafin, 2010) and their perceptions of the barriers to integrating technology influence their classroom instruction. For example, Hutchison & Reinking (2011) found that over 60% of teachers believe they do not have time to teach students the basic computer skills needed for more complex tasks. This finding represents a potential misconception of literacy teachers that they must be an expert in the digital tools that they use for instruction (Ertmer et al., 2012; Leu et al., 2013); however, there have not been studies that examine how teachers position themselves as experts or facilitators when planning a lesson in which they are using technology.

An additional factor influencing literacy teachers’ lesson planning is the professional development support they have when seeking to integrate technology into
their instruction. While professional development in technology integration can support teachers’ integration efforts (Blocher, Armfield, Sujo-Montes, Tucker & Willis, 2011; Ertmer et al., 2012; Kopcha, 2012), over 81% teachers in a national survey (Hutchison & Reinking, 2011) reported that the professional development they had received in this area was inadequate. This finding is further complicated when viewed in light of the lack of research of how teachers enact skills and approaches learned through technology integration professional development when designing literacy instruction. Because professional development in technology integration seeks to influence teachers’ classroom instruction, it is important to also understand the processes teachers use when lesson planning in order to better connect the aims of professional development to teachers’ authentic lesson planning practices.

There are multiple areas of teacher thinking, decision-making, and planning in which knowledge is underdeveloped in the literacy field. The aim of the present study is to contribute to an understanding of the processes teachers draw on when planning a lesson that integrates technology into literacy instruction.

**Purpose of the Study**

Teacher lesson planning is an important component of understanding how teachers utilize multiple systems of knowledge to design instruction for students (Cho & Woodward, 2014; Leinhardt, 1989; Putnam & Borko, 2000). Examining the knowledge and beliefs literacy teachers draw upon when planning instruction can contribute to the knowledge of what processes teachers can and should use as they seek to integrate technology into their instruction. Further, exploring how elements of planning tools like the TIPC are reflected in teachers’ actual lesson planning can inform an understanding of
designing effective professional development that meaningfully supports literacy teachers in their technology integration efforts (Adelman et al., 2002; Porter, Garet, Desimon, Yoon, and Birman, 2000). The purpose of this study was twofold. First, this study examined the specific knowledge and orientation to using technology that teachers use when planning to integrate technology into their literacy instruction. Second, this study explored how the elements of the TIPC are represented in the processes teachers use when seeking to integrate technology into their literacy instruction.

**Research Questions**

This study examined teachers’ lesson planning processes as they designed a lesson in which technology was integrated into literacy instruction. Additionally, this study explored how the elements of the TIPC framed the instruction planned. Thus, the following questions guided this study:

1) What knowledge and dispositions do teachers draw upon when planning to integrate technology into literacy instruction?

2) How do the elements of the TIPC frame the planning process used by teachers when integrating technology into literacy instruction?

**Theoretical Perspectives**

The conceptual framework for this study is informed by: situated learning perspectives, new literacies, and the technological, pedagogical, and content knowledge framework. These theoretical perspectives offer different insights into teacher thinking and planning, which together serve to illuminate important elements of the processes literacy teachers use when designing instruction that integrate technology.
Situative Learning

A situative perspective of teacher thinking (Borko, 2004) fosters an approach that both focuses on individual teachers and their thinking while simultaneously accounting for the influence of the community within which they are teaching. Borko (2004) called for using a situative approach to understanding teacher learning because of the close connections between the knowledge a teacher is gaining through professional development and the context in which the teacher is both learning it and will apply it. This view of conceptual knowledge, from a situative perspective, is a combination of the context and culture of the situation in which the concept is learned and the individual’s understanding and experiences. Brown, Collins, and Duguid (1989) offer the analogy of conceptual tools, where using the tools both deepens one’s understanding of them and influences future learning and actions as a result of using the tool. Because teachers are planning to meet instructional goals within their specific contexts, a situative perspective suggests that exploring teachers’ planning when situated within their own classroom and curriculum may provide useful insights into the cognitive tools they use when planning. Drawing on situative perspectives of learning provided a lens through which to examine the situated processes and conceptual tools teachers used when planning.

New Literacies

New literacies perspectives offer a framework for understanding the type of instruction being designed by teachers in this study, as well as insights into the roles and stances they take when lesson planning. New literacies scholars claim that digital tools have altered the landscape of literacy through changing the ways in which texts are consumed and produced in multimodal ways (Moje, 2009; Coiro, Knobel, Lankshear, &
Leu, 2008). Thus, new literacies represent the skills and dispositions required to interact and make meaning with this different type of text.

Particularly, new literacies perspectives offer an understanding of the mindsets (Lankshear & Knobel, 2007) and stances (Leander, 2009) taken by teachers when they are considering print and new literacies in their classrooms. Lankshear and Knobel (2007) discussed the perspective of two separate mindsets, one which reflects a preference for print-based literacies, where knowledge is highly structured and authority is easily established. The other mindset reflects a new literacies mindset where knowledge comes in multiple forms and authority can be created in increasingly diverse ways. These mindsets serve to inform four stances that Leander (2009) stated represent the ways that teachers conceptualize the relationship between print and new literacies: resistance, replacement, return, and remediation. Each stance privileges print or new literacies in different ways. New literacies perspectives provided insights into how teachers oriented themselves towards using technology as well as into the type of instruction they were planning.

**Technological Pedagogical Content Knowledge**

Technological Pedagogical Content Knowledge (TPACK; Mishra & Koehler, 2006) is a theoretical framework which refined Shulman’s (1986) work on pedagogical content knowledge (PCK) to include technological knowledge. This framework functions to describe how teachers think about integrating technology into their instruction by explaining the new types of knowledge created when adding technological knowledge to the PCK framework. These new overlaps of knowledge types result in several new types of knowledge, at the center of which is technological pedagogical content knowledge.
Mishra and Koehler (2006) claimed, as important as PCK is to designing meaningful instruction for students, that TPACK is that important to designing meaningful instruction for students when integrating technology. This framework illuminates the types of knowledge the teachers in this study use as they plan, as well as the types of knowledge that may be lacking in their planning.

**Definition of Terms**

*Context.* In this study, context refers to the specific situative elements in which the participants are completing the lesson planning task (Brown, Collins, Duguid, 1989; Borko, 2004). Factors involved in context include: student population, classroom environment and setting, school in which the participant teaches, and progress in curriculum.

*Digital tools.* Digital tools are any tools accessed by using a digital device, and is sometimes broadly referred to as technology. Digital tools include websites, apps, software, audio and video recording devices and others. These are at times identified as the Internet and other ICTs (Information Communication Technologies) in the literature (Leu, Kinzer, Coiro & Cammack, 2004).

*Lesson planning.* The process of designing instruction and formalizing it into an agenda for a forthcoming class is referred to as lesson planning. Lesson planning involves articulating the structure, content, and execution of a lesson, as well as operational factors, such as management, feedback, and evaluation (Leinhardt, 1989).

*Literacy instruction.* Literacy instruction is comprised of, “how teachers talk, show, enact, or otherwise represent information or ideas so their students acquire a deeper knowledge of literacy and the skills they need to become proficient readers and writers”
Teacher thinking. Teacher thinking is a broad area of research within the field of education. Teacher thinking, in this study, is situated within the work about domains of teacher knowledge as they work in a social and professional context (Mitchell & Marland, 1989). This view of teacher thinking responds to Shulman’s concerns (1986) that examination of teachers’ cognitive processes should value the perspectives of the teachers.

Verbal protocols. Verbal protocols are the result of a concurrent or retrospective verbal report, which is produced as part of a think-aloud study (Pressley & Afflerbach, 1995; Taylor & Dionne, 2000). In a think-aloud study, participants are asked to explain their thinking as they are completing a task, which is termed verbal reporting. The result of the verbal reporting completed by a participant is a verbal protocol.

Overview of the Study

Identifying conceptions of teacher thinking is an important step in understanding the processes teachers use when planning instruction (Borko, Shavelson & Stern, 1981; Stern & Shavelson, 1983). This is especially important in new literacies classrooms as a result of the critical role teachers play (Leu et al., 2013) and the influence that their orientation to integrating technology has on their instruction (Lankshear & Knobel, 2007; Leander 2009; Polly & Hannafin, 2010). Targeted professional development has been shown to increase teachers’ integration of technology (Ertmer et al., 2012; Blocher et al., 2011); however, this increase was largely measured through classroom observations and
self-reports. Understanding of the processes teachers use when connecting professional development to their instruction is not reflected in current research.

While there are many approaches to understanding teacher thinking, one particularly useful approach has been think-aloud studies. Think-aloud studies use a verbal reporting methodology to gain access to a participant’s cognitive process and activities (Ericsson & Simon, 1980, 1984/1993; Pressley & Afflerbach, 1995; Fox, Ericsson, & Best, 2011). During or after completing a task, participants are asked to think aloud about how they are navigating a task. These verbal protocols are then analyzed to make inferences about the processes used by participants. Methodological research suggests that by asking participants to think aloud both as they complete the task (concurrently) as well as after completing the task (retrospectively) that verbal protocol analysis is most robust (Taylor & Dionne, 2000).

The present study is designed as a think-aloud study (Pressley & Afflerbach, 1995; Cho & Woodward, 2014) with multiple complementary methods (Cho, 2014; Coiro & Dobler, 2007; Zhang & Duke, 2011). In addition to both concurrent and retrospective verbal protocols, other data sources included interviews, surveys and questionnaires, observations, and documents and photos. Three participants were selected from a larger technology integration professional development study using intensity sampling (Patton, 2002). Factors that influenced participant selection included students’ consistent access to a device, student grade level, teacher experience with grade level, students’ demographic information, data on teacher use of technology, and previous lesson observations.
For the think-aloud session, participants were asked to think-aloud while planning an upcoming literacy lesson for their class in which they planned to integrate technology. There were no time limits established (Fox et al., 2011) and teachers used the computer and resources they typically used for daily planning activities. When teachers completed planning their lesson, a retrospective verbal report was elicited that explored particular actions or comments that were not fully explained during the concurrent verbal report.

Data analysis was completed in two cycles, with the first being open coding (Corbin & Strauss, 2008) to address the thinking and perspectives teachers draw upon when planning a literacy lesson in which technology was integrated. The second cycle utilized hypothesis coding (Saldaña, 2016) to explore how the elements of the TIPC reflected the teachers’ planning processes.

The following chapters report the details of this study. In chapter two, relevant literature is reviewed to inform the conceptual framework of the study and to provide an understanding of the body of research in which this study is situated. Chapter three addresses the research questions and the design of the study, including participant selection, data sources and collection, and data analysis. Chapter four reports the findings of the study, and chapter five presents the important implications which arise as a result of this study.
CHAPTER 2
REVIEW OF THE LITERATURE

Introduction

Teacher thinking and planning has long been of interest to literacy scholars, especially in determining how to make specific instructional decisions (Borko, Shavelson, & Stern, 1981; Peterson, Marx, & Clark, 1978; Stern & Shavelson, 1983). As teachers seek to address the Common Core State Standards’ (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010) focus on understanding text in online and digital environments, they must plan for instruction and learning environments that are conducive to meeting complex instructional goals (Hutchison & Woodward, 2014a; Hutchison & Colwell, 2014; Leu et al., 2015; Leu et al., 2013; Yim, Warschauer, Zheng, & Lawrence, 2014). Although there is debate as to the level of skill with technology a teacher must have to successfully integrate digital tools into their literacy instruction (Beach, 2012; Hutchison & Reinking, 2011; Lankshear & Knobel, 2007), it is widely agreed that students need instruction in how to effectively utilize literacy skills in navigating digital environments. Additionally, while several studies have explored high-quality literacy instruction using digital tools, there are none which have focused specifically on the processes used by teachers as they seek to integrate technology into their literacy instruction. This has created a dearth of knowledge in our understanding of the knowledge and dispositions used by teachers when planning to integrate technology into literacy instruction. This study is intended to
contribute to an understanding of not only how teachers plan to integrate technology into literacy instruction, but also how to support teachers in their efforts to do so.

This chapter addresses the theoretical perspectives used to inform the development of a conceptual framework for the present study, which include: situated cognition, new literacies, and technological, pedagogical, and content knowledge. Next, literature on teacher thinking and planning is discussed, which informed an understanding of the connection between teacher knowledge and planning and the design of this study. Finally, issues of teaching literacy with technology are discussed, including the technology integration planning cycle which guided the professional development received by teachers in this study.

**Conceptual Framework**

This study is informed by situative learning perspectives (Brown, Collins, Duguid, 1989; Borko, 2004), new literacies (Lankshear & Knobel, 2007; Leu, Kinzer, Coiro, & Cammack, 2004), and Technological, Pedagogical, Content Knowledge (Mishra & Koehler, 2006). First, a situative perspective is used to understand the processes that teachers use when planning to integrate technology into literacy instruction are influenced by and related to their context. Next, a new literacies perspective frames an exploration of the roles teachers adopt when integrating digital literacies into their classrooms. Finally, the TPACK framework is utilized to understand and describe the types of knowledge teachers draw upon when planning and the ways in which these types of knowledge influence teachers’ planning process.
Situative Perspective on Learning

A situative perspective on learning views learning as “inextricably a product of the activity and situations in which it is produced” (Brown, Collins & Duguid, 1989, p.33). This perspective differs from those theoretical orientations of situated learning and situated cognition which suggest that some learning is situated and some is not (Anderson, Reder & Simon, 1996). In a classroom, this approach considers the interactive systems that learners use as they interact with each other and selected materials and resources (Greeno, 1997). Darling-Hammond, Hammerness, Grossman, Rust, and Shulman (2005) elaborated that learning is situated within specific contexts where it needs to be developed and from which it must be helped to transfer. A situative perspective of teacher thinking enables the use of a multifocal research lens (Borko, 2004) where the focus can be on individual teachers and their learning while simultaneously accounting for the influence the context within which they are teaching. This is a particularly useful for understanding the way in which the professional development program may have framed the elements the participants’ planning.

Borko (2004) called for using a situative approach to understanding teacher learning and thinking due to the close connections between the knowledge a teacher is gaining through professional development and the context in which the teacher is both learning it and will apply it. This view of conceptual knowledge, from a situative perspective, is a combination of the context and culture of the situation in which the concept is learned and the individual’s understanding and experiences. Borko elaborated that learning, from a situative perspective, is a process of both individual construction of knowledge and enculturation into larger social practices.
Brown, Collins, and Duguid (1989) argued that learning as enculturation can be an important aspect of a situative perspective, as through this lens, the values of teachers, schools, and communities can be revealed. They further claim that students can become disconnected from schools where their culture is not mirrored in the classroom environments in which they learn. Therefore, learning must be reflective of authentic activities that represent the practices of students, practitioners, and “just plain folks” (Brown, Collins, and Duguid, 1989, p.35). Brown, Collins, and Duguid (1989) claimed that by presenting students with multiple instructional approaches for an instructional goal that they were able to develop conceptual tools that would allow them to transfer knowledge beyond the specific context in which it was learned. Fundamental to the analogy of conceptual tools, is that using the tools both deepens one’s understanding of them and influences future learning and actions as a result of using the tool.

Because teachers are planning to meet instructional goals within their specific contexts, a situative perspective suggests that exploring teachers’ planning within their own classroom and curriculum may provide useful insights into both the cognitive tools they use when planning and the ones they design for their students. Further, drawing on situative perspectives of learning can provide a lens through which to examine the situated processes they use and the perspectives they take when planning to integrate technology into literacy instruction.

**New Literacies**

Digital tools have changed both the consumption and production of texts, especially multimodal texts (Moje, 2009; Coiro, Knobel, Lankshear, & Leu, 2008). These tools have influenced the types of reading and writing that are possible, thus creating new
possibilities and new strategies for literacy with digital tools. Leu, Kinzer, Coiro and Cammack (2004) claim this reading and writing within a digital environment requires “new literacies.” A new literacies perspective contributes an orientation towards literacy that provides some distinction among traditional print literacies and those literacies required to use digital tools effectively. Leu et al. (2004) offer the following definition:

The new literacies of the Internet and other ICTs include the skills, strategies, and dispositions necessary to successfully use and adapt to the rapidly changing information and communication technologies and contexts that continuously emerge in our world and influence all areas of our personal and professional lives. These new literacies allow us to use the Internet and other ICTs to identify important questions, locate information, critically evaluate the usefulness of that information, synthesize information to answer those questions, and then communicate the answers to others (p. 1572).

Although research in the last decade has expanded the conception of the Internet and ICTs to include myriad digital tools, the central tenets of considering the differences between print and digital literacies, or indeed, how those literacies are enacted differently in different environments is still a useful perspective. Recently, Leu and his colleagues (2013) have proposed a dual-level theory of New Literacies in which an overall theory of New Literacies is informed by multiple perspectives and approaches of new literacies. In this theory, uppercase New Literacies represents the common themes drawn from the large body of lowercase new literacies research.

The ability to design effective learning experiences is central to the principles of New Literacies theory. The authors claim that teachers must be aware of the new social
practices that arise when using new literacies and be prepared to create both instruction and a classroom environment that facilitates the development of new literacies. One area of new literacies research that Leu et al. (2013) called for an expanded focus and increased attention to is professional development on new literacies due to the change in the teacher’s role that is required.

**Teachers in a New Literacies Classroom**

New literacies scholars argue that a new literacies approach to instruction requires a shift in belief about texts and composition from rigid and authoritative to flexible and dynamic (Lankshear & Knobel, 2007). In order to better understand how teachers may situate themselves when planning to integrate technology into literacy instruction, two perspectives are discussed: Lankshear and Knobel’s (2007) discussion of mindsets and Leander’s (2009) perspective on teachers’ stance towards the relationship between print and new literacies.

**Mindsets.** Lankshear and Knobel (2007) situated their discussion of teacher mindsets within the distinction between physical space and cyberspace. They claim that people, including teachers, approach the world with one of two mindsets. The first is that the world is largely the same as it has been “throughout the modern-industrial period, only now it has been technologized in a new and very sophisticated way” (p. 10). The second mindset reflects the idea that with the development of new technologies has come important new ways of interacting that enable people to envision new ways of imagining, exploring, and being. Among the many differences that characterize the more concrete elements in these mindsets, are those which focus on production, creation, validation, and relationship.
Production, from the perspective of the first mindset, is centered around producing material artifacts utilizing specific tools to complete the task, which may include research papers, responses to book-based questions, or other classroom activities where the goal is to summarize or synthesize existing knowledge. Whereas production from the second mindset would focus on practices that include the production of connectivity and relationships, such as chatting, multiplayer online role playing, blogging, photo sharing, and others (p. 13). Next, creation differs significantly from the first to second mindset, in which the first mindset prioritizes the individual as the preferred agent for production and the second mindset reflects the importance of collaboration, or “collectives” (p. 11). The issue of creation and agency is also reflected in the differences in how expertise and authority are established in both mindsets. In the first mindset, authority is primarily found in known individuals and institutions; however, in the second mindset authority is distributed among the collective. This reflects the value of collaboration in the second mindset, in which multiple contributions would be more valid than few or a single person’s contribution. Finally, the relationship element focuses on the approach to the text paradigm that each mindset holds. Lankshear and Knobel argue that the first mindset represents a “bookspace” (p. 13) text paradigm, in which there is a clear order to structure, rules for establishing authority, and directionality of power from the author to the readers. The second mindset considers that there is no text paradigm. Texts can be unstructured, non-experts can write authoritatively about topics, and readers can and should question authors in an environment where authors can be held accountable.
Leander (2007) explored how these mindsets were enacted in competing discourses in an all-girls school that had recently begun a one-to-one laptop policy in the school. He noted that teachers established differences in expectations for students in terms of time-space, or when and where students were expected to be working, as well as in the areas of production, creation, validation, and relationship. Together with Lankshear and Knobel’s (2007) perspective on mindsets, this work illuminates the importance of understanding a teacher’s stance towards integrating technology into their literacy instruction.

**Stances.** Drawing on earlier work from Lankshear and Knobel (2003), Leander (2009) presented a perspective that can connect these two mindsets to four specific stances that reflect how teachers may orient themselves specifically to the relationship between print and new literacies. By situating the juxtaposition of the first and second mindsets within the literacy teacher’s stance towards using new literacies, Leander provides a powerful framework for understanding teachers’ roles in a new literacies classroom. However, rather than arguing for the importance of new literacies, as Lankshear and Knobel (2007) did, Leander’s (2009) focus is on describing the stances that teachers can and do take in the classroom, in order to better inform an understanding of existing teaching and research practices.

Leander (2009) claimed that questions about the value of integrating technology into literacy instruction and how they might fit into a curriculum that is largely focused on print-based literacies stem from a lack of understanding of how new literacies relate to conventional print-based literacies. How teachers orient themselves to understanding this
relationship can be termed their stance, of which he described four: resistance, replacement, return, and remediation.

A resistance stance is characterized by a commitment to conventional print-based literacies, which include those print genres typically found in school settings such as “the novel, the academic argument, poetry, the research paper and the like” (p. 147). This stance reflects Lankshear and Knobel’s (2007) second mindset. Rish (2013) noted that while this stance might reflect the literacies most valued by teachers, it might also be a response to standards and high-stakes assessments in which print literacies are predominant. Leander (2009) argued that teachers with a resistance stance view new literacies as interfering with meaningful literacy instruction.

The replacement stance is in direct opposition to the resistance stance and reflects Lankshear and Knobel’s (2007) first mindset. Teachers who approach literacy instruction from this stance privilege digital literacy practices over those they view as outdated and representative of a canon that does not serve the everyday practices of their students. Learning activities in a replacement oriented classroom might be film analysis, multimedia persuasion using website design, and critical interpretations of blogs, rather than novel analysis, argumentative essays, and critical interpretations of poems.

Teachers who neither ascribe to fully rejecting or adopting technology into their literacy instruction often have a return stance. Teachers with a return stance value new literacy practices, but only insofar as they support conventional print literacies. For example, while a teacher might adopt some of the learning activities that a replacement oriented teacher might use, such as film analysis, this analysis would be used to inform
and advance students’ understanding of conducting a novel analysis. The print piece is privileged in terms of assessing student learning, rather than the digital project.

Last, a remediation stance stands apart from the first three stances in terms of how a teacher might view the relationship between print and new literacies. Leander (2009) noted that the connotation of remediation, one that relates to struggling students, is not what is meant by this term. Rather, remediation focuses on how different mediums might best mediate thinking and learning. Instead of privileging one approach over the other, as in Lankshear and Knobel’s (2007) mindsets framework, Leander recognized that teachers and students live in a world in which print and new literacies are valued differently. Therefore, neither should be privileged and the focus should be on which medium best affords communication of the meaning to an intended audience.

While the mindsets framework contributes to an understanding of the fundamental elements underlying decisions about privileging conventional print literacies or new literacies, Leander (2009) situated these perspectives within a classroom environment as reflected in the resistance and replacement stances. Further, Leander offers additional perspectives which describe teachers who do not fit firmly into a dichotomous stance towards integrating technology. These perspectives serve to inform an understanding of how teachers might orient themselves towards integrating technology into their literacy instruction.

**Technological Pedagogical Content Knowledge**

A final perspective that contributes to the conceptual framework for this study is a theoretical framework which extends Shulman’s (1986) work on pedagogical content knowledge (PCK) to include technological knowledge. It provides a means for
understanding how teachers think about integrating technology into their instruction by identifying overlaps among types of knowledge and proposing a new kind of knowledge, technological pedagogical content knowledge (TPACK). Mishra and Koehler (2006) argued that it is the intersection of these types of knowledge that should guide teachers in successfully integrating technology. The types of knowledge and relationships among knowledge types that constitute the TPACK framework are: content knowledge, pedagogical knowledge, technological knowledge, pedagogical content knowledge, technological content knowledge, technological pedagogical knowledge, and technological pedagogical content knowledge. Like Shulman’s (1986) original work on pedagogical content knowledge, Mishra and Koehler’s (2006) TPACK framework is a descriptive approach to delineating the different types of knowledge used to design instruction when integrating technology. In the TPACK framework, the types of knowledge that are of particular importance are PCK and TPACK.

These two types of knowledge are especially useful for understanding how teachers plan instruction, as they illuminate both the ways that teachers provide instruction about content and how they meaningfully integrate technology when providing instruction about specific content. PCK, specifically, draws the distinction between expertise in content and knowledge of effective teaching practices to illustrate a teacher’s ability to usefully represent disciplinary concepts in ways that foster student understanding. Thus, TPACK reflects a teacher’s understanding of how technology intersects with both the content and pedagogy to inform meaningful integration of technology to “develop appropriate, context-specific strategies and representations” (p.1029).
TPACK and PCK represent one of many systems of knowledge that teachers draw upon when planning and implementing instruction.

Putnam and Borko (2000) argue that multiple systems of knowledge work in an integrative way to form the foundation of knowledge that teachers use when planning and providing instruction. Lampert (1985) emphasized the personal aspects of teaching and the difficulty teachers have establishing an identity that allows them to navigate interpersonal issues such as classroom management and responsibilities beyond the classroom, as well as those pedagogical issues which relate to personal epistemology about how knowledge is generated. Fenstermacher and Richardson (2005) foregrounded the importance of teaching that reflects rational and moral approaches, rather than offensive or mean-spirited instruction and the types of acts that teachers select in their instruction that are reflective of that rational instruction. Finally, Putnam and Borko (2000) address the importance of teachers accounting for the contexts of their classroom, school, and community in order to design authentic learning experiences for students. These are each important systems which contribute to understanding teacher knowledge in new and different ways.

However, because the pedagogical knowledge discussed by Shulman (1986) and Mishra and Koehler (2006) highlights the importance of the context of instruction, the students being taught, and the careful selection of appropriate methods for which to provide instruction, the TPACK framework values multiple systems of knowledge in its description of the types of knowledge teachers should use when integrating technology into instruction. This theoretical framework, when combined when new literacies and situative learning perspectives, offers powerful potential for understanding how teachers
plan to integrate technology into literacy instruction, and the specific elements they draw on and prioritize when planning.

**Technology Integration in Literacy**

While recent studies have been conducted to determine the impact of using digital tools on student literacy learning (Dalton, 2012; Hutchison, Beschorner & Schmidt-Crawford, 2012; Vasinda & McLeod, 2011), little is known about how teachers can plan to maximize new literacies when integrating technology, especially in literacy instruction.

One factor that may influence teachers’ planning efforts is their perception of technology. Although there has been recognition of the relationship between teacher perceptions of technology and technology integration in the classroom (Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009; Hutchison & Reinking, 2011; Polly & Hannafin, 2010), there has been little research that examines the extent of that relationship. Hutchison and Reinking (2011) surveyed literacy teachers to explore possible barriers to teachers’ integration of technology and found that over 60% of teachers believe they do not have time to teach students the basic computer skills needed for more complex tasks. This highlights an important perception many teachers hold about student use of technology that students need direct instruction about how to use digital tools. However, there is conflicting research about whether the teacher does need to be the technology expert in instruction (Leu et al., 2004; Lankshear & Knobel, 2007). This furthers the need for insights into teachers’ planning processes to understand how they are utilizing their knowledge of digital tools and the influence that knowledge may have on their planning decisions.
Recent research has explored the role that teachers take in a new literacies classroom. Dwyer (2016) explored a classroom in which students used specific strategies in an online inquiry environment and noted the importance of the teacher’s role as promoting mutual interdependence and respect between teacher and student. White (2016) examined her own practice and how she positioned herself in the classroom when using Internet Reciprocal Teaching. Tour (2013) reported how three teachers’ digital mindsets shaped their classroom instruction and beyond. Finally, Hutchison and Woodward (2014b) examined the role of an English Language Arts teacher as she sought to integrate technology instruction into her sixth grade instruction. This growing body of research indicates that how teachers orient themselves towards integrating technology into their literacy instruction influences their resulting instruction. This study aims to understand the relationship between how teachers orient themselves towards using technology and the instruction they plan.

**Professional Development in Literacy Technology Integration**

The participants in this study were recruited from a larger technology integration project; therefore, it is useful to consider the influence that professional development in technology integration can have on participating teachers. Further, this study seeks to explore how a technology integration planning cycle, which served as the foundation of the larger professional development, may relate to the actual planning that teachers do. Many professional development initiatives are designed to increase and support teachers’ technological knowledge. However, the existing models used to support teachers’ development of technology integration skills, such as corporate training, student experts, and single technology trainers in schools, have not been empirically useful (Adelman et
al., 2002; Lawless & Pellegrino, 2007). Instead, research supports that high-quality professional development should be: (a) longer in duration, (b) involve opportunity for teachers from the same context to interact, (c) provide active learning opportunities, (d) focus on specific content, and (e) promote coherence with teaching goals and standards (Porter, Garet, Desimon, Yoon, & Birman, 2000). However, professional development for literacy teachers is complicated by their own perceptions of the quality of support they receive to integrate technology into instruction. In a national survey of literacy teachers, Hutchison (2012) found that 81% of literacy teachers felt that the professional development they received on integrating technology into literacy instruction was inadequate. Further, 75% of these teachers had received professional development on technology integration within the last school year.

These findings conflict with Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, and Sendurur’s (2012) claim that teachers are more confident in integrating technology and are skilled at using technology in the classroom. They drew on NEA results (2008) that showed that 80% of teachers found technology-related professional development valuable and that teachers noted the relevant connections to goals and standards and available technology. The results of the NEA survey highlight a key difference between literacy and other teachers, that when literacy teachers specifically were surveyed (Hutchison & Reinking, 2011), professional development is found to be lacking. This discrepancy may indicate that literacy teachers need different professional development experiences than teachers of other content areas. Further, this difference exposes the need for understanding how literacy teachers specifically may be navigating the barriers to technology integration, as current professional development models have not influenced
literacy teachers’ perceptions of their preparedness to integrate technology into instruction.

A primary barrier to integrating technology has been the support teachers receive. Lawless and Pellegrino (2007) stated that professional development is often “driven by a strong perceived need for action, but it is often not guided by any substantial knowledge base derived from research about what works and why with regard to technology, teaching and learning” (p. 576). This may explain why Blocher, Armfield, Sujo-Montes, Tucker, and Willis (2011) later claimed that, in general, typical professional development was not effective when it came to technology integration. However, they found that providing targeted and theoretically based instruction to teachers over the span of two years did have a positive impact on their use of digital tools as part of their instruction. This finding suggests that by providing opportunities for teachers to explore integrating technology into their own curriculum may influence the effectiveness of their technology integration. Further, the authors suggest that a sustained model may be effective in modifying teachers’ perceptions of technology, which can also be a significant barrier to integration (Ertmer, 1999; Ertmer et al., 2012; Kopcha, 2012).

Teachers’ perceptions of technology may also be a barrier to technology integration. For literacy teachers, their beliefs about the importance of integrating technology have been found to directly influence their integration. Hutchison and Reinking (2011) found that there was a direct relationship between teachers’ beliefs about the importance of integrating technology and the extent to which they integrated it into their instruction. The authors found that this path was mediated by the additional variables of professional development on how to integrate technology and the skills
needed, beliefs about their own skills, perceived obstacles, support available to the
teachers, their stance towards using technology, and availability of technical support and
relevant technologies.

These variables highlight factors that should be accounted for when supporting
teachers as they seek to integrate technology into their literacy instruction and the
importance of accounting for the influence of teachers’ perceptions of the importance
using digital technology on their integration efforts. These factors also highlight the need
for an understanding of how teachers draw on different knowledge and stances towards
technology when planning to integrate technology into literacy instruction.

**Technology Integration Planning Cycle**

The Technology Integration Cycle for Literacy and Language Arts (Hutchison &
Woodward, 2014a) is designed to guide teachers through planning and works in concert
with specific, contextualized professional development to empower teachers to plan
effectively on their own. This model arose from a line of classroom based research that
demonstrated a need for supporting literacy and language arts teachers specifically when
they are planning to integrate technology into instruction. The model, shown in Figure
2.1, is a reflective cycle in which each of the elements influences the others. The
elements of the model are:

1. Identify and adhere to a clear instructional goal when integrating digital technology
2. Identify an appropriate instructional approach for the instructional goal
3. Select appropriate digital or nondigital tools to support instruction
4. Foresee how the selected tool can contribute to the instructional goal
5. Identify the potential constraints of using the tool to determine whether they can be overcome.

6. Understand how the instruction will need to be delivered or altered due to the use of the selected tool.

7. Reflect on the resulting instruction and make changes/learn more about the instructional tools as needed (p.5).

These elements are designed to support teachers as they seek to teach both digital and nondigital literacy skills and ask students to engage in multimodal content as both producers and consumers. Through receiving professional development on using this cycle to guide planning to integrate technology into literacy instruction, teachers may be able to more successfully navigate the barriers to technology instruction.

Participants in this study were part of a larger professional development program which used this planning cycle as a foundation for supporting teachers. However, as the model was developed from classroom-based research that largely focused on observing teachers instruction but is intended to guide the planning process, research is needed that contributes to an understanding of how these six elements may be addressed by teachers as they are planning.

**Teacher Lesson Planning**

A growing body of research indicates scholars in literacy and other fields are interested in how teachers think about lesson planning from a variety of perspectives. Jacobs (2008) argued that evaluating lesson plans allow for insights into not only teachers’ decisions about structure, but also their understanding about the relationships between activities and content that are not readily evident through classroom observation. Janssen and Lazonder (2015) argued that lesson plans provide a useful understanding of teachers’ beliefs and how they orient themselves towards integrating technology into instruction. Further, lesson plans have been used specifically to measure the effectiveness of professional development in the area of literacy (Silk, Silver, Amerian, Nishimura, & Boscardin, 2009). Although lesson plans, and the processes involved in teachers’ planning, have been of scholarly interest, approaches to understanding teacher thinking as it relates to lesson planning varies widely.

Most studies involving teacher thinking and its connection to lesson planning are discipline specific. However, one notable interdisciplinary study was conducted by Eley (2006) as he sought to understand how teachers’ conceptions of teaching influenced specific decisions they made when planning to teach. His study was situated within a
higher education environment with university faculty who reflected on recent instructional planning. These participants were interviewed to determine how they considered elements such as existing student knowledge, student engagement, and student thinking. Frequencies were then calculated to inform an understanding of which elements were most important to the participants when planning. As Eley noted, a particular constraint of a recalled thinking approach is that participants might often conflate their experiences with teaching the lesson with their descriptions of their instructional planning decisions.

In the areas of math and science, investigations into teacher thinking and planning focus predominantly on the lesson itself, using additional interviews and analysis of lesson plan content to make inferences about teacher thinking. Leinhardt (1989) incorporated the use of classroom observations and agendas to inform her understanding of mathematics teachers’ plans. Leinhardt defined agendas as the teachers’ mental representations that are not written, which involve additional goals and actions needed to enact the lesson plan. Analysis focused on five dimensions of instruction: student response, student actions, tests, instructional actions, and instructional logic elements. In contrast, Pringle, Dawson, and Ritzhaupt (2015) conducted a large scale analysis of 525 in-service science teachers’ lesson plans who were participating in a yearlong technology integration project designed to strengthen teachers’ TPACK. Their analysis focused on evaluating the lesson plans for evidence of the different knowledge dimensions of TPACK. Finally, Janssen and Lazonder (2015) compared pre and in-service teachers’ selection of existing lesson plans. Teachers were then interviewed using a protocol designed to elicit how their TPACK influenced their selection decisions. Analysis
involved a number of factors related not only to types of knowledge used by teachers, but also factors related to their evaluation of the lesson plan materials.

In language and literacy instruction, additional approaches served to structure the investigation of teacher thinking and planning, specifically the use of verbal protocol analysis, or think-aloud studies. Gatbonton (1999) investigated how experienced in-service ESL teachers drew on their PCK when teaching a lesson. Participants watched themselves teaching a lesson and retrospectively reported their thinking as they watched. Analysis of the verbal report indicated ways in which teachers considered specific aspects of content, student contributions, maintaining rapport, and monitoring student progress.

In literacy specifically, one of the earliest investigations into teacher thinking when planning literacy instruction was conducted by Borko, Shavelson, and Stern (1981). They focused on the decision-making process of elementary reading teachers when they are planning small group instruction. To inform their understanding of decision-making process, the authors analyzed the procedures and findings of four studies to determine how teacher thinking influenced their decisions. This analysis indicated that teachers consider student characteristics as well as ability first, and then contextual factors and their own beliefs about reading second. A later study conducted by Cho and Woodward (2014) also investigated teacher decision-making. Cho and Woodward (2014) conducted a think-aloud study to explore how pre-service teachers selected digital materials for instructional use. In their study, pre-service English teachers were given a specific instructional goal and classroom context and were asked to select materials they would use for their instructional approach. Analysis was of their concurrent verbal reports and revealed different ways in which their knowledge, orientation towards teaching, and new
literacies skills influenced the materials they selected. Bigelow (2000) also used a think-aloud approach to explore differences between expert and novice English teachers when planning a lesson using research-provided materials. The frame used for data analysis was the same used by Gatbonton (1999); however, Bigelow’s results indicated that novice teachers prioritized student rapport more than experienced teachers.

These studies reveal the important insights that can be gained through considering the processes used when teachers are planning instruction. Further, an approach to investigating teacher thinking through planning to integrate technology into instruction may be especially useful to better support teachers in their integration efforts. However, due to the limited research in this area, an established methodology for exploring teachers’ thinking as they plan a lesson has not been established, and exploring additional approaches is worthwhile. Further, previous studies which sought to situate teachers’ thinking within their own classrooms did not prioritize teachers’ concurrent thinking processes. The present study attempts to accommodate the multiple approaches previously described through accessing teacher thinking through a situated think-aloud approach.

Summary

The strong relationship between literacy teachers’ beliefs, perceptions, knowledge, and the resulting instruction they plan has been of recent interest to scholars (Dwyer, 2016; Hutchison & Reinking, 2011; Hutchison & Woodward, 2014b; Tour, 2013; White, 2016). Although some studies have investigated teachers’ lesson planning specifically (Bigelow, 2000; Cho & Woodward, 2014), most have been retrospective commentary after a lesson has been designed or taught (Eley, 2006; Leindhardt, 1989;
Pringle, Dawson, & Ritzhaupt, 2015). Therefore, it is important and useful to explore the specific processes that contribute to teachers’ lesson planning as they are planning the lesson. Further, while decontextualized lesson planning can contribute to an understanding that teachers use generally when planning their lessons, exploring their planning processes as they plan for a specific class which they are currently teaching may illuminate specific contextual factors and types of knowledge that impact their planning.

The current study draws on situative learning, new literacies, and TPACK perspectives to inform an exploration of the planning processes literacy teachers use when seeking to integrate technology into literacy instruction. Specifically, this study addresses the types of knowledge teachers use and how they orient themselves towards integrating technology into instruction. Additionally, this study explores the usefulness of the Technology Integration Planning Cycle as a frame for understanding the elements of teacher planning.
CHAPTER 3

METHODS

Introduction

Understanding teacher thinking is important to understanding the instructional decisions teachers make when designing learning experiences for students (Stern & Shavelson, 1983; Fenstermacher & Richardson, 2005; Cho & Woodward, 2014). This is especially important for literacy teachers seeking to integrate technology into their instruction, as multiple factors may influence their lesson planning. These factors include the context of their classroom and school (Putnam & Borko, 2000; Borko, 2004), their ability to conceptualize meaningful instruction using technology (Mishra & Koehler, 2006), their orientation to using print and new literacies in their classroom (Leu, Kinzer, Coiro, & Cammack, 2004; Lankshear & Knobel, 2007; Leander, 2009), and the specific elements they prioritize when planning (Hutchison & Woodward, 2014a).

This study aims to explore the planning processes used by literacy teachers when they are planning instruction that integrates technology. Through the use of a think-aloud design, teachers’ in-the-moment thoughts are reported as they are planning a lesson for their students for an upcoming class session. The research questions which guide this study are:

1. What knowledge and dispositions do teachers draw upon when planning to integrate technology into literacy instruction?
2. How do the elements of the Technology Integration Planning Cycle (Hutchison & Woodward, 2014a) frame the planning process used by teachers when integrating technology into literacy instruction?

This chapter will address the design, participants, methods and data collection, and data analysis used in this study.

Design

Verbal Reporting/Think-Aloud Methodology

This study uses a verbal reporting methodology, along with complementary data, to investigate the processes teachers use when planning to integrate technology into their literacy instruction. Verbal reporting is a methodology which refers to principles, methods, and techniques used to understand a participant’s cognitive processes and activities (Ericsson & Simon, 1980, 1984/1993; Nisbett & Wilson, 1977; Pressley & Afflerbach, 1995; Fox, Ericsson, & Best, 2011). Sometimes referred to in the literature as think-aloud studies (Berne, 2004; Ward & Traweek, 1993) or simply verbal reporting (Gog, Kester, Nievelstein, Giesbers, & Paas, 2009), the essential elements remain the same: a participant is asked to describe his or her thoughts during or just after an experience. There exists some debate regarding whether verbal reporting is a method utilized as a part of a larger methodology, or a methodology itself. However, even those studies which discuss it as a method (e.g. Kuusela & Paul, 2000), lack discussion of a separate methodology, and therefore are treating the method and methodology as one.

Concurrent and Retrospective Verbal Reports

An important distinction in verbal reporting is the one between concurrent and retrospective verbal reports. Taylor and Dionne (2000) define concurrent verbal protocols
as “verbatim records of a problem solver thinking aloud while solving a problem” and retrospective verbal protocols as “the problem solver’s account of how a problem was solved, reported following the problem-solving activity” (p. 13). In much of the original methodological work on verbal reporting (Ericsson & Simon, 1980, 1984/1993; Newell & Simon, 1972; Nisbett & Wilson, 1977; Pressley & Afflerbach, 1995), concurrent verbal reporting was valued more highly than retrospective reports. Each work addressed concerns that retrospective reports focused almost exclusively on the participant’s evaluating and commentary about their thinking, rather than being reflective of the actual thinking itself.

In 2000, two studies examined and compared the relationship between concurrent and retrospective verbal reporting. Kuusela and Paul (2000) viewed these methods as distinct, and therefore explored their utility separately. Rather than focusing on problem-solving, their discussion is situated in the context of consumer judgment and decision making processes. Their experiment involved 58 participants, where half gave concurrent verbal reports and the other half gave retrospective verbal reports. Although a significant limitation of this study is that the conclusions were drawn primarily on frequency of protocol segments, the claim that concurrent verbal protocols are superior to retrospective verbal protocols in determining decision-making processes is widely supported by the literature.

Conversely, Taylor and Dionne (2000) explored complementary use of each method through secondary analysis of problem solving data. Thirty-six participants provided concurrent verbal report data as they were solving two problems and after each problem were guided through a retrospective debriefing. Statistical analysis of the
frequency of strategic actions indicated that the combination of concurrent and
retrospective verbal reporting captured more patterns of difference than either method
alone. They draw on this data, as well as selections from other literature, to claim that the
value of verbal reporting lies within the complementary methods of concurrent and
retrospective protocols, as together they represent the most complete understanding of a
participant’s processes. This perspective is also adopted in the present study.

**Procedural Suggestions**

Because concurrent reporting is widely held to be the most useful method of
understanding a participant’s processing through their verbal report, it is important to
adhere to specific standards for eliciting the most useful report. Although Pressley and
Afflerbach (1995) argue for flexibility in these procedures, others claim that there is
evidence that the procedure used to elicit the verbal report is important (Fox et al., 2011).
In their robust meta-analysis of 94 think-aloud studies with almost 3,500 participants,
Fox et al. (2011) found that there was significant difference in the validity of the verbal
report based on the type of instructions participants received. They found that merely
asking participants to verbalize their thinking did not alter their performance, but asking
them to provide explanations about their thinking improved performance. Additionally,
they found that time limits adversely affected the participant’s performance and drew the
conclusion that because thinking aloud prolongs the solution time, time given to complete
the problem should be ample. They conclude by reiterating that their findings
demonstrate verbal protocol analysis is a reliable and valid way of gaining understanding
about thinking processes.
Much research is still being conducted on refining and improving verbal reporting. Recently, think-aloud studies have been conducted with a host of complementary data, including screen capture software with parallel audio recording, background information, prior knowledge assessments, and interview data (e.g., Cho, 2014; Coiro & Dobler, 2007; Zhang & Duke, 2011). In addition to advancements in data collection, some researchers claim that verbal reporting can be used for purposes that extend beyond understanding higher-order thinking processes such as understanding epistemic beliefs and emotions (Eva-Wood, 2004; Ferguson, Braten, & Stromso, 2012) and the relationship of socio-cultural influences on reading and writing (Smagorinsky, Cook & Reed, 2005). These perspectives influenced the data collection and analysis in the present study.

Participants

Setting

This study took place in a Midwestern suburban district. The district had recently begun a one-to-one initiative, in which Chromebooks were provided to each fifth grade student for in- and out-of-school use. The population of students in the district was predominantly white, with a free and reduced lunch rate of 13.7% in the year that this study was conducted. Free and reduced lunch rates for each school are reported in the findings to illuminate both the similarity in the contexts that teachers in this study were working in, as well as to acknowledge that preadolescent students’ in-school digital literacy practices can be influenced by the out-of-school availability of tools and practices (Hutchison, Woodward, & Colwell, in press). Complementary data was collected from
September through May and the think-aloud sessions for each participant occurred in April.

**Participant Selection**

Participants were selected according to a number of factors designed to intensify the phenomenon being studied, which was technology integration into literacy instruction. Intensity sampling is a type of purposeful sampling (Patton, 2002) that focuses on “information-rich cases that manifest the phenomenon of interest intensely (but not extremely)” (p. 234). While intensity sampling seeks rich examples of the phenomenon being investigated, it does not seek extreme or highly unusual cases. In order to effectively identify cases for intensity sampling, participant characteristics must be established, which requires exploratory work prior to selecting participants.

For this study, participants were selected from a larger project, The Technology Integration Project. The Technology Integration Project was a one year professional development that specifically supported teachers in integrating technology into their classroom instruction using the Technology Integration Planning Cycle (Hutchison & Woodward, 2014a) as a framework for support. Any teacher in the school district was eligible to participate, and forty-three teachers participated in the Technology Integration Project. There were several characteristics that were used to identify the sub-sample of participants for the current study. The characteristics that contributed to the intensity sampling included: teacher provided explicit literacy instruction, students’ consistent access to a device; student grade level; teacher experience with grade level; data on teacher use of technology; and previous lesson observations. Because the current study emphasizes teachers’ planning processes while integrating technology into literacy
instruction, it was important to select participants who taught literacy as a primary subject area at some point in the day and had consistent access to digital devices for students. Based on these factors, potential participants were limited to the sixteen participating fifth grade teachers, as they were the only teachers in the study whose students had consistent access to a digital device, and they also provided daily literacy instruction as part of the fifth grade curriculum. In order to maximize the phenomenon being studied, teachers were also expected to have taught fifth grade for at least two years to ensure that they were familiar with the fifth grade standards and curriculum in this district. This factor further narrowed the pool to fifteen. Next, data from teachers’ self-reports about the quantity and type of digital tools they used as part of their instruction was used to determine which of the potential fifteen participants did integrate technology into their literacy instruction in some way. Teachers who did not report integrating technology into their instruction were excluded, which resulted in six potential remaining participants.

The final criterion used to select participants from this study was teacher lesson observations. These observations served to inform an understanding of the teachers’ approaches to integrating technology, in order to select participants that represent multiple perspectives to technology integration. Observations revealed that one teacher used technology for other purposes such as attendance and scorekeeping but did not use digital tools in her literacy instruction. From the remaining five, observations revealed that three demonstrated they were planning to integrate technology into literacy instruction, but in different ways from one another. These three participants were invited to participate in the study and all consented.
This selection process contributed to participant selection where integrating technology into literacy instruction was an existing practice and would not be out of context for the teacher. This additionally allowed for a focus on teacher thinking and planning without some important barriers, such as access to devices or student ability. Further, because each teacher was teaching in similar contexts with similar students, the focus could be primarily on the teachers’ lesson planning without accounting for obstacles, such as access to technology, nor substantial differences in student ability from classroom to classroom. Table 3.1 depicts the demographic information for each participant and the school in which they teach; all names are pseudonyms.

Table 3.1

Participant Demographic Information

<table>
<thead>
<tr>
<th>Pseudonym</th>
<th>Years Teaching Experience</th>
<th>Age Range</th>
<th>Gender</th>
<th>Elementary School</th>
<th>Free/Reduced Lunch Rate at School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lauren</td>
<td>8</td>
<td>26-30</td>
<td>Female</td>
<td>Edmonds</td>
<td>16.76</td>
</tr>
<tr>
<td>Bailey</td>
<td>4</td>
<td>21-25</td>
<td>Female</td>
<td>Rivers</td>
<td>8.46</td>
</tr>
<tr>
<td>Susan</td>
<td>7</td>
<td>26-30</td>
<td>Female</td>
<td>Washington</td>
<td>11.63</td>
</tr>
</tbody>
</table>

Methods and Data Collection

Verbal Protocols

The primary data source for this study were participant-generated verbal reports during an instructional planning task, which were synchronized with participants’ computer screen moves (Cho, 2014; Cho & Woodward, 2014; Pressley & Afflerbach, 1995). Verbal protocols have been used with practicing teachers to elicit their perspectives on new literacies and the relationship between new literacies and their
pedagogy (Lewis & Chandler-Olcott, 2012). Verbal protocols have also been used to explore how pre-service teachers plan English Language Arts instruction for a given task and context (Cho & Woodward, 2014). Using verbal protocols in these contexts was a useful method for providing insights not only into the types of knowledge that may be involved in integrating technology into literacy instruction, but also the beliefs that influence the planning process as well. In this study, verbal protocols were utilized to identify the knowledge and processes being used (Afflerbach, 2000) within the teacher’s context and with an authentic task in order to also gain insights on the participants’ beliefs and contextual factors (Smagorinsky, 2001) influencing planning decisions.

Both concurrent and retrospective verbal reports were collected, as Taylor and Dionne (2000) found that combining participants’ online, concurrent think aloud with a retrospective debriefing statistically accounted for more of participants’ strategic actions than either method alone.

**Procedure for Collecting Verbal Protocols**

Teachers were invited to participate in a single planning session and asked to think aloud while planning a lesson at the end of a yearlong involvement with a professional development program designed to support their technology integration into literacy instruction using the TIPC (See Appendix A). The session was scheduled during a naturally occurring time in the teacher’s curriculum where they would choose to integrate technology to provide instruction on a specific literacy instructional goal. Although participants were instructed they could choose any location for the planning session, all participants chose their classrooms and indicated in their scheduling email that this was a typical location for planning. Participants were asked to plan as they
normally would and to use any and all resources that would normally be available to them. Prior to beginning the session, a web-based screencasting software, Screencast-O-Matic, was activated on the participants’ computers in order to capture any digital resources the participants utilized while planning. This software was chosen because it was easily activated on most computers, and the resulting data could be uploaded directly to a password-protected, encrypted data storage site. This was useful as it was important for each participant’s own computer to be used, as a researcher-provided computer would prevent the participant from having access to any files, bookmarks, or other materials easily available to them on their own device.

Before beginning the think-aloud session, the task for the session was addressed and participants were led through a practice exercise in order to model think-aloud procedures (Afflerbach, 2000). The practice exercise involved a researcher-provided demonstration of thinking aloud while determining the number of doors in a house; after which, the participant was instructed to think aloud while counting the windows in their home. After completing the practice think-aloud, the participants were invited to begin the think-aloud session. The task for the think-aloud session was to plan a lesson. No structure was provided to participants to guide specific lesson elements or format (See Appendix B). Once the participant was comfortable with thinking aloud, the planning session began. Both the screencasting software and a separate audio recorder were used to capture all utterances from the participants, as some participants moved to interact with print texts or referenced other materials in the classroom away from the computer. There was no time limit, as time constraints have been found to adversely affect participants’ performances (Fox, Ericsson, & Best, 2011). Once the session began, the participant
thought aloud as they were planning, with only occasional probes from the researcher. Probes were used to encourage the participant to continue to think aloud when a participant was silent for more than three seconds. Probes were limited to: “What are you thinking?” or “Why did you do that?” in an effort not to influence the thinking reported by the participant (Pressley & Afflerbach, 1995). When the participant indicated that they had completed their lesson plan, the session was terminated.

Immediately following the concurrent verbal report, the researcher led the participant through a retrospective verbal report (Taylor & Dionne, 2000), which addressed specific actions and statements made by the participant during the session that required further elaboration. While domains of questions were generated in advance of the retrospective verbal report (See Appendix C), each one varied according to the information provided in each session. As the participant was thinking aloud, the researcher generated a memo that noted the time and action or statement in which the thinking or process was not clear. This memo guided the content of the retrospective verbal report. For digital actions, the screencast was played for the participant, and she was asked to think out loud about her actions. For statements that were not explicitly tied to an action, the statement was replayed for the participant and she was asked to think about her action. For broader statements or references, the question asked was framed in the context of the lesson. Example questions and memo notes are shown in Table 3.2.

Table 3.2

*Example Retrospective Verbal Protocol Questions*

<table>
<thead>
<tr>
<th>Researcher Memo</th>
<th>Question asked of Participant</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:15-why critiquing?</td>
<td>Around 8 minutes and 15 seconds, you were really focusing on critiquing and the critiquing section of that planning document. Why did you choose critiquing?</td>
</tr>
</tbody>
</table>
Table 3.2 continued

<table>
<thead>
<tr>
<th>Timecode</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:20</td>
<td>So around 11 minutes and 20 seconds, you were looking at the text-dependent questions. What made you look for those text-dependent questions?</td>
</tr>
<tr>
<td></td>
<td>What requirement sheet? When you were planning, you mentioned a requirement sheet. Do you have a copy of that?</td>
</tr>
<tr>
<td></td>
<td>Book trailer? How did she decide on that? What made you think of using a book trailer?</td>
</tr>
<tr>
<td></td>
<td>- Educreations, Prezi, and Animoto. So you mentioned that your students were interested in those, they had experience with those. Are there other reasons you chose those three specifically?</td>
</tr>
</tbody>
</table>

The combination of the concurrent and retrospective verbal protocols comprised the entirety of the think-aloud session. Following each think-aloud session, the audio files of the concurrent and retrospective verbal protocols were transcribed.

**Complementary Data**

In addition to the verbal protocols, complementary data was collected to contextualize and inform interpretation of the think-aloud sessions.

**Interviews**

A pre-interview was conducted at a time prior to the think-aloud session. These were separated due to the possibility of the influence of pre-interview questions on the lesson planning itself. For example, a question about identifying the most important parts of the lesson might have caused a participant to prioritize lesson elements differently when planning, in an effort to align their planning with the interview response. Pre-interview questions focused on the following domains of interest: normal lesson planning procedures, technology integration, and development of planning throughout the year. All
pre-interview questions are listed in Appendix D and were asked, in order, to each participant.

Following the think-aloud session, a post-interview was conducted. These questions asked participants to reflect on specific elements of their lessons to both provide them an opportunity to reflect on their lesson and to elaborate on the elements of their lesson planning. Questions in the post-interview focused on the following domains: lesson effectiveness, lesson planning procedures, and lesson plan elements. All post-interview questions are listed in Appendix E and, like the pre-interview, were asked in order to each participant.

Both interviews served to validate (Cresswell, 2014) the think-aloud session. For example, questions about normal lesson planning procedures in both interviews validated the actual procedures used by participants in the think-aloud session. Responses to questions in the pre-interview regarding development of planning throughout the year were used to validate the authenticity of the planning approach used in the think-aloud session. Further, questions in the post-interview contributed to an understanding of the alignment between the participants’ stated lesson plan elements and the ones demonstrated in their verbal protocols. Both interviews were transcribed upon completion.

**Surveys and Questionnaires**

Participants in this study were recruited from a larger professional development project on technology integration. As part of this project, participants were asked to complete the Survey of Technology Use in Literacy and Language Arts (Hutchison & Reinking, 2011) at the beginning and the end of the school year. This survey focused on:
the frequency of technology integration into literacy instruction, perceived value of integrating technology, teacher abilities and stance towards using technology, support for and availability of technology, and professional development perceptions. Selected questions from participants in this study were used to inform an understanding about the beliefs and experiences teachers brought to the lesson planning think-aloud session in order to better conceptualize the context in which each teacher was teaching.

In addition to the Survey of Technology Use in Literacy and Language Arts, participants completed a Weekly Technology Diary for seven months of the school year, October through April. The Weekly Technology Diary utilized an experience sampling (Christensen, Barrett, Bliss-Moreau, Lebo, & Kaschub, 2003) method to understand the digital tools that participants were incorporating into their instruction each day for one week a month. Figure 3.1 displays the types of tools listed on the Weekly Technology Diary from which participants could choose. In addition to those listed, participants could also write in additional tools they used or select “I did not use technology today”.

<table>
<thead>
<tr>
<th>Audio, Images &amp; Video</th>
<th>Social Media/Interaction</th>
<th>Other Tools and Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Gather images online</td>
<td>• Publish information to social media</td>
<td>• Submit work online</td>
</tr>
<tr>
<td>• Create images</td>
<td>• Gather information through social media</td>
<td>• Practice a skill</td>
</tr>
<tr>
<td>• Watch a video online</td>
<td>• Use social bookmarking sites</td>
<td>• Search for information online</td>
</tr>
<tr>
<td>• Create a video</td>
<td>• Read or publish fanfiction</td>
<td>• Read a digital book or story</td>
</tr>
<tr>
<td>• Listen to information online</td>
<td>• Collaborate with students from other classes</td>
<td>• Use reference sites online</td>
</tr>
<tr>
<td>• Use apps to create products</td>
<td></td>
<td>• Create a document using Word Processor</td>
</tr>
<tr>
<td>that incorporate images</td>
<td></td>
<td>• Use a graphic organizer tool</td>
</tr>
<tr>
<td>• Use apps to create products</td>
<td></td>
<td>• Annotate digital text</td>
</tr>
<tr>
<td>that incorporate audio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Use apps to create products</td>
<td></td>
<td></td>
</tr>
<tr>
<td>that incorporate images, video</td>
<td></td>
<td></td>
</tr>
<tr>
<td>or audio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Create a multimedia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>presentation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 3.1. Digital tools presented in the Weekly Technology Diary by category.
These three teachers did not report each day during the sixth of the seven months the reports were collected, so only six months were used for analysis. Relevant findings from analysis of this survey and questionnaire data are reported in Chapter 4.

**Observations**

Observations were conducted as part of the larger technology integration project. Teachers were invited to schedule an observation for a time in which they would be integrating technology into their literacy instruction. An observation protocol (Cresswell, 2014) was developed prior to the observations which focused on the following: the instructional goal and approach, use of technology, constraints and obstacles, instructional supports, and other, which included student differences, other classroom activities, and additional relevant observations. This protocol also included demographic information with teacher name, date, location, and observation length.

In addition to the observation protocol, an Instructional Planning Cycle rubric was developed. Based on the elements of the Technology Integration Planning Cycle (TIPC; Hutchison & Woodward, 2014a), this rubric assessed the lesson observed for the following elements: instructional goal and approach, technology selection, contribution to instructional goals, potential constraints, instruction and reflection. The rubric was designed with a three-point scale with narrative descriptions of each value.

Finally, teachers reflected on their lesson using an Instructional Planning Cycle reflection form. This form asked teachers to identify the standards that informed their instruction, evaluate themselves on the Instructional Planning Cycle rubric, and provide a reflective response to the question, “What did you learn about using technology in this way that can inform what you do in the future?”.
**Documents and Photos**

During each think-aloud session, relevant documents were collected to inform the context of the class for which the planning was taking place, as well as to supplement the audio and video data with needed information that would not be captured in those forms. All non-digital materials referenced by participants were captured in photo or document form and are shown in Table 3.3.

**Table 3.3**

*Document and Photo Data*

<table>
<thead>
<tr>
<th>Participant</th>
<th>Documents</th>
<th>Photos</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lauren</td>
<td>1) Example Student Magazine Project Sheet 2) School Standards Document</td>
<td>1) <em>The Terrible Two</em>, novel cover 2) Magazine Feature Ideas poster</td>
</tr>
<tr>
<td>Susan</td>
<td>1) School Standards Document</td>
<td>1) Handwritten note she wrote with lesson plan order on it</td>
</tr>
</tbody>
</table>

**Data Analysis**

Prior to data analysis, the data was organized in a number of ways. First, participant profiles were created, which captured the multiple data sources for each participant together in one place. The qualitative analysis software NVivo 11 was used to facilitate this collection and analysis. Using NVivo, the video of the think-aloud session was integrated into the transcribed verbal protocol so that analysis could be informed by
the participants’ onscreen actions while coding. Additionally, documents and photos were linked into the transcript, where they could be viewed and analyzed during the verbal protocol analysis. Finally, utterances were segmented into small idea units before categorization and coding (Chi, 1997). Also included in each participant’s profile were their interview transcripts, survey and questionnaire responses, and their observation materials.

Verbal protocol analysis was informed by Smagorinsky’s (2001) suggestion that protocols are reflective of situated practice and that through articulating their thinking, participants are creating meaning. Therefore, the first cycle of data analysis was conducted using a general inductive approach to qualitative data analysis, which allows research findings to emerge from the frequent, dominant, or significant themes in the data (Thomas, 2006). First, each participant’s profile was read through in its entirety, which included the verbal protocols with matched screen moves, and all complementary data. A researcher memo was then created which reflected the dominant ideas reflected in the data. These fourteen initial categories were then analyzed for connectedness and redundancy and were then refined. Data was then coded with refined categories, the result of which was further refinement of codes based on relationships found among the codes, and from this analysis two themes emerged. The first cycle of data analysis served to inform the first research question: What knowledge and dispositions do teachers draw upon when planning to integrate technology into literacy instruction? This process is shown in Table 3.4.

In order to gain insight into how the specific elements of the TIPC might be reflected in teacher planning, data was analyzed in a second cycle to address Research
Question 2: How do the elements of the TIPC frame the planning process used by teachers when integrating technology into literacy instruction? Because this research question addressed exploring teachers’ planning processes to determine how the elements of the TIPC were related to the actual planning processes of teachers, a secondary data analysis using a hypothesis coding approach (Saldaña, 2016) was used. Hypothesis coding utilizes an already established list of codes to explore specific explanations of a phenomenon in the data. This approach facilitated focused data analysis of the verbal protocols and complementary data for the specific elements of the TIPC, while also accounting for non-examples of each element. Examples from the second cycle of data analysis are shown in Table 3.5.

Table 3.4

First Cycle Data Analysis

<table>
<thead>
<tr>
<th>Initial Categories</th>
<th>Refined Categories</th>
<th>Re-Analysis of Data</th>
<th>Theme</th>
<th>Description of Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus on standards</td>
<td>Re-named Awareness of Instructional Purpose</td>
<td>Awareness of Instructional Purpose</td>
<td>Complexities of Teacher Knowledge</td>
<td>Represents the multiple systems of knowledge teachers draw on when planning to integrate technology into literacy instruction.</td>
</tr>
<tr>
<td>Mindful of learning outcome</td>
<td>Collapsed into Focus on standards</td>
<td>Previously collapsed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection between daily goals and larger standards</td>
<td>Collapsed into Focus on standards</td>
<td>Previously collapsed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flexibility in assessment and tools</td>
<td>Re-named Expected Student Performance</td>
<td>Expected Student Performance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Differentiation through using digital tools</td>
<td>Collapsed into Expected Student Performance</td>
<td>Previously collapsed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student interest</td>
<td>Re-named Student Engagement &amp; Interest</td>
<td>Student Engagement &amp; Interest</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3.4 continued

<table>
<thead>
<tr>
<th>Collaboration among students</th>
<th>Collapsed into Expected Student Performance</th>
<th>Previously collapsed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modeling use of digital tool</td>
<td>Collapsed into Teaching with Technology</td>
<td>Previously collapsed</td>
</tr>
<tr>
<td>Using familiar tools</td>
<td>Re-named Teaching with Technology</td>
<td>Teaching with Technology</td>
</tr>
<tr>
<td>Students should be creative</td>
<td>Collapsed into Expected Student Performance</td>
<td>Previously collapsed</td>
</tr>
<tr>
<td>Disoriented use of digital tool</td>
<td>Collapsed into Using Digital Tools</td>
<td>Previously collapsed</td>
</tr>
<tr>
<td>Using digital tools to create classroom choice</td>
<td>Re-named Purpose for Integrating Technology</td>
<td>Purpose for Integrating Technology</td>
</tr>
<tr>
<td>Comfortable with failure</td>
<td>Collapsed into Using Digital Tools</td>
<td>Previously collapsed</td>
</tr>
<tr>
<td>Using technology as an extension</td>
<td>Re-named Using Digital Tools</td>
<td>Using Digital Tools</td>
</tr>
</tbody>
</table>

| Orientation to Integrating Technology | Represents the assumptions and positions teachers take when integrating technology. |

Table 3.5

Second Cycle Data Analysis

<table>
<thead>
<tr>
<th>TIPC Element</th>
<th>Example Excerpt</th>
<th>Non-Example Excerpt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructional Goal</td>
<td>Instructional were, it’s kind of that long-term goal. The compare/contrast event, characters, and settings.</td>
<td>Honestly, I feel that this came up just because a student was interested in it. It didn’t necessarily come up through me going, “How can I meet this other goal?”</td>
</tr>
<tr>
<td>Instructional Approach</td>
<td>I think once I do that mini lesson, I’m just going to give them some work time but as a little bit of bait, emphasize the QR work.</td>
<td>Do I just want to see where it goes and then use that information for next year? That these guys would be my guinea pigs…</td>
</tr>
<tr>
<td>Tool Selection</td>
<td>They could use Animoto. That’s one that we use a lot though. I’m going to try to think of some others in case the kids are sick of doing the Animoto. It’s the end of the year. They are asking about doing Prezis, so maybe they could create a Prezi for their book trailer.</td>
<td>Just make sure that we have some sort of device, like the book, I have to make sure that it loads on here…Really, it’s just trying out devices to see if it works.</td>
</tr>
</tbody>
</table>
Table 3.5 continued

| Contribution to Instruction | There’s a lot of reading and stopping and thinking. They’ll add to this. They’ll be grabbing the iPad to look up a word, or they’ll Google Earth where this is taking place just to help visualize and to actually see where it’s happening. | Usually I try to figure out what everyone else is doing at their seats, which is where our technology, I think, comes into play the most. |
| Constraints | If I start to see them (students) struggle then, at least I’ve thought through the three steps, and I can put on the board, "Go to this website. Click this, and you’re looking for image URL". | If they’re going to be in a group, can they share the document and not work with each other? Can they share the project? Prezi, they can share and collaborate on that together. I have to think about stuff like that. |
| Instruction | I’ll type it up in a document, so the kids can see it and I’ll share it with them. Usually, I’ll just share it so they can view. I’ll write my directions on there…it eliminates the questions, “What are we doing?” | None. |

**Trustworthiness**

Constant comparative analysis (Glaser & Strauss, 1967) was essential to data analysis because of the wide variety of complementary data sources collected in this study. After each step in the data analysis, a researcher memo was created to document any changes that needed to be made in the coding framework. This was facilitated through the use of research memos in NVivo, which were specifically connected to participant profiles or data sources. Constant comparative analysis was also useful in establishing the trustworthiness of this study to ensure that relevant protocol excerpts were contextualized, when possible, through the additional data sources. Annotations were made within NVivo to denote connections among sources, which would serve to triangulate inferences made from the verbal protocols with complementary data.

Cresswell (2014) noted that “if themes established based on converging several sources of data or perspectives from participants, then this process can be claimed as adding
validity to the study” (p.201). Therefore, establishing clear connections among data sources served to strengthen the trustworthiness of this study.

**Summary**

This qualitative study uses verbal protocol analysis (Pressley & Afflerbach, 1995; Smagorinsky, 2001) and complementary data (Cho, 2014; Coiro & Dobler, 2007; Zhang & Duke, 2011) to explore the processes used by literacy teachers seeking to integrate technology into their instruction. Participants were three fifth grade teachers participating in a larger technology project. Data collected included: verbal protocols, interviews, survey and questionnaires, observations, and documents and photos.

Data analysis included two cycles in order to best address the research questions. Open-coding, hypothesis coding, and constant comparative analysis were used at different points during data analysis. Efforts were made to ensure trustworthiness through adhering to established procedures in conducting think-aloud studies, using complementary data, and using multiple data sources for triangulation. The findings, reported in Chapter 4, describe the knowledge and stances that teachers used when planning their lessons and the elements of the TIPC that framed their lessons.
CHAPTER 4
FINDINGS

Introduction

Chapter 4 presents the findings of this study. The purpose of this study was to better understand how teachers plan to integrate technology into literacy instruction and to explore how a lesson planning model might support teachers’ planning efforts. Two research questions guided this study:

1. What knowledge and dispositions do teachers draw upon when planning to integrate technology into literacy instruction?
2. How do the elements of the Technology Integration Planning Cycle (Hutchison & Woodward, 2014a) frame the planning process used by teachers when integrating technology into literacy instruction?

Three teachers from a larger technology integration project were invited to participate in a think-aloud study while they planned a lesson to integrate technology into literacy instruction. The teachers selected the time and date during which they would be planning a lesson in which they anticipated integrating technology. The think-aloud study occurred in the place where the teachers typically planned their lessons and with materials usually available when planning. In addition to verbal report and interview data, complementary data from the larger technology project were used to further contextualize the teachers’ approach to integrating technology in the classroom (Borko, 2004).

Data analysis occurred in two cycles. First, data were analyzed using a general inductive approach to qualitative data analysis (Thomas, 2006), which allows research
findings to emerge from the frequent, dominant, or significant themes in the data. These major themes were then examined for redundancy and collapsed into the two major themes which respond to the first research question: the complexities of teacher knowledge and orientation to integrating technology. Then a second cycle of data analysis was conducted using a hypothesis coding approach (Saldaña, 2016) to explore the second research question. These findings are reported under the theme enactment of the elements of the Technology Integration Planning Cycle (TIPC).

Teacher-Participant Profiles

Participant Characteristics

Three fifth grade teachers were invited to participate in the study based on their participation in a larger technology integration professional development project using intensity sampling (Patton, 2002). The characteristics that contributed to the intensity sampling included: students’ consistent access to a device; student grade level; teacher experience with grade level; students’ demographic information; data on teacher use of technology; and previous lesson observations. These factors contributed to participant selection where integrating technology into literacy instruction was an existing practice and would not be out of context for the teacher. Further, because each teacher was teaching in similar contexts with similar students, the focus could be primarily on the teachers’ lesson planning rather factors such as access to technology or differences in student ability. All three think-aloud sessions were conducted within two weeks of each other, so planning was not expected to vary widely in terms of expectations of student ability as might have been the case with a session early in the school year and another teacher’s session much later in the year. Also, teachers experienced the same amount of
support from the larger technology integration project. However, observation data indicated that while these teachers all did use technology, they had different purposes and approaches to doing so. Selecting participants according to these factors fostered an intensification of the phenomenon of integrating technology into literacy instruction, without focusing on extreme cases. Table 4.1 lists the teacher-participants’ (hereafter termed teachers) demographic information, as well as relevant findings from the survey data.

**Table 4.1**

*Teacher-Participant Information*

<table>
<thead>
<tr>
<th>Pseudonym</th>
<th>Years Experience</th>
<th>Age Range</th>
<th>Free/Reduced Lunch*</th>
<th>Weekly Digital Practice Average</th>
<th>Reported Stance Towards Tech</th>
<th>Planning Session Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lauren</td>
<td>8</td>
<td>26-30</td>
<td>16.76</td>
<td>17.67</td>
<td>Very Important</td>
<td>44 min.</td>
</tr>
<tr>
<td>Bailey</td>
<td>4</td>
<td>21-25</td>
<td>8.46</td>
<td>39.67</td>
<td>Can’t Live Without it</td>
<td>40 min.</td>
</tr>
<tr>
<td>Susan</td>
<td>7</td>
<td>26-30</td>
<td>11.63</td>
<td>16.33</td>
<td>Can’t Live Without it</td>
<td>41 min.</td>
</tr>
</tbody>
</table>

*Rate for this district was 13.7 in the year this study was conducted.*

While the teachers ranged in classroom experience, all had been teaching fifth grade for the entirety of their teaching careers. These teachers were slightly younger than the average teacher participating in the larger project (average=31-40), and were slightly less experienced (average=12.66 years). They did not describe themselves as digital natives (Prensky, 2010) and noted in survey data that they did not believe they had received adequate professional development on technology integration previous to this project. This indicates that the teachers did not consider themselves experts in technology integration and recognized a need for development in this area.
For the Weekly Technology Use reports, once a month, teachers in the project reported the frequency of using a digital device for a variety of purposes. For one week during the month the teachers indicated the specific digital tools or activities students would be using from a possible twenty-two options. Items included using audio, video, and images, such as watching or creating a video or listening to information online, social media interaction, such as publishing information to social media or collaborating with other classes, or other tools and practices, such as practicing a skill, accessing or creating a document, or searching for information. The full list of questions is included in Appendix H. The average reported in Table 4.1 reflects the average number of digital tools or practices the teachers reported using in one week. These three teachers did not report each day for the sixth of the seven months the reports were collected, so averages displayed in Table 4.1 reflect data from six months of reports.

Also, teachers completed the Survey of Technology Use in Literacy and Language Arts (Hutchison & Reinking, 2011) at the beginning and end of the larger project. In general, these teachers responded similarly to many of the questions on that survey. Specifically, these three teachers reported the same stance towards technology in the pre-survey as they did the post-survey. However, there are important differences in some responses, which are discussed in each teacher’s individual portrait.

In order to fully contextualize the thematic findings from the think-aloud study, individual portraits of each teacher are presented. Understanding the context that each teacher was working within is critical to the situative approach taken in this study (Borko, 2004).
Participant Portraits

Susan, The Technophile

Susan had been at the school where she was teaching since the start of her career, and an instructional coach stated that Susan was one of the best at technology integration in the school. While Susan’s survey data was largely similar to the other teachers’ responses, she differed in a few important ways. Susan did not indicate in the pre-survey that she utilized social media or multimedia presentations consistently in class. She also indicated that she did not present students with opportunities to create videos or collaborate with other classes. This is notable because these are areas of change indicated by her post-survey, in which Susan’s responses changed from not at all to incorporating videos to a small extent and collaborating with other classes frequently. Susan also differed in her assessment of obstacles to integration. Unlike the other teachers, Susan indicated that time to prepare and time required to prepare students for high-stakes testing were obstacles to integrating technology ranked those as both having a moderate impact on her ability to integrate technology. Additionally, Susan’s response to the question, “How hard would it be to teach without laptop computers?” changed from an initial response of not too hard to somewhat hard. These responses reflect that Susan recognizes more obstacles to technology integration than the other teachers, which may influence how she prioritizes using digital tools in the classroom. Further, her response to teaching with the Chromebooks indicates an increase in use and integration into instruction throughout the year.

Previous to the think-aloud session, each teacher was observed teaching a literacy lesson in which technology was integrated. Susan’s lesson observation was of a typical
lesson in her literacy block, as noted in her self-reflection after the observation. During this lesson, students were working on a variety of different projects with different instructional goals. Students were grouped homogeneously according to reading ability for all work during this lesson. Overall, most students were working on a task that was expected of them. Susan spent most of her time sitting with the group comprised of struggling readers or troubleshooting audio difficulties with the groups that were using Skype for a literature circle meeting with another class. With the exception of the literature circle group, the students were focused on using a digital tool to respond to different features of text. For example, one project was to “use Popplet to push your thinking about the book” (observation memo). Another was to use the app Subtext to analyze non-fiction text features. Without clear instructional goals, the groups produced myriad outcomes for each of these activities. For example, the high level group produced a complex web of personal reactions to key quotes in the text, while another group typed previously written chapter summaries into a timeline or copied the annotations made in an iPad app down in a notebook before posting them on a blog. Susan’s self-reflection indicated that additional instructional goals included text-based interpretation and supporting ideas with textual evidence. She noted that the Popplet project might have been a distraction because students were talking to collaborate on the one iPad and also in the literature circle groups.

Susan’s think-aloud session took place in her classroom after school, which she stated during the pre-interview was where she typically planned her literacy instruction. She noted that she sometimes utilized time during the day to plan, but had not been able to plan during the day of the session. She was comfortable with thinking aloud and spoke
with few breaks for the entirety of her session. She organized her class with a shared
Google Doc, which served both as her planning document and the students’ overview of
the day’s work. The instructional goal for the literacy lesson planned during the think-
aloud session was refined multiple times as she planned. She began her planning by
stating that she wanted students to create a book trailer as a summary of the book.
However, in the post-interview, Susan stated, “I wanted them to be able to show me the
different elements of the plot and different character analysis and description type pieces
of the book”. This lesson fell at the end of a literature circle unit when students had just
finished reading their books.

Susan used her school-issued PC laptop to access all of the resources she used to
plan her lesson; although she did plan to print a document that would serve as an
organizer for students’ projects. Susan stated in her pre-interview that she utilized district
ELA standards as a guide for standards when planning, the extended learning program
coordinator for ideas for extension, and Pinterest and other resources when planning.
During the session, she primarily used the Google Doc for planning and created an
assignment sheet for the book trailer. She stated in her post-interview that this lesson
would be effective for “getting them organized with their thoughts, so they have a plan
before they just jump right into the project. Otherwise, their project doesn’t flow
nicely…and is missing things.”

Lauren, The Motivator

Lauren taught at the most socio-economically diverse school in this study and had
been there for eight years. In her pre-survey response, she indicated that she felt
proficient at presenting opportunities for students to learn with digital tools from a variety
of approaches. She did indicate that she was less comfortable teaching with social media for instructional purposes in both the pre and post survey. There were two important differences in her post-survey. First, she noted that she was using images and multimedia presentations more in class and went from not using audio recordings in class at all to using audio moderately in class. Also, her response to the question, “How hard would it be to teach without laptop computers?” changed from the initial response of somewhat hard to very hard. These responses reflect Lauren’s disposition to not integrate social media as part of her instruction, openness to incorporating other digital tools throughout the year, and a self-perception of being relatively skilled with using digital tools for instructional purposes.

Lauren’s lesson observation focused on the instructional goal of comparing and contrasting two texts using the digital tool VoiceThread, a presentation tool that incorporates audio, video, annotation, and commenting. Students created a script of their narration prior to beginning the project and worked in small groups. There were no stated requirements about the content of the slides, nor the narration. However, Lauren expressed that she would be evaluating the projects on the completeness of comparing and contrasting the fiction elements in the text. Throughout the class, Lauren’s feedback was primarily on classroom management issues, rather than the content students were creating, and the class was busy and moderately on task. Students encountered some obstacles with using VoiceThread in the lesson. For example, on a Chromebook, presentations are created in Google Slides, which do not upload directly to VoiceThread. Although Lauren instructed students to take a screenshot of each slide to upload, an observation memo noted that more time-efficient approaches existed. This affected the
instruction, as students were using tools in Google Slides, such as transitions and movements, which would not translate to VoiceThread via screenshots. In her self-reflection on the lesson, Lauren noted that she wished she had created a rubric to share with the students that could have guided their creation of the project.

Lauren’s think-aloud session took place in her classroom after school, which she indicated was the usual time and place that she planned instruction. She was comfortable thinking out loud and had a structured approach to planning. For example, at the beginning of the session, she planned a math activity because students would be doing a math warm-up while class was starting before the literacy block. She acknowledged this was not relevant to her literacy instruction, but needed to plan it because it came first in the day. For the literacy lesson Lauren planned for the think-aloud study, she stated her instructional goal was “talking about the purpose of the QR code and why somebody might want it or what they’re used for…showing them something else that they can add a different text feature that might be a little less traditional than what they’ve learned in the past” (retrospective verbal report). This lesson was situated within a larger unit of instruction on journalism and magazines, which was focused on the recognition and production of text features.

Lauren also used her school-issued PC laptop to access most resources she used to plan her lesson and the website planbook.com to organize her lesson planning each week. While planning her lesson she referred to two print documents, a list of magazine feature ideas that were generated throughout the unit and a magazine project template that listed the required article types and text features. No digital features were listed as required on the sheet. In fact, Lauren elaborated that she felt that using QR codes would “be different
and engaging for them (students), just something to spice it up to make it a fifth grade project and not a third grade project” (post-interview).

**Bailey, The Experimenter**

Bailey was in her third year of teaching fifth grade, and her first year at this school. She had previously been at a school with a free and reduced rate of 29.63%, well above the district’s average, and so was experienced with a range of socio-economically diverse learners. In her pre-survey data, she differed from Lauren and Susan by indicating that she both frequently used social media in her classroom and felt comfortable using social media for instructional purposes. In fact, the primary factor in Bailey’s Weekly Technology Use report that increased her average was the frequent use of social media in her instruction. Additional differences in her pre-survey data include using digital tools more frequently to include audio recording, collaborate with students in other classes, and create multimedia presentations. Her post-survey indicated that these were still strongly important to her; however, she did change her response to the question “How hard would it be to teach without laptop computers?” from an initial response of *very hard* to *impossible*. These responses indicate that Bailey was inclined to incorporate a variety of digital tools in her instruction, saw herself as prepared to use digital tools to accomplish instructional goals, and valued technology as an integral part of her instruction.

Bailey’s lesson observation was when students were working on a larger project about European exploration and colonization. This topic was extended into literacy instruction through a project that met several writing, reading, and speaking and listening standards from the state standards document. The specific instructional goal for this lesson was to produce a video by fluently reading a previously written text about the
topic and to share this video using a QR code with a third grade partner and each other. The third grade students would then learn about the topic through listening to an older fluent reader and peers in the classroom could provide feedback on both the quality of content and video production. Expectations were shared in multiple formats for students with specific, standards-based requirements. Throughout the class, Bailey was working with students to develop content and provide suggestions and feedback relative to the project expectations. Some students were using up to four devices to create, produce, and share their video. Only a few students encountered constraints, such as a QR code not scanning correctly or being cut off, and they were able to solve these using peer support before Bailey intervened. In her self-reflection, Bailey indicated that she felt this lesson strongly aligned with the instructional goals and that students were successful in demonstrating the skills she was assessing.

The think-aloud session took place after school in Bailey’s classroom. She indicated she splits her time planning between after school in her room and late in the evening at home, depending on the materials she needed. For this lesson, Bailey was planning after school in her room. Bailey did well with the think-aloud practice, but did stop infrequently during her planning session to ask if what she had said made sense. Although she was more aware of the think-aloud procedure than the other two teachers, her verbal report did not reveal any utterances or decisions that were influenced by the researcher’s presence. Further, she indicated in the post-interview that the process used in planning was typical of her usual process. For the literacy lesson Bailey planned, she stated that the instructional goal was critiquing and analyzing. In her post-interview, she elaborated that this goal was situated within “that long-term goal of comparing and
contrasting events, characters, and settings. Also, working on fluency, working on vocabulary, just because it all comes into it”.

Like Lauren and Susan, Bailey also used her school-issued PC laptop to access many resources she used to plan her lesson. However, she referred to several other print documents in her classroom and used those to inform her planning. She used a print-based planning notebook, which contained the topic for that day’s lesson. For example, for the day that Bailey was planning the lesson, her planner showed “Iqbal Ch. 10, 11.; Book Club; Articles”. She had a print copy of Iqbal as well as different digital versions available. She also drew on a Prompting Guide and Planning Wheel (Fountas & Pinnell, 2009) as referents for material she was creating on her computer. In her post-interview, Bailey noted that the most effective part of the lesson would be the discussion and responses that would be fostered through the work. She stated that based on those, she would be able to assess their ability to critique and analyze these types of texts and would use that information to “help the kids a little bit more or where I need to challenge them more or backup any of those (skills)” (post-interview).

**Thematic Findings**

The following sections present the three dominant themes: complexities of teacher knowledge, orientation to integrating technology, and enactment of the elements of the TIPC as they illuminate the research questions. The first two themes relate specifically to Research Question 1, What knowledge and dispositions do teachers draw upon when planning to integrate technology into literacy instruction? While the third theme addresses Research Question 2: How do the elements of the TIPC frame the planning process used by teachers when integrating technology into literacy instruction?
Complexity of Teacher Knowledge

Teacher knowledge is widely recognized as a critical aspect of effective teaching and is generally discussed as a complex organization of systems of knowledge. These systems of knowledge include navigating pedagogical conflict (Lampert, 1985), the moral and psychological acts of teaching (Fenstermacher & Richardson, 2005), the context of classroom, school and community (Putnam & Borko, 2000), and pedagogical content knowledge (Shulman, 1986), among others. Putnam and Borko (2000) suggest that multiple systems of knowledge work together to form the foundation teachers draw on when teaching. The findings about the complexity of teacher knowledge in this study are reported in terms of how that knowledge relates to the knowledge systems of pedagogical content knowledge (PCK) and technological pedagogical content knowledge (TPACK). This emphasis is consistent with the work of other scholars (Blocher, Armfield, Sujo-Montes, Tucker & Willis, 2011; Koehler & Mishra, 2009; Lewis & Chandler-Olcott, 2012).

Further, PCK and TPACK are distinguished from one another to illuminate the differences between teachers drawing on their PCK, knowledge that is “the ways of representing and formulating the subject that make it comprehensible to others” (Shulman, 1986, p.9), versus their TPACK, which is knowledge of how, “educational technologies and PCK interact with one another to produce effective teaching with technology” (Koehler & Mishra, 2009, p.62).

Pedagogical Content Knowledge

Each teacher demonstrated use of their PCK in different and complex ways when planning their lesson. However, in only some cases was it complementary to the lesson.
In other words, in some instances teachers focused on PCK when seeking to integrate technology into their instruction, when including their technological knowledge in their planning approach would have strengthened the instruction.

Of the three teachers, Susan did not draw on her PCK as much as Lauren and Bailey. When Susan was planning the elements to include in the final book project, she discussed the work that students might do, “We’ve been summarizing. We’ve been working on the different reading strategies. It’s really just review because at this point in fifth grade they know how to use all of those” (concurrent verbal report). This provides useful insights into some misconceptions that Susan holds about instructional content and students’ mastery of instructional goals. In the classroom observation, Susan had clarified that she uses the state standards to guide her instruction. The state standard particularly related to reading strategies states that fifth grade students should, “Employ the full range of research-based comprehension strategies, including making connections, determining importance, questioning, visualizing, making inferences, summarizing, and monitoring for comprehension”. Notably, this same standard appears in the fourth and sixth grade expectations as well, as the expectation is that using those comprehension strategies would increase both in complexity themselves and in the texts those strategies were being applied to, as students continue in school. Therefore, Susan’s conclusion that all of her fifth grade students had mastered using diverse reading strategies highlights a gap in her understanding of teaching that content. Further, the evidence from her classroom observation suggests that not all of her students were achieving at the same level, as demonstrated by the different levels of literature circle groups she organized. This finding
suggests that her implication that students know how to use the full range of comprehension strategies may not reflect the actual context of her classroom.

Lauren differed from Susan in that her PCK focused more on understanding her students and their abilities. However, like Susan, Lauren did prioritize an engaging instructional approach over teaching content. In her pre-interview, Lauren stated that her planning approach typically involved a series of questions, “Where are they (students), currently, with those skills? So, it’s a lot of questions that aren’t, necessarily, anything formal. Just, what are their abilities? What are things that have engaged them before? What are they tired of doing?” While these questions do highlight her attention to students’ needs, they also reflect her orientation towards engaging students at their level and not necessarily designing learning experiences around an instructional goal. The lesson she planned during her think-aloud session exemplified this focus.

In Lauren’s concurrent verbal report describing the selection of the instructional goal she stated, “We looked through magazines and noticed some different things, and there are some QR codes…They’re (students) pretty much independent. I had a student ask me if they could put QR codes.” Although Lauren had an extensive list of text features for students to already use in the creation of the magazine, she added QR codes in an effort to be responsive to student interest. However, she does not note the specific value that providing instruction about a digital text feature might add to their understanding of text features, indicating a lack of PCK that may detract from student’s learning. Further, she was aware that students were already struggling with the multiple text features already presented to them, stating:
A lot of my kids are struggling with almost over complicating the whole process. We've done a lot of writing in different text structures and they're ... I think they feel like, they have to use all research and it's not the case. So, I'm trying to remind them of some different things like using words such as first and next and last. (concurrent verbal report)

Although awareness of the particular contributions of the QR code may be a result of a lack of technological knowledge, the disconnection between the students’ struggling with using the text features presented through previous instruction and creating an instructional goal of adding another text feature represents Lauren’s lack of content and pedagogical awareness. Shortly after this statement, Lauren indicated she does plan to support selected struggling students by monitoring their progress:

I might check in on like, five kids as far as our magazines go to see what they're doing. I'm pulling out the other day when I had ... each of them came up and just showed me how far they were or what their progress was and then they had to do it over the weekend and they all said they did. Let's check in to see if they really did. The ones I'm worried about anyway. (concurrent verbal report)

While Lauren does plan to monitor the progress of struggling students, she does not demonstrate an overall awareness that adding an additional text feature based on student interest may not serve to support the overall content goal.

In regards to her pedagogical knowledge, Lauren was reflective about the type of instruction to provide to students. During her think-aloud, she stated, “Just today, I was thinking I should have a sample magazine for them, but I always struggle a little bit with, I don’t want them to think, then, that that’s what it has to be”. She summarized this
challenge in her follow up interview as, “how much instruction do I need to give them, versus how much do I want them to figure it out on their own?” This is reflected as she struggled to address the engagement of some students with one particular text feature, the QR code, and her perception that many students were struggling with combining text features into a magazine project. Further, her content knowledge in this area may need strengthening, as she does not indicate that she clearly understands the specific elements required of students to complete the project, as indicated by her recognition that several of them seem disoriented.

Finally, the knowledge represented in Bailey’s verbal report was primarily her TPACK; however, she did draw on her PCK specifically in two instances. First, in her pre-interview, Bailey discussed how she approached the content that was the foundation of her instruction. She stated, “I’ve been able to actually break them all down, all the standards into where they fit kind of along the wheel…”. The standards she referenced are those same standards used by Susan; however, her statement demonstrates a sophisticated understanding of the standards and how to teach them. Bailey reorganized the state standards into specific interactions with text, as explained by a wheel-shaped Prompting Guide that organizes approaches to text by: thinking within the text, thinking about the text, and thinking beyond the text (Fountas & Pinnell, 2009). These specific interactions with text then serve as the foundation for her lesson planning, depending on the standard she is planning instruction for.

Next, in her concurrent verbal report, Bailey also addressed her knowledge of monitoring students’ fluency through opportunities to read aloud. She stated:
They (students) love to read out loud. We have the microphones and they'll sign up. ... I just erased it, but they'll sign up on the board in the morning. If they don't want to read that day, they don't have to. I have an ongoing list like okay, this student hasn't been reading. Then I make sure in a small group I'm reading with them instead.

Here, she is aligning standards that address fluent reading, drawing on the thinking within the text skill of maintaining fluency to ensure that all students have opportunities to practice fluent reading in an environment where they are comfortable. Further, she indicated she monitors student engagement in oral reading systematically. While Bailey does demonstrate a strong understanding of PCK, she has designed her instruction to incorporate technology extensively. This resulted in the specific displays of her knowledge being explained best by TPACK, rather than PCK.

As many scholars have noted, teacher PCK is an essential component to high-quality instruction for students (Barone & Wright, 2008; Fenstermacher & Richardson, 2005; Shulman, 1986). When teachers seek to integrate technology into their instruction, then their technological knowledge becomes additionally important, especially in how that knowledge intersects with their knowledge about content and pedagogy. Therefore, it is important to understand how teachers’ knowledge systems relate to the TPACK framework for understanding teacher knowledge.

**Technological Pedagogical Content Knowledge**

Each teacher drew on their TPACK differently when planning the lesson. At some times, this knowledge served to strengthen the learning experiences for students and add
depth and complexity to the instructional goals for students. At others, this type of knowledge was lacking and served to inhibit effective instructional planning.

An important part of Susan’s lesson was using technology to collaborate. She noted in her post-interview that she will often consider how collaboration can take place within a lesson:

There's [sic] different ways they can collaborate with technology, so I have to think creatively how they can do that. If they're going to be in a group, can they share the document and not work with each other? Can they share the project? Prezi, they can share and collaborate on that together. I have to think about stuff like that.

Although Susan demonstrates useful technological and pedagogical knowledge regarding the digital tools and instructional approach for fostering collaboration, she demonstrates a lack of understanding of the specific content goals. The standards document that Susan stated guides her instruction includes the following for grade 5 students, “Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts (emphasis in original), building on others’ ideas and expressing their own clearly.” However, her focus in planning this lesson is largely on the digital tool, rather than instruction about effective collaboration and potential new literacies skills.

This lack of focus on content is further exemplified through Susan’s retrospective verbal report. Susan was asked to comment on her decision to plan a backchannel, a digital space for commenting and discussion, for each literature circle group. She explained:
Even though the projects, I'm going to have them do independently, I still want them to...collaborate in here, and it's a skill that we even assess in the report card. But it's just a way for them to share ideas and collaborate in a digital way. Not that we don't want them to have conversations, but it's just a fun way, too. So I won't assess it, but it's just a way for them to share ideas and collaborate and ask questions if they need to. Some kids don't like to ask questions out loud, so this is even a good place for them to—they can type it. Some kids love to share, and so it's a good place for them to put it.

Susan created a space designed for students to share and strengthen their projects through collaboration. She additionally noted that using this tool can engage students who are otherwise not willing to ask questions or share. However, although she stated that the instructional purpose of this tool is for students to collaborate, she dismisses the potential for assessing the work students do using this tool. Although she acknowledged that this skill is measured and reported as student progress, she chose not to use this learning activity primarily for instructional purposes, instead choosing to prioritize the potential engagement. Without the technological knowledge to recognize the contribution of the digital tool to her instruction, expectations for collaboration were unclear and unmeasurable, even though, as Susan stated, there is potential for high quality collaboration. This may also reflect a difference between Susan’s self-perception of her own technology knowledge and her demonstrated use of the knowledge. On both the pre and post survey data, Susan rated herself highly proficient at assessing digital student work. Her verbal report indicates that there are areas in which Susan may develop her TPACK to use digital tools for assessment purposes more effectively. Although by
integrating technology into the project, Susan increased the potential for additional instructional goals and strengthened the possibilities for students to develop new literacies skills.

Unlike Susan, Lauren demonstrated a change from the pre to post survey in her perception of her ability to assess students’ digital work, rating herself only slightly proficient at the beginning of the year to highly proficient at the end of the year. This is particularly notable for Lauren, as both the classroom observation and the lesson planned in the think-aloud session did not include assessment plans for the digital student work, only for the print work. This may be indicative of a pedagogical challenge for Lauren, as her think-aloud session provided insights into the thoughtful way that she planned to integrate technology into her literacy instruction about text features.

When explaining her approach to integrating technology into literacy instruction, Lauren stated that she felt that instruction was generally:

More of a collaborative, usually because they’re going to learn from each other….I’m not going to say, ok, everybody open up this brand new thing and work. It’s usually not how that works unless I’m wanting to teach every single person (individually). But, some pick it up in ten seconds and some would take ten days. (pre-interview)

Lauren intentionally shifts the classroom environment to be more collaborative when using digital tools, and draws on her technological pedagogical knowledge to know that students are more successful when learning a digital tool when they are able to collaborate (Lankshear & Knobel, 2007).
Although, Lauren’s lack of content knowledge prevents her from clearly identifying the instructional purpose of incorporating an additional text feature, the instruction she designed would, in fact, meet an important writing standard from her standards document, “Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably”. Further, by incorporating a QR code, she addresses useful new literacies skills of how to curate and share information online. As she prepared her lesson she reflected on the type of instruction she wanted to provide and determined that providing a sample that was unrelated to the students’ magazine topics would show them how to use the technology, without providing an example students would copy directly into their work. This reflects her TPACK, as she is incorporating her technological knowledge in creating an example with her PCK, where she indicated that balancing direct instruction and student creativity is important. Lauren utilizes her TPACK to both build her own understanding of how the QR code might be used and to guide the creation of a brief overview of how to use the tool for students. Her concurrent verbal report reflects the knowledge she used as she navigated the tool:

Now, I think they'd want ... I was just thinking contact (information), and I don't think I want any of those. They need to change the caption. They need statistics. Okay, let’s see. Share, maybe embed. It (the QR generator) needs the site. I think it just wants the image URL. I don't know. Let's try it.

She anticipates what students will and will not need to do to use the tool to add the text feature to their magazine, while maintaining a flexible approach to build her technological knowledge. When she plans the specific instruction of how to use this tool, she anticipates the type of learning she wants students to engage in:
Sometimes I write things down and then I ... I don't really think they need those step by step (instructions)…but I'm going to write down the steps for my own self. I'll probably even tell them like, I just searched QR code generator. I think it's important that they like, they don't magically just come up with these things.

(concurrent verbal report)

She goes on to state that the important instruction will be modeling for students the process of how she was able to use the digital tool, “How did I get there, how did I figure this out, and I’ll tell them I just played around with it and that they might figure out things that I don’t know but this is the basic idea.” By drawing on her TPACK to model her thinking for students, she was providing them with valued instruction about how to use the tool to accomplish the instructional purpose, while also creating an opportunity for students to build their own understanding about how to use the QR code to connect to their magazine topic. This skill is an important one in new literacies classrooms, as the teacher is responsible for creating an environment in which students are able to pursue composing their own texts using digital features (Leu et al., 2013).

In her follow up interview, Lauren indicated that she has other supports for students who are not able to complete the task after the modeling and explanation. She stated:

If I start to see them struggle, then at least I've thought through the three steps, and I can put on the board, "Go to this website. Click this, and you're looking for image URL", or whatever. I can give them three bullets because I've already thought through the three, just trying to simplify it down like that.
Lauren demonstrated that she is able to use her TPACK to inform how she will provide instruction to the whole class and to plan specific instruction for students who will need additional support. Although her use of PCK alone indicated that she was not clearly able to identify the instructional purpose of including the QR code, by using a digital tool in instruction, the goal of creating a QR code was strengthened by her technological knowledge, making her TPACK stronger than her PCK alone.

The difference in PCK and TPACK that Lauren demonstrated contrasts with Bailey who, throughout the study, demonstrated strong TPACK. In her classroom, student learning is supported most effectively by presenting students with the opportunity to choose the most useful tool to accomplish the instructional goal. To this end, Bailey’s planning represented a strong understanding of the specific content being taught in her lesson, the methods she would use to provide instruction to meet the instructional goals, and ways to use technology that would support student learning. As part of a comparing and contrasting characters and settings instructional goal, Bailey explains that students will self-select an article on child heroes from a collection of articles she has shared with students using Google Drive. The students’ purpose is to connect the hero in their article to the main character of the whole-class book they are reading, *Iqbal* (D’Adamo, 2003). She stated that students will:

> Read it (the article) independently, then they’ll come up with some sort of graphic organizer. A lot go to Venn diagrams. Some do a T chart. They’ll do a mind map on the iPad, but however their brain is thinking that day. (concurrent verbal report)
She clarified in her retrospective verbal report that while some students may choose different digital tools, and that completing the assignment on paper is always an option, most students choose to use their Chromebook to create the graphic organizer.

Later in her planning session, when determining how she would assess students’ understanding of the whole-class reading from that day, Bailey utilized the Prompting Guide to inform her creation of synthesis and analysis discussion questions. She posted those questions to the class blog and stated in her verbal report, “I’ll use this as that quick assessment just to see okay, are they following along? Do they understand? Do they not? Are they off somewhere?” Students then respond to those questions on their blog, and their responses serve to inform class discussion on the following day. Bailey noted in her post-interview that this was the most effective element of her lesson stating:

Based on those discussions, (I can) see where I need to help the kids a little bit more or where I need to challenge them more or backup any of those students…They change their answers so much and even how they blog.

Sometimes they won’t get done here (in class), but they’ll go home and send it in quick….

Bailey’s strong TPACK contributes several important considerations in this aspect of the lesson. First, her technological knowledge allows her to present students with several tools to empower them to create a representation that meets the instructional goal through choosing the approach that works best for each individual student. Next, she designed challenging questions that are intended to engage students deeply in the text, but because she was using a blog, students were able to access the content after class, should they need additional time. Conceptualizing the possibility of different types of response is an
important skill for teachers in a new literacies classroom, and the technology used allowed her to differentiate her instruction in a way that would not be possible with print tools. She noted that by having students respond digitally, she was able to provide feedback on the blogs throughout the day and evening and in a variety of formats. She stated in her concurrent verbal report, “That’s one of my huge goals, trying to do a lot more feedback and quickly. (With) the use of technology, you can get it to them quickly.” This comment reflects her pre and post survey response that she felt moderately proficient at assessing students’ digital work. Moreover, her planning session was consistent with the classroom observation, where students were working in multiple mediums towards the same instructional goal and created a digital outcome that could be shared and assessed at a later time. Bailey summarized the impact that integrating technology had on her literacy instruction in the post-interview. In response to a question about what she does differently when integrating technology, Bailey replied:

This is a hard question. Because, it’s just kind of, we just use it, so I guess if I didn’t have any technology, I wouldn’t be doing the same thing. I don’t know what I would be doing. Probably LEAD 21, but I don’t like that. It wasn’t the best for my students.

She continued to explain how students annotate text, respond, and revise in ways that they did not before she began to consistently integrate technology into literacy instruction.

In conclusion, when teachers sought to incorporate technological knowledge into their pedagogical content knowledge to draw on TPACK, it highlighted different strengths and weaknesses of their instruction. Susan became increasingly focused on the
digital tool and students’ engagement with the technology, at the expense of content and instruction. Lauren’s careful consideration of the technology strengthened her instruction and supported student learning, even without clarity of the specific content guiding her instruction. Bailey’s strong TPACK was highlighted through the rich instruction she planned for students and the specific content and pedagogical knowledge she used her technological knowledge to support.

**Orientation to Integrating Technology**

After initial open coding, codes related to how teachers conceptualized their orientation towards using technology were organized into a theme. Because these teachers were planning to integrate technology into literacy instruction, Leander’s stances framework is used to structure the report of these findings. This framework describes the four common stances on the relationship between new literacies (Leu, Kinzer, Coiro, & Cammack, 2004) and conventional print-based literacies: resistance, replacement, return, and remediation (Leander, 2009, p. 147). There were no data from these teachers that indicated a resistance stance, which is possible, as these teachers were selected because they do seek to integrate technology in their instruction. However, all teachers displayed more than one orientation throughout their planning session.

**Replacement-foregrounding the digital**

Replacement is described as the opposite of resistance. Whereas resistant teachers seek to avoid integrating technology due to its negative influence on print literacy practices, teachers with a replacement stance seek to substitute canonical print literacies entirely with digital literacy practices. Although Susan did demonstrate that she oriented herself differently towards technology, her primary stance was one of replacement.
Frequently throughout her planning session, Susan would acknowledge previous learning that students had done in a print-only environment and work towards replacing that work with technology. Although students had completed previous print work, Susan valued the digital work more highly. For example, in her concurrent verbal report, when planning the character traits expectation for the final project, she noted: “That’s another standard we’ve been working on. We’ve made posters with their characters. They can use that as their resource. I might say, ‘Use your character list poster as a resource to help you with this’.” She also sought to replace students’ collaboration on the final project with a backchannel conversation. During her think-aloud session, she explained, “Another thing I want them to be able to do while they’re creating their projects is a backchannel. I try to do this every once in a while. I’m going to do a Today’s Meet (a digital backchanneling tool), I think.” Backchanneling is a real-time conversation held in a digital environment that accompanies an in-person experience, and Susan was discussing the possibility of creating a space for students to have online conversations about their in-class work on their final project. Although there may be a pedagogical reason for her to hold this conversation online, as she was planning, her intention was largely to replace in-person conversation with using a digital tool. Susan explained in her retrospective verbal report that much of the project was designed to replace previously completed print literacy learning with digital work. In response to the question, How do you see this project as different from the work students have already done on plot and character?, Susan responded:

It's really not too different, it's just adding a culminating piece to it. Some of them, the books that they did earlier, they had to make a plot wave and write out
those things…They haven't specifically written out those—falling action, rising action, solution on their books, so they'll have to reflect back and do that independently. Before, with other books, we wrote them out….Then the character list, really that's basically copying—well, they'll have to do it in a creative way, but they've already made their charts up on the board, so they've been updating those. I haven't really assessed those yet, so I'll see what they write and what they felt was important to add into their project. But otherwise, it's putting their skills into the projects, so I don't know if it's a whole lot different, but a little bit.

In her post-interview, Susan elaborated that if students were not using digital tools to complete the book projects, “I would just have them get in a group if it wasn’t technology and just work on it like a poster or whatever”. The priority for students was not necessarily the contribution to instruction that the technology made, but rather that students were engaged in digital literacy practices rather than print literacy practices.

Although replacement was Susan’s dominant stance, Lauren and Bailey also demonstrated a replacement stance, albeit to a lesser extent, while planning their lessons. Lauren stated in her concurrent verbal report when planning the QR code instruction, “once I do that mini lesson, I’m just going to give them some work time. But, as a little bit of bait, emphasize the QR code work.” She indicated that she wants students to complete work on the print magazine, so they are able to devote their time to the QR work. In Bailey’s planning for small group vocabulary, she stated that she wanted students to use the app Popplet to create concept maps root words and affixes. However, the purpose for this activity is largely centered around a focus on using digital technology for engagement purposes, as explained by her concurrent verbal report, “So they’ll put
their root word in here, and then go off with their different words. So, I mean, they’re super engaged when they have something like this.” Although none of the teachers oriented themselves towards integrating technology into their literacy instruction at all times from a replacement stance, it is important to understand that a desire to incorporate digital tools for the primary purpose of replacing a print literacy practice with a digital one did influence each teacher at some point in their planning process.

**Return-justifying the digital with print**

A return stance is one that values digital literacy practices, as they are related to print literacy practices. Leander (2009) described this stance as somewhere between resistance and replacement, where digital literacy practices are valued to underscore and support traditional print literacy learning. Susan provided an interesting perspective in her retrospective verbal report, as she explained her thinking about a comment she made during the think-aloud session about the importance of incorporating non-digital features into digital projects. She stated:

It's interesting because sometimes with the digital projects, they find a picture on Google, or they find a picture that's not created by them, and it kind of takes the—I don't know, the student work element out of it. Or, like, the human element out of it because it's all digital. Digital images and things that aren't produced by them, and so animated. So by adding in a cute kid drawing, or their own writing, you can really tell it's theirs and then it makes it more authentic. So I like to add that if I can.
Susan highlighted the importance of including print-based student work as examples of their own creative process, without recognition of the digital skills of curating and remixing when students utilize and produce digital images (Lankshear & Knobel, 2007).

Lauren also indicated a return stance when describing her assessment expectations for incorporating the QR code into the magazine project. She stated, “I don’t think I’m going to make it required by any means. I think it’s just an extra that if they want to include, they could” (concurrent verbal report). Her statement is supported by the magazine planning document she shared during her planning session, which highlighted a number of text features and content that should be included in the magazine project, none of which were digital features. Further, she noted that some students had chosen to not use technology at all for their magazine projects. She elaborated in her post-interview:

If the internet’s down tomorrow or for the next week, then fine. It’s not the end of this project. I’m still going to get, can they use text structure in their writing? That really doesn’t matter if they can use technology or not.

In this excerpt, Lauren demonstrated that she was prioritizing print literacies over the new literacies skills involved in selecting and creating QR codes, in addition to the other digital tools students may have used on their Chromebooks throughout the project.

However, like the other teachers, Lauren demonstrated multiple stances throughout her planning session. In fact, although Lauren’s statement indicated that her predominant use would be the return stance, her planning processes and actions indicated a remediation stance towards integrating technology.

Finally, there was no evidence that Bailey justified digital literacy practices in relation to their connection to print literacies.
Remediation-choosing an effective medium

The final stance, remediation, is a position that values neither print nor new literacies over one another and recognizes that different mediums serve different purposes for teaching and learning. The aim for those who hold a remediation stance towards integrating technology into literacy instruction is to determine which medium, or combination of mediums, best creates meaning and fosters communication.

Susan articulated a remediation stance in her pre-interview:

I’ve been trying to not use technology just to substitute things…I’ve tried to do that a lot more this year, and do it meaningfully and to move up that scale (in complexity). I’ve really thought, like when I think about planning I think, “How can I extend something and enhance the learning and not just substitute something with the technology piece?”

Although this statement indicates that she is focused on choosing meaningful learning experiences based on a learning goal, her planning process did not include evidence that she planned with this approach. Rather, Susan approached planning predominantly from a replacement stance and a return stance, to a lesser extent.

Despite articulating a return stance in her post-interview, Lauren discussed a remediation stance in her pre-interview and enacted that stance in her think-aloud session.

When explaining how she used technology in her classroom, Lauren gave the example:

Like today, we were making a concept web and they (students) said, “This sure would be easier on our Chromebook.” And I said, “Well, we tried that two days ago and it was a flop, so we’re doing it on paper today.” Because, at that moment,
I couldn’t spend the time dealing with how do I make. …How do I do a new …

We were just trying to get our thoughts down and it was the easiest at the time.

(pre-interview)

Lauren had attempted both mediums for making a concept web and determined that, in the context of her class for that instructional purpose, a print-based approach was the most useful. It is important to note that Lauren was open to choosing from among multiple mediums to suit the purpose and is exploring the most effective medium with which to do that. Here, she did not privilege one type over another, but rather engaged in trying digital and print-based approaches.

Lauren goes on to explain:

For example, the other day brainstorming, we were brainstorming government, just words that we thought of and, instead of me standing up and writing words down, or even having them write them on stickies, which we’ve done, we used Today’s Meet (the backchanneling tool). And they just typed in words, and saw other words and then they just thought of other words and, pretty soon, I’ve got twelve pages of words. (pre-interview)

By being willing to design learning activities with both print and digital mediums, without privileging one over the other, Lauren’s brainstorming activity reflects a remediation stance, which resulted in students not only creating their own meaning but collaborating to build meaning as a learning community as well. During her planning session, Lauren explained how she expected students to use technology and print approaches together, but discovered that some students were choosing a dominant medium when creating their magazines:
Some of them (students) are just going to print and cut it apart. That's why some of them have formatted their whole page...They just made them in Google Docs and then my plan was to just cut it apart and glue it on the paper. But some of them have gone the extra mile and like, formatted the whole page and figured out how to make a sidebar and how to insert pictures and stuff. (concurrent verbal report)

Lauren’s remediation stance towards how students create the final project fosters the opportunity for students to choose a medium that is most effective for displaying their learning and communicating the information in their magazine to others.

Remediation is a stance that is also shared by Bailey. Although Bailey did orient herself with a replacement stance when planning a vocabulary building activity, she most consistently approached technology integration into literacy instruction with a remediation stance. In her pre-interview, Bailey discussed students’ responses to reading:

It's always on either their website or my blog. I've noticed, like in a journal, the kids will either lose their journal or they'll just open up a random page and so they can't keep it consistent of even when they wrote it or what their book was about, and they like seeing that. Oh, last week, I wrote this, or two days ago, I wrote this.

In order to help students develop continuity, Bailey gives students opportunities to respond digitally rather than in a print journal. She explained that decision is designed to support students to build a collective body of responses, rather than distinct unrelated responses. Her decision is not influenced by a preference for print or new literacies, but rather the learning goal for the students. This focus on providing the best tool for
meaning-making is prevalent throughout Bailey’s classroom structure, as she explained in her pre-interview:

I only have probably two or three (students) that ask, "Can I make a movie? Can I grab the iPad? Can I do this?" The other ones, they just know, go for it. These are our tools. I think it's definitely a mind shift for the kids because even ... they said last year, they did not use technology hardly at all, and so at first it's like, "What? You have iPads? No way!" But, "Yes, these are our tools to help us learn," and just really reinforcing that they're here for our learning, not for messing around, not for games.

Bailey draws on this class routine when planning her lesson. When planning the questions that students will consider when their whole-class text is being read aloud, she enacts her approach of allowing students to use and determine the tools that will best enable their response. In her concurrent verbal report, she stated:

I will post the questions on our Weebly. We have a read aloud section, and the kids are so used to they can just pull up their device, their Chromebook, or whatever and get on really fast. Not everyone submits it into here (the Weebly blog). Sometimes they write it on a note card, a sticky note, they put it on the window, they put it on their little folder there. As long as they’re responding to that question, then there's different ways. This one I just said select a few of these questions.

In her post-interview, Bailey noted that this is not an approach consistently taken by her colleagues and that she finds it difficult to explain this approach to teaching:
It's hard to explain, really it is to even other teachers that I've worked with. It's hard to explain what we do in here because it is flexible, it changes all the time yet we all have a focus. How the kids are getting to that is what's different and maybe you are a packet person and that's fine but maybe this person's not. It adapts to how the kids learn and I will not force them to use technology at all, that's fine, but I've had maybe one or two kids that they don't want to.... If it's not your thing, that's okay.

Bailey’s approach to choosing tools and mediums for teaching and learning is consistently focused on meeting students’ learning needs and accomplishing instructional goals. She is not bound by specific expectations regarding print or new literacies, which enables her to plan instruction that uses mediums to serve instructional goals, rather than simply replacing print literacy practices with digital ones, or privileging print literacy skills over new literacies skills.

In conclusion, teachers are often thought to remain relatively static in their orientation towards technology, unless they are afforded the opportunity for sustained and meaningful change (Ertmer, 1999; Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012; Kopcha, 2012). This study presents an alternative explanation that while professional development may influence meaningful change in teachers’ stances, they may orient themselves differently within a single lesson. For example, Susan clearly articulated a remediation stance when describing her approach, but enacted a return stance in her lesson, which may reflect a lack of skill with integrating technology that influenced the way in which she oriented herself towards print literacies when planning instruction. In contrast, Lauren stated that she privileged students’ print work over their
new literacies skills, but provided several contradictory examples of that stance in both her pre-interview and concurrent verbal report. While it is important work to provide teachers with the opportunity to reflect and build a stance to incorporating technology into literacy instruction that will result in student learning, it may be equally important to support teachers in recognizing which instructional decisions align with their intended stance and which do not.

**Enactment of the Elements of the Technology Integration Planning Cycle**

In order to gain insight into how the specific elements of the Technology Integration Planning Cycle (TIPC; Hutchison & Woodward, 2014a), might be reflected in teacher planning, data was analyzed to address Research Question 2: How do the elements of the TIPC frame the planning process used by teachers integrate technology into literacy instruction? Because this research question addressed exploring teachers’ planning processes to determine how the elements of the TIPC were related to the actual planning processes of teachers, a secondary data analysis using a hypothesis coding approach (Saldaña, 2016) was used. This approach allowed for focused data analysis of the verbal reports and complementary data, while also accounting for non-examples of each element. The specific codes and frequency are represented in Table 4.2.

**Table 4.2**

*Technology Integration Planning Cycle Codes*

<table>
<thead>
<tr>
<th>Code</th>
<th>Total Frequency</th>
<th>Frequency in Verbal Report*</th>
<th>Frequency in Interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructional Goal</td>
<td>38</td>
<td>22 (57.9%)</td>
<td>16</td>
</tr>
<tr>
<td>Instructional Approach</td>
<td>28</td>
<td>18 (64.3%)</td>
<td>10</td>
</tr>
<tr>
<td>Tool Selection</td>
<td>15</td>
<td>11 (73.3%)</td>
<td>4</td>
</tr>
</tbody>
</table>
Table 4.2 continued

<table>
<thead>
<tr>
<th>Contribution to Instruction</th>
<th>16</th>
<th>11 (68.8%)</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constraints</td>
<td>7</td>
<td>4 (57.1%)</td>
<td>3</td>
</tr>
<tr>
<td>Instruction</td>
<td>15</td>
<td>8 (53.3%)</td>
<td>7</td>
</tr>
</tbody>
</table>

*Percentages reflect frequency of all data coded in that code represented in the verbal reports.

Notably, the cycle also includes two exit points. Although these exit points were represented in initial coding, no data were coded as representative of the exit points. This is likely a result of the lesson planned in the think-aloud session was one in which the teacher expected to integrate technology into literacy instruction, and therefore did not consider exiting.

These findings are organized by element of the TIPC and in the order in which they occur in the cycle.

**Instructional Goal-Focused or Disoriented Routines**

The instructional goal was addressed with similar frequency through the verbal report and interview data, which may indicate that teachers do rely on their understanding of an instructional goal during planning, as this was actively discussed during their planning process. However, only Bailey was focused on an instructional goal throughout her planning. Early in her think-aloud session, Bailey stated, “We’re working with critiquing. Critiquing goes along with our wheel over there (the Prompting Guide).” She then selects critiquing characters, setting, and events through comparing and contrasting from her standards document and places it at the top of the page where the lesson materials will be posted for students. She explained her thinking about sharing the standard with students in her concurrent verbal report:
Actually, even the kids see this. I'll copy and paste it on here, so then they know exactly oh here's the standard that we're doing. Usually, I'll write it on this board or the board up there. Sometimes it goes into kid friendly terms, or sometimes it's just straight like this.

In her retrospective verbal report, she explained her thinking about the purpose for sharing the standard:

I feel like they should know what they're doing, or what's being expected of them. I mean, I know when I don't know what I'm supposed to be doing, I have that feeling like, "What?" So, I've been very open, like, you've seen with math, everything. Science. Social studies. Lit. Writing.

Bailey’s discussion of sharing learning standards reveals an important part of her disposition to explicitly share instructional goals with students. To share instructional goals with students, Bailey needed a strong understanding of standards and how those standards connected to her classroom practices. Because Bailey’s classroom was focused on providing tools to students to accomplish learning, having a clear focus and sharing it with students became even more imperative, as students had the freedom to accomplish assignments in multiple ways.

Lauren and Susan were both disoriented in their process of identifying and planning instruction around an instructional goal. Lauren indicated in her pre-interview that she had a strong conception of how to identify an instructional goal. However, when she worked towards explaining her process, she lost focus:

I think it probably starts with just what’s my objective? What’s my standard? What am I trying to get them (students) to be able to know, understand, do? Then,
what can we do to get there?...Then, in literacy, I feel like it’s a little bit different, of course, that’s a different beast. We tackle fantasy and there are lots of skills within that. Right now, we’re doing informational texts. So, kind of broader topics, but, obviously, there are skills that are going on throughout the year that are woven into the daily routine in literacy. But then, then I think it goes from, yeah, kind of unit, a big standard, to, ok, what are the things we need to accomplish underneath that. I can’t say it’s always the most logical or thought through process.

This disoriented approach resonated with Lauren’s lesson planning as she struggled with establishing clear instructional goals. She did allude to some guidelines for the expectations for the project, but noted, “I need to be more clear or have the kids help me come up with more, or I don’t know” (concurrent verbal report). While working on developing her technological knowledge of the tool, Lauren remarked, “This is nice because this is probably something they haven’t done before.” When asked what she was thinking when she made that comment specifically during the retrospective verbal report, Lauren stated:

I feel like there's only one part that I'm actually teaching anything. So I guess it's maybe just talking about the purpose of the QR Code and why somebody might want it or what they're used for. Let's see. Yeah, I mean, so just showing them something else that they can add a different text feature that might be a little less traditional than what they've learned in the past.

Lauren does stay focused on the text feature element of the overall magazine unit, but does not offer a specific instructional goal or address the standards that might be met
through incorporating a QR goal. This lack of attention to instructional purpose may be best explained by Lauren in her post-interview:

Honestly, I feel that this came up just because a student was interested in it. It didn't necessarily come up through me going, "How can I meet this other goal?" That's just one that I think would be different and engaging for them, just something to spice it up to make it a fifth grade project and not a third grade project.

Lauren noted that the lesson she planned is not intended to meet a specific, standards-based instructional goal, but rather the purpose is to engage students and increase the complexity of the project.

Similarly, Susan’s focus was on the use of technology in her lesson, rather than foregrounding an instructional goal. The first statement she made in the think-aloud session was, “I kind of want to have a final project on their literature circle books to do with their technology.” She then went on to comment:

When they finish I think I want to give each book club the same criteria for what to include in their final project about their book. I need to figure out what I want that criteria to be, and what I want really the project to be. I think I might give them a few choices for what project to do but have everyone have the same criteria in their project so they can still have some choice and be creative.

Susan’s goal for the lesson was for the students to complete a project using technology, but she does not identify a specific instructional goal to guide the creation of the project. As she was planning, her verbal report revealed disorientation as she sought to identify
and select the instructional goals for the project. The exchanges below illustrate the refining process she used in her concurrent verbal report (emphasis added for clarity):

(1) We’ve been summarizing. We’ve been working on the different reading strategies. It's really just review because at this point in fifth grade they know how to use all of those.

(2) I'm going to delete the summaries and reading strategies because I don't think they can really ... I'm not going to have them include that in there, in their final project.

(3) I want to be able to tell that they understood the rising action. They understood the climax and summarize everything we've been working on in a book trailer. That's why I'm doing the criteria here.

(4) They're going to have to include those elements of the plot. That is in our standard. Those different things can show me if they're understanding that in their book.

Because Susan struggled to clearly identify an instructional goal, she works throughout the lesson to refine different literacy practices that might best fit into the final book trailer project that she was planning. It is not until she recalled a standard, which was not mentioned or directly referred to during her think-aloud session, that she narrowed the purpose to represent elements of plot in the book. This is reflective of Susan’s routine of choosing digital tools and an instructional environment before clearly establishing an instructional goal, which leads to disorientation when attempting to identify a clear instructional purpose for learning activities.

**Instructional Approach-Determining Priorities**
Each teacher discussed the instructional approach more during their planning session than in the interviews. This may be due to a heightened focus on instructional approach when planning, as Hutchison and Woodward (2014a) claim that teachers draw on their pedagogical content knowledge to consider the best methods for meeting the instructional goal, which serves as a guide throughout the rest of the cycle. It is, therefore, important that teachers do carefully consider instructional approach when planning a lesson, as shown in the frequency of this code (18) in the verbal reports.

When thinking about the instructional approach, Bailey first situated this lesson within the larger unit goals she had planned for the class:

After we finish this book, what I’ll do is then, they’re going to research and choose their own young person hero that they want to research and do a little mini inquiry on this. We should be able to finish our book by Friday. So next week that’s when we’re going to start doing some of those things.

Knowing that students would be utilizing the instructional goal for this lesson of using compare and contrast strategies to critique and analyze texts for the future research project allowed her to organize her approach to contribute to the future instructional goal. She then focused on developing questions that would prompt student learning in this area and planned how she would assess their learning:

Sometimes we will pull out three really good posts (question responses), or I’ll just say, “how about we hear from student X today?” Then they’re still accountable because they all have to do the work. I’ve never had anyone be like oh, I don’t want to do this because they’re all so engaged with the story. Then, I’ll
use the responses, I’ll use this as that quick assessment just to see okay, are they
following along? Do they understand? Do they not? Are they off somewhere?

Bailey’s planning of the instructional approach indicates that she prioritized the
instructional goal, the larger unit goals, the environment of the classroom and how she
would assess student learning. These are all important elements of an instructional
approach when planning to integrate technology into literacy instruction (Harris & Hofer,

Lauren drew on many of these same elements; however, without a strong
instructional goal, she prioritized how students were learning, rather than the content they
were learning. She stated in her pre-interview that integrating technology into literacy
instruction does influence her instruction:

I think something that might be different is the, it’s definitely going to be more of
a collaborative usually because they’re going to learn from each other. So, unless
they’re really … Unless I know that everybody is really good at a certain tool, it’s
not going to be an independent thing or there will be a choice involved because
some just don’t feel as comfortable and they’ll learn from each other.

Lauren’s planning is reflective of an emphasis on collaborative learning, but she also
recognized the importance of her role in facilitating this learning, which was developed
throughout her planning session. Excerpts from her concurrent verbal report demonstrate
this process:

(1) Do I just see where it goes and then use that information for next year, that
these guys would be my guinea pigs?
(2) I was going to just project it (the instructions), but now I'm thinking I'll probably share it (via Google Drive) with them, or I was thinking I might share it with just Alicia.

(3) Wait, I don’t really need it. I guess I don’t really see any point to share it with them. Why do they need one more thing in there? So, I’ll probably just project it. Then show them, show them the steps I guess.

Lauren had previously commented that the idea for using a QR code in this unit came from a student, Alicia. During the process of planning her instructional approach, she considers asking students to completely determine how to use the QR code independently, highlighting Alicia as an expert, and sharing instructions for students to read independently before deciding to provide direct instruction to the whole class by projecting her process on a screen. In her retrospective verbal report, Lauren addressed this process:

I think I was thinking about Alicia, and how I wanted her to be incorporated in it. Then I know that they’re engaged by QR codes because we did them with some fraction stuff earlier and it took them to where there was a problem. They were so engaged in doing those problems because they got to go around the room and pick up a code and scan it. It was exciting, but they’re engaged by it so they’re already hooked. It’s like a built in hook.

Lauren’s verbal reports indicate that while she was less clear on the overall instructional purpose of the activity, she was prioritizing the environment of the classroom, the experience students had with the tools, and the type of instruction she would need to provide.
Susan discussed her instructional approach considerably less than the other teachers. One potential explanation for this was that Susan conflated the instructional goal and approach as she began her planning, stating at the beginning of her planning session that the goal was for students to individually make a book trailer about their literature circle books. Because her decision about the instructional approach was made early in the session, it was refined less throughout her planning. In her retrospective verbal report, Susan explained her choice for instructional approach:

I guess that’s kind of my go-to, which- I need more go-to’s for an ending project for their book, but it kind of summarizes the book. They can do a book recommendation at the end, so I feel like it’s a good synopsis of a book, like a project they can do with it.

This statement indicates that because Susan was planning an activity to culminate the reading of a large text, she already knew the instructional approach because of where the lesson fell in her curriculum, rather than the instructional goals and particular needs of her students.

The ways in which each teacher considered the instructional approach differently informed the other planning decisions they made. Whether the priority of the lesson was student learning, student engagement, or a project itself, teachers’ subsequent instructional decisions reflected the planning of their instructional approach.

**Tool Selection-Reflective of Instructional Approach**

More than any other element of the TIPC, tool selection was largely planned within the planning session itself. This reflects Hutchison and Woodward’s (2014a) guidelines that tool selection should happen after instructional goals and approaches have
been established. As teachers did utilize their planning sessions to establish goals and approaches, it is expected that tool selection would happen in the planning session.

Further, the tool selection reflected the priorities established when planning the instructional approach.

Bailey’s tool selection relies largely on a classroom environment that presents a variety of digital tools from which students can select. She relied heavily on pre-established classroom routines to guide students towards tools that may be effective for them. For example, the class website was a foundation for much of the work students do in the class. In her concurrent verbal report, she stated:

They can look at what subject we’re in and they can just click on it instead of ‘where do I go?’, ‘what do I do?’. That’s a lot of me modeling at the beginning of the year and being consistent with it.

While students are expected to visit the class site for the daily work, Bailey does not expect them to respond to the questions in a digital environment. Although she noted that evaluating work digitally allows her to give feedback more efficiently, her instructional approach was that students were able to choose a tool that allows them to best communicate their responses, which could involve both print and digital tools. When reporting on how she chose the tools available to students for this lesson in her retrospective verbal report, Bailey commented:

Just make sure that we have some sort of device, like the book, I have to make sure that it loads on here (an iPad) and if it doesn’t, then I’m not going to use that and we’ll have to use those laptops or their Chromebooks. Really, it’s just trying out the device to see if it works.
She uses tools available to students in her classroom, and also evaluates the functionality of each device to ensure that should a student want to use that device that they will be able to complete the lesson using it. Although Bailey did not explicitly list the tools she expected students to use, this was closely tied to her instructional approach of allowing students to choose the medium that worked best to facilitate their response.

Lauren’s instructional approach was centered on the creation of a specific digital image, a QR code. She knew from previous experience that students could use their Chromebooks to scan a QR code, but she did not know how to create one. In her concurrent verbal report, she considered how she might determine what tool students could use:

We had done them in math where they could use their Chromebooks, so then a student came up to me and said, “Do you know how (to create a QR code)?” I said, no but I could figure it out or you could…She used QR code generator (a website). “Maybe so,” I said, “save it. We’ll come back to it and you can be our go-to-expert.”

When selecting the QR generator tool, Lauren went on to explain:

I think this is the one she used. I’d like to use the one she (Alicia) used because she’s somebody who could use a little bit of a boost in her abilities and have the way people see her she’s new. I think she’d really like to share her knowledge. Lauren did not investigate other QR code generating tools, instead choosing the one that her student had used. She stated this choice was intended to incorporate this student into her instruction, something she had considered in her instructional approach, but ultimately decided against. She does acknowledge that by using the website the student
located, it would highlight that student’s abilities. However, her selection of this tool does not reflect consideration of ease-of-use and whether this is the best tool to use to generate the types of QR codes that would be representative of magazine text features, her overall unit goal. This selection aligns with her instructional approach that prioritizes engaging students, rather than the instructional goal.

Susan’s process for selection of digital tools was clearly tied to the book trailer final book project she stated was the instructional goal and approach for the lesson. In her concurrent verbal report, she assembled the potential digital tools students might use to complete the project:

They could use Animoto. That’s one that we use a lot though. I’m going to try to think of some others in case the kids are sick of doing the Animoto. It’s the end of the year. They are asking about doing Prezis, so maybe they could create a Prezi for their book trailer. Book trailer’s kind of a video. Seems like. I guess it doesn’t have to be. Educreations, we’ve done. I think I’ll just stick to those three. Those are three big ones. I know they all know how to do. I’ll think I’ll let them choose one of these things.

The tools Susan selects are prioritized due to student familiarity or ease-of-use. Although she refines the instructional goal throughout her planning session, these three tools do not change. She stated towards the end of her planning session that, “They can choose from an Animoto, a Prezi, or an Educreations. I know they all prefer and have interest in different ones. Hopefully that hits everybody’s interests.” Susan’s instructional approach was primarily centered on completion of this book trailer project, and she chose three tools that would be engaging to students and would result in completion of the project.
Contribution to Instruction-Articulating the Purpose of the Digital Tool

Two important considerations of identifying a digital tool’s contribution to instruction are the literacy learning use of the tool affords and the multimodalities students are asked to engage in (Hutchison & Woodward, 2014a). However, identifying appropriate technology relies not only on teachers’ technological pedagogical content knowledge (Mishra & Koehler, 2006), but also on a clear instructional goal and an effective instructional approach.

Bailey envisioned the primary contribution of using different tools to be that students would use their responses to guide meaningful discussion, which would extend their understanding about critiquing the text. In her concurrent verbal report, she remarked:

As they’re (students) typing they’ll say something. Then all of a sudden these two are talking. They’re like, “what? No, I thought it was this way.” You can hear the whispers just keep going. That is fine because they’re having that amazing discussion between that… There’s a lot of reading and stopping and thinking. They’ll add to this. They’ll be grabbing the iPad to look up a word, or they’ll Google Earth where this is taking place just to help visualize and to actually see where it’s happening.

Although Bailey’s identification of the contribution to instruction is largely based on the types of devices students may choose to use, she articulated the importance of students using tools to contribute to their overall understanding. She does not state specifically what each potential tool might contribute specifically to the instructional goal of using compare and contrast strategies to critique and analyze texts, but she does have a clear
conception of how students might use these tools to support and develop their understanding of the text using multiple modalities, an essential part of her lesson.

Lauren did not explicitly address the contribution of the QR code generator to instruction beyond its influence on building the student Alicia’s confidence. For this lesson, the particular tool choice seemed secondary to completing the activity, and the tool was selected due to concerns about classroom environment and student engagement. While these are important instructional concerns, Hutchison and Woodward (2014a) argue that teachers should clearly identify the specific contributions of the tool to learning literacy and creation or consumption of multimodal texts. Although students would engage in multimodal production by creating a QR code relevant to their magazine topic and develop a deeper knowledge about integrating outside sources into texts with multiple text features, these are not affordances identified by Lauren in any of her responses. Indeed, Lauren does not appear to have considered the specific purpose of using a QR code beyond to generate student interest.

Susan stated in her pre-interview that she chooses digital tools to complement seat work while she is working with students in small groups, “Usually then I try to figure out well what’s everyone else doing at their seats, which is where our technology, I think, comes into play the most.” This highlights an important area of focus for her when selecting tools, that students need to be able to use them independently. This is evident when she explains in her concurrent verbal report that a specific contribution of the three tools that she selected would, “Through this final project, I’ll be able to see too where each student is at in their database of what to do with technology. Different things they can use with it.” Susan identified the primary contribution of the tools to be a way of
informing her as to their facility with digital literacy practices of creating videos or presentations. She elaborated on the specific affordances of each tool in her retrospective verbal report:

I was thinking about them creating a book trailer, and the different elements that they could add to it, I thought Educreations, they could speak into and add pictures, Prezi they could really add everything. I don’t know if they- they can’t really speak into it. There are probably ways, but I don’t think ways that they can figure out. And then Animoto is more like a video-type, classical book trailer that I would think of. I’m sure there’s other things that I could do that would be good for book trailers, but those are ones that I feel like they know how to use, and they could add all these elements I was asking them to add into it and they could add all those things in there. Some of them would be easier and better than others, probably, but I just- yeah that’s why I chose those three.

Susan acknowledged that there might be other tools that would contribute more to instruction, but she was prioritizing familiarity over match with instructional goal. However, she does note that students are able to use multiple modes of media within each tool, which does address an important purpose, although she does not focus explicitly on these particular skills in her instruction.

**Constraints-Effect on Instruction**

Identifying the constraints of using a particular tool is an important step in designing effective literacy instruction using technology. Through considering whether the constraints overwhelm the instruction and whether the constraints can be overcome, teachers can carefully plan to maximize the effectiveness of their instruction (Hutchison
& Woodward, 2014a). Constraints were considered in teachers’ planning processes, but were not always explicitly tied to instruction, but rather something recognized by teachers as a necessary part of using the tool.

In fact, Bailey only addressed one constraint in her planning, when she was building the discussion questions in the class blog:

Another thing, always copy this (blog content) because sometimes it deletes when you press post. The kids and I have learned that a lot. Oh, see look it did it. Good thing I did that. Sometimes you have to add in stuff. So then it worked. I always check just to make sure that it did go. (concurrent verbal report)

However, her comment indicates that this is a common constraint experienced in her classroom, and that she has worked with her students to build an awareness of the problem to make posting on the site as efficient as possible. This constraint does not particularly relate to this lesson and instruction specifically, but is a recognized problem with the tool.

Lauren identified constraints that were specific to individual students as well as those that might affect the whole class. When selecting the tool, she recalled in her concurrent verbal report that Alicia, “did say that she couldn’t figure out how to copy it, or something. That she could only print it and then ... I figured there was probably a way.” Although the tool she selected allows her to easily copy, rather than print, the QR code, she was aware that this was a potential constraint. When finalizing her instruction, Lauren noted, “This is when I wish I had a Chromebook, so that I could test it because I’d like to have them make sure it works before I spend any time on it.” She acknowledged that the steps she planned might not work in the same way on students’ Chromebooks as
it did on her PC laptop. However, because this was a frequent occurrence in her
classroom, she did not view it as having an overwhelming effect on instruction. She also
considered that one student’s Chromebook was inoperative and that he may not be able to
complete the assignment. In her post-interview Lauren stated that he could, “just do it on
a friend’s (Chromebook) and save that on your Google Drive, or he could do it on a
friend’s and just copy the image once you get your Chromebook back.” Finally, Lauren
recognized that students may need more information than just how to access the tool, so
she planned instruction designed to support those students:

    If I start to see them (students) struggle then, at least I’ve thought through the
    three steps, and I can put on the board, "Go to this website. Click this, and you’re
    looking for image URL", or whatever. I can give them three bullets because I’ve
    already thought through the three, just trying to simplify it down like that. (post-
    interview)

Each of these examples indicate that Lauren is likely able to identify potential constraints
of using the tool and is able to plan resultant instruction to accommodate those
constraints.

    Susan did identify an important constraint of asking students to create a digital
final book project. She noted that when most of the preparatory work had been in print,
that some students might struggle meeting the project expectations using digital tools:

    A lot of kids can think about ways to show the plot on their own. Some kids aren’t
    as good about thinking like that with technology. I try to give them some ideas if
    they need to. Ways they could show these things.
However, although she identified this constraint, she did not determine whether or not it would overwhelm the instruction or plan the ideas needed to support these students. In her post-interview she explained questions that guide her approach to identifying potential constraints:

If they’re going to be in a group, can they share the document and not work with each other? Can they share the project? Prezi, they can share and collaborate on that together. I have to think about stuff like that.

While these issues of sharing and collaboration may be important, they were not relevant to the instruction in this lesson, as students were creating individual book projects to be turned into the teacher, not collaborated on or shared with another audience. In Susan’s case, her identification of constraints did not result in improved instruction, as she did not consider whether or not they overwhelmed the instruction.

**Instruction-Foregrounding the Important**

In the final element of the TIPC, the instruction is considered. These considerations can include classroom environment and management, directions and additional needed resources, physical space, time constraints, and assessments (Hutchison & Woodward, 2014a, p.463). For these teachers, assessments were primarily planned as part of the instructional approach, if they were considered at all. Also, for some teachers, relying on classroom routines to inform the instruction was important.

Bailey relied on existing routines to envision how she would prepare students to engage in the lesson. She shared in her concurrent verbal report that:

I always share it (the schedule) with the kids. So it will be up here and that’s on the board right when they walk in so they know. I’ll share it with them and they
can click on Literacy Living Things, and that’s where they have to go to. So they all know exactly what they’re doing… Or they can look at what subject that we’re in and they can just click on it instead of where do I go, where do I go. That’s a lot of me modeling at the beginning of the year and being consistent with it.

Because Bailey carefully established classroom routines, students are able to work on the assignment largely independently. Another important classroom routine that Bailey relies on is student awareness of the importance of accomplishing stated instructional goals through choosing appropriate tools. She articulated this approach in her pre-interview:

If it proves to me that they (students) understand what our focus was, then I’m open to … you can make a movie if you want. You can write a paragraph, you can do this. I’ve had to set that up from the beginning of the year until now, and that comes from … I mean, really, yeah. Planning.

Bailey did not reference assessment while she was planning these other factors, as the assessment for the discussion questions was a part of her instructional approach.

A reliance on classroom environment to facilitate instruction was also a factor that Lauren addressed, although to a lesser extent than Bailey. When thinking about a comment she made about the possibility of students struggling with completing the QR code assignment, Lauren stated in her retrospective verbal report, “Actually I shouldn’t even say that. I think they’ll all be successful at it because as soon as they can’t, they’ll find somebody who can.” This foregrounds the collaborative approach Lauren sought to establish when integrating technology into her literacy instruction. Additional instructional considerations identified during her planning included decisions about what information to present students with such as: the topic for an example QR code she could
show to struggling students, the order in which to present the steps, and reviewing the three steps to ensure they worked on her computer. Because Lauren stated she would not require all students to complete a QR code, although she expected all students would complete one, she did not consider how it would be assessed.

In her post-interview, Susan articulated her approach to instruction when integrating technology into literacy instruction:

And then trying to find meaningful work for the kids to do when they are not necessarily at their desk, but the kids who aren’t with me at small group - trying to find something that’s not just busy work. So I try to find something to let them be creative and ... Because usually at small group I’m telling them to do something kind of specific with me, like a skill. So I try to get something creative for them to do when they’re not with me, and that’s kind of what seems like I focus on the most. Because of the skills at the table, I kind of just start with something and then go with where our lesson takes me, naturally.

Susan’s approach to instruction is important as it highlights the importance of student creativity when using technology, but also how her class time is structured in regards to learning literacy. She prioritized small group instruction for learning literacy skills over work students are completing independently. The rest of Susan’s planning of instruction is related to a digital organizer that she expected students to fill out prior to beginning work on the project. Susan stated in her concurrent verbal report that this was important because, “I found that when they write and they make digital projects, if they don’t map it out first, then their projects don’t look very good. They’re not very quality.” Susan worked towards revising the organizer template to fit the project and ensuring each
student had a print copy to submit to her in class before beginning on the project.
Although Susan refined the specific required elements of the book project throughout her
planning session, and there were additional elements on the digital organizer, she did not
plan how students’ work would be assessed.

While analysis revealed that each teacher considered the elements of the TIPC in
their planning, the way that that element was addressed in their planning varied widely.
Chapter 5 provides discussion of these differences, along with those found in teachers’
orientation to using technology and use of knowledge in their planning processes.
CHAPTER 5
DISCUSSION AND IMPLICATIONS

Introduction

In the present study, three participants thought aloud while planning a lesson in which they integrated technology into their literacy instruction. The purpose of this study was to explore the processes literacy teachers use when planning a lesson that integrates technology and to understand the relevance of the Technology Integration Planning Cycle (TIPC; Hutchison & Woodward, 2014a) to literacy teachers’ planning. This chapter will discuss the conceptual implications of this study, the methodological implications for think-aloud studies, instructional considerations for classroom teachers, limitations of the study, and possibilities for future research.

Conceptual Implications

This study suggests several important implications that are relevant to ways in which teacher knowledge is conceptualized, how teachers orient themselves towards using technology, and the TIPC.

Technological Pedagogical Content Knowledge

Recent research has explored the connection between teachers’ technological pedagogical content knowledge (TPACK; Mishra & Koehler, 2006) and lesson planning (Janssen & Lazonder, 2015; Pringle, Dawson & Ritzhaupt, 2015). However, no studies have investigated teachers’ use of TPACK as they are planning the lesson, instead the focus has been on written lesson plans or lesson selection. The present study has notable
implications for understanding literacy teachers’ complex use of their TPACK when designing classroom instruction.

First, there was evidence from each teacher that they drew on both pedagogical content knowledge (PCK; Shulman, 1986) and TPACK while planning their lesson, which suggests that these are useful descriptions of the nature of knowledge teachers not only have and need to develop (Janssen & Lazonder, 2015), but also that they need to draw upon explicitly when planning instruction (Hutchison & Woodward, 2014a). Further, depending on which type of knowledge they were drawing upon, the resultant planned instruction was different. The interconnectedness of the TPACK framework indicates that a lack of knowledge in one area might weaken the planned instruction. However, for teachers in this study, adding technology strengthened their instructional planning. Analysis of two of the teachers’ PCK revealed important gaps in their content and pedagogical knowledge. However, when they were incorporating technology into their instruction, analysis of their standards’ document revealed that they were, in fact, meeting relevant learning standards, thereby planning meaningful instruction for students. By adding technology to their existing PCK, these teachers’ TPACK worked to provide meaningful instruction to students without having clear instructional goals. This is a useful conception of the complex difference between PCK and TPACK for teachers integrating technology into literacy instruction.

An additional suggestion that emerged from this study is that strong TPACK may be necessary for teachers to foster an environment in which students can learn new literacies. As teachers drew on their knowledge of content, pedagogy, and specific technology, an outcome of that interplay was often to plan to support students’ new
literacies skills (Leu, Kinzer, Coiro & Cammack, 2004) through their instruction. By incorporating technology into literacy instruction, teachers were commonly addressing issues of students locating and synthesizing information and communicating in digital spaces, which are skills common in new literacies classrooms.

**New Literacies**

Drawing on a new literacies perspective, this study explored the stances (Leander, 2009) teachers held when planning to integrate technology into their literacy instruction. Leander’s (2009) four stances each hypothesize a different orientation that teachers have towards the relationship between print and new literacies. The present study indicates that while teachers may adopt one particular stance throughout most of the planning, each teacher adopted more than one stance at different points in their planning. This negotiation of orientation can be described as creating multiple realities (Labbo & Reinking, 1999), in which a teacher’s stance in a particular planning moment results in different emphases on instructional goals and classroom instruction. Exploring these multiple realities has important implications for the fields of professional development and understanding teacher thinking.

Much research has been conducted on technology integration in professional development (Blocher, Armfield, Sujo-Montes, Tucker & Willis, 2011; Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012; Kopcha, 2012), as well as technology integration professional development for literacy instruction (Dwyer, 2016; Hutchison, 2012; O’Byrne & Pytash, 2015). Additionally, there has been work on the ways in which teachers’ perceptions of technology influence technology integration in the classroom (Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009;
Hutchison & Reinking, 2011; Polly & Hannafin, 2010). For literacy teachers, the digital tools they choose to integrate into the classroom often lead to new literacies learning, which can better prepare students to participate in the print and digital world in which they will be entering (Leu et al., 2013). Therefore, it is especially important that they are supported in technology integration efforts. However, their stance towards the relationship between print and new literacies may influence if and how they plan instruction designed to support students in their learning of both print and digital literacies, or if one is privileged over the other. Professional development in technology integration into literacy instruction should focus on understanding teachers’ perceptions about using technology in order to support teachers’ planning to meaningful integrate new literacies into their instruction.

In addition to implications for professional development, there are also implications for understanding teacher thinking from a new literacies perspective. By focusing specifically on how teachers orient themselves towards integrating technology, scholars can better understand how teachers are making sense of the concept of new literacies. Teachers in this study all indicated that they valued a variety of digital tools for instructional purposes. However, only one teacher consistently adopted a remediation stance, creating a learning environment where students interacted with print and digital literacies as was appropriate for specific instructional goals. These three teachers interpret new literacies skills, as well as digital literacy standards differently according to which literacies they prioritized in their classroom. Thus, this difference in teacher thinking influenced the instruction planned for students. Therefore, it is important to consider
teacher thinking in discussions about how teachers are planning to incorporate new literacies in their instruction.

**Technology Integration Planning Cycle**

The second research question guiding this study explored specifically how the six elements of the TIPC (instructional goal, instructional approach, tool selection, contribution to instruction, constraints, and instruction) framed the lesson planning of the teachers in this study. Because this planning cycle was based on existing classroom research, which focused largely on classroom observations, it was important to explore the utility of the planning cycle for teachers’ planning processes. Therefore, the teachers’ lesson planning was analyzed to determine if they did, in fact, use the elements of this planning cycle. Four implications for using this planning cycle are discussed.

First, Hutchison and Woodward (2014a) suggest that teachers primarily utilize their PCK when planning the instructional approach for a lesson. This is an important distinction in the TIPC because this step occurs before the selection of a tool, in order to inform a decision about whether or not to select a digital tool. Teachers in this study often incorporated using technology generally in this step, although they had not yet selected a specific tool. For example, teachers focused on ideas like collaborative learning and differentiation when discussing their instructional approach; however, their conceptions of these were being digitally facilitated. These conceptions were found to be influenced by their TPACK, rather than their PCK. This may be related to the task for the lesson planning session, as teachers selected this lesson to plan in the think-aloud session because they anticipated incorporating technology in some manner into instruction. However, modifying the cycle to incorporate specific directionality that highlights the
link between tool selection and instructional approach may be useful for both teachers who anticipate using technology as well as those who are seeking to determine whether or not to use a digital tool.

Next, incorporating a stronger connection between tool selection and instructional approach may also be useful as a result of the relationship between these two elements in the teachers’ planning processes. Although each teacher had different conceptions of their instructional goals, they each designed a specific instructional approach to be used in this lesson. Their selection of the tools to use were aligned specifically to their selected instructional approach. This close connection is not consistently reflected in the other elements of the planning cycle and may indicate an interaction between instructional approach and tool selection that is not clearly described in the existing representation of the TIPC.

Additionally, the stance from which teachers orient themselves to integrating technology may also influence their instructional approach. For example, for teachers who take a remediation stance, the instructional approach element would involve a decision about whether digital literacy practices were an effective medium for students to learn about the targeted instructional goal. Consideration of the stance that teachers take towards integrating technology may be a useful addition to understanding the TIPC element instructional approach.

Finally, this study indicates that foregrounding the instructional goal, as is suggested by the TIPC may be a step that is not given appropriate attention while teachers are planning. Only one teacher had a clear conception of instructional goal, while the other two teachers focused largely on the other elements of the planning cycle.
Hutchison and Woodward (2014a) state that the cycle is a, “flexible, reflective cycle that highlights the aspects of instruction that should be considered when integrating digital technology into literacy instruction” (p. 464). However, the present study indicates that the instructional goal should be prioritized and form the foundation of lesson planning in order to strengthen the planning process. A revised model that indicates flexibility while also foregrounding the instructional goal may be a useful next step in supporting teachers in their planning efforts. A figure that illuminates this connection may take the shape of removing the instructional goal from the circular cycle and placing it in the center to represent the connectedness of each element to the instructional goal.

This study indicates that the elements of the TIPC are found in teachers’ planning processes. Further, the issues addressed by the TIPC that are designed to strengthen instruction, such as beginning with an instructional goal and identifying possible contributions to instruction before identifying the constraints, are useful guidelines for planning to integrate technology into literacy instruction. This study addressed the complexities of the elements of this model and afforded an opportunity to explore how these elements manifest themselves in teachers’ planning.

Methodological Implications

This study attempted to build on existing research using verbal reporting to understand teacher thinking and lesson planning (Cho & Woodward, 2014; Gatbonton, 1999; Leinhardt, 1989). However, it differed from previous work in important ways. Through adopting a situative perspective, rather than an information processing perspective, this study was conducted with an open-ended task and situated within teachers’ existing contexts of their current students, classroom, and progress in their
curriculum. Previous work investigating students’ writing processes have taken this approach (Smagorinsky, Cook & Reed, 2005; Smagorinsky, Daigle, O’Donnell-Allen & Bynum, 2010), and retrospective verbal reports have been used to explore teachers’ thinking about the lesson after it was taught (Eley, 2006; Gatbonton, 1999) but no work regarding teacher thinking and planning has been situated within a classroom planning session. Calderhead (1987) claimed that by using different theoretical orientations to ground the use of verbal reporting to investigate teacher thinking, an understanding of the characteristics of teacher cognition will be more fully developed. This study may contribute a situative perspective to the “comparisons of different models and the views they give us of teaching processes” (Calderhead, 1987, p.188) when examining teachers’ verbal protocols.

This study serves to advance the potential for using verbal reporting to access the processes that teachers use when designing instruction. By asking teachers to think aloud while they plan, a better understanding of how their knowledge and beliefs influence the planned instruction can be gained. Further, this study highlights the particular value of verbal reporting as a method for understanding complexities in teachers’ knowledge and beliefs. Teachers’ statements in interviews and responses to survey data did not always align with the decisions made in their lesson planning, and their verbal protocols provided important insights into the complexities that may have influenced this inconsistency.

**Instructional Considerations**

This study addresses several useful considerations for practicing literacy teachers, as well as those who support them. For teachers seeking to integrate technology into their
literacy instruction, this study contributes to the argument that teachers do not need to be experts in particular digital tools to facilitate learning using digital tools in the classroom (Ertmer et al., 2012; Leu et al., 2013). For the teachers in this study, their knowledge of the content and standards guiding their instruction influenced the quality of their planning more than their knowledge of the technology used. In fact, by incorporating technology, some instruction was strengthened despite a lack of clarity of the instructional purpose. For professional development providers, instructional coaches, and others who work to support teachers’ literacy instruction, revisiting the importance of establishing clear instructional goals for every lesson may help teachers to prioritize their efforts when integrating technology into their instruction.

Relatedly, it is important to recognize that the teachers in this study were recruited from a larger professional development project, in which teachers’ perspectives towards integrating technology were considered. This study utilized the TIPC as a framework for supporting teachers’ planning efforts when integrating technology into their literacy instruction. However, although they had been supported in multiple ways that highlighted the importance of selecting a clear instructional goal, not all teachers in this study demonstrated they internalized the importance of selecting an instructional goal. For those who support teachers, this finding suggests that in addition to considering how teachers orient themselves towards using technology, developing an understanding of how teachers identify and select appropriate instructional goals for daily instruction may be integral to their ability to successfully integrate technology into their instruction.

When teachers use the TIPC to guide their instruction, it is important to utilize the integrated exit points involved with selecting the instructional tools and identifying
constraints. None of the teachers in this study provided any evidence of exiting, either due to not using a digital tool or to identifying constraints that overwhelmed the instruction. However, there were instances when a digital tool was not appropriate. For example, when planning for students to reproduce their character lists in a digital form, Susan should have recognized that this instructional approach would not have contributed to student learning and chosen not to use a digital tool for that section of her lesson.

Finally, it is important to note that the teachers’ planning processes in this study varied widely. Given that these teachers were all fifth grade teachers in similar contexts, it can be expected that variance would only increase among teachers in a school or district. The teachers in this study were more skilled at some parts of planning than others. Through using the TIPC to frame the important elements of a literacy lesson plan in which technology is integrated, those who support teachers might be better able to identify specific areas in which teachers may need support. Further, teachers may utilize these elements to assess their own planning to determine which elements they have knowledge about and are able to incorporate, and the areas in which they may need additional development.

Limitations

The population in this study lacked diversity, as all participants were white females under thirty teaching in a predominantly white suburban school district. Therefore, the claims made about teacher knowledge and stance when planning to integrate technology into literacy instruction may not reflect teachers’ experiences who fall outside of the narrow demographics of this study. Additionally, teachers in this study were selected because they demonstrated they were already integrating technology into
literacy instruction, so the knowledge and stances represented may not reflect those characteristics of teachers who are not already integrating technology into literacy instruction. Further, these teachers and all of their students had access to laptop computers on a daily basis, therefore the sample was limited to teachers whose students had consistent access to a digital device.

There are several potential limitations that arise from the situated nature of the verbal protocols generated through this study. This study was not conducted in an experimental setting and utilized an open-ended task; therefore, the processes used when planning and the outcomes could not be directly compared. Although each teacher was planning a lesson in which they sought to integrate technology into literacy instruction, it is possible teachers had additional other purposes when planning. Without a defined task with research provided objectives, there is more variability around the precise purposes that teachers were considering when planning. Although this reflected their authentic planning practices, not having the same purpose made comparisons of participants’ lesson purposes more difficult to identify. Relatedly, because each teacher’s lesson plan took a different format and structure, comparisons among the lesson plan outcomes specifically could not be made. Each teacher created resources and organized instruction that suited their own purposes and planning approach, which were not reflective of the other teachers in the study.

Finally, the analysis of the TIPC elements found in teachers’ planning processes reflect participants who were involved in a larger technology integration professional development project which utilized the TIPC as a framework to support teachers. These participants had knowledge of the TIPC that other teachers are not likely to have.
Although none of the teachers in the study explicitly stated that they were using the TIPC while planning, it is likely that their participation in the overall project may have influenced their planning.

**Future Research**

This study highlights several avenues of potential future research. In regards to the population studied, research should be conducted with a wide variety of teachers to further develop our understanding of the complex processes teachers use while planning. Teachers in this study were involved in a larger technology integration professional development project, so it would be useful to explore how literacy teachers who are not otherwise supported in their technology integration efforts plan lessons. Additionally, teachers in this study both had access to laptop computers themselves as well as their students. It is useful to understand how teachers whose students share or have different devices plan instruction differently. Further, these teachers had, prior to this study, self-selected to participate in a professional development project about integrating technology. Additionally, due to the sampling process used in this study, they were also teachers who did, at varying degrees, integrate technology into their literacy instruction. This resulted in no teachers demonstrating a resistance stance when planning instruction in this study. Teachers who orient themselves towards new literacies with a resistance stance would still be responsible for providing instruction to students seeking to meet standards addressing multimodal composition and other digital literacies standards (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010). Therefore, it is important to understand the processes used by those teachers when planning instruction.
In addition to the insights gained about literacy teachers’ lesson planning through expanding the population of interest, additional insights might be gained through further explanation of the TPACK framework and the TIPC. Findings from this study indicate that by incorporating technological knowledge into PCK, instruction might be strengthened, in spite of some lack of content knowledge. Additional research into the ways that teachers use their TPACK when designing instruction might illuminate some of the complexities of the difference between teachers’ PCK and TPACK.

Also, additional research exploring how teachers planning to integrate technology into their literacy instruction use the TIPC would be useful. Studies focused on teachers who are specifically using the cycle to plan their instruction might illuminate additional factors that contribute to their successful planning efforts. Further, specific explorations of how teachers select instructional goals and how they use those goals to guide their planning decisions would inform the use of the TIPC.

**Summary**

There are several useful implications that arise from this study. Potential contributions to an understanding of how teachers draw on their TPACK when planning literacy instruction may inform a conceptualization of the complex ways in which teacher knowledge effects lesson planning. Additionally, descriptions of how teachers’ stances influence their literacy instruction may illuminate issues of teachers’ roles in new literacies classrooms. Also, discussion of how the elements of the TIPC frame teachers’ planning processes highlights the potential usefulness of this model for teachers’ lesson planning when integrating technology into literacy instruction. These findings also
highlight ways in which teachers, professional development providers, and others who support teachers can work to strengthen technology integration into literacy instruction.
REFERENCES


APPENDIX A-INSTITUTIONAL REVIEW BOARD APPROVAL

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Date: 9/11/2014
To: Dr. Amy Hutchison
    N126 Lagomarcino Hall

From: Office for Responsible Research
Title: Exploration of Teachers' Use of the Technology Integration Planning Cycle
IRB ID: 14-403
Study Review Date: 9/10/2014

The project referenced above has been declared exempt from the requirements of the human subject protections regulations as described in 45 CFR 46.101(b) because it meets the following federal requirements for exemption:

- (1) Research conducted in established or commonly accepted education settings involving normal education practices, such as:
  - Research on regular and special education instructional strategies; or
  - Research on the effectiveness of, or the comparison among, instructional techniques, curricula, or classroom management methods.

- (2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey or interview procedures with adults or observation of public behavior where:
  - Information obtained is recorded in such a manner that human subjects cannot be identified directly or through identifiers linked to the subjects; or
  - Any disclosure of the human subjects' responses outside the research could not reasonably place the subject at risk of criminal or civil liability or be damaging to their financial standing, employability, or reputation.

The determination of exemption means that:
- You do not need to submit an application for annual continuing review.

You must carry out the research as described in the IRB application. Review by IRB staff is required prior to implementing modifications that may change the exempt status of the research. In general, review is required for any modifications to the research procedures (e.g., method of data collection, nature or scope of information to be collected, changes in confidentiality measures, etc.), modifications that result in the inclusion of participants from vulnerable populations, and/or any change that may increase the risk or discomfort to participants. Changes to key personnel must also be approved. The purpose of review is to determine if the project still meets the federal criteria for exemption.

Non-exempt research is subject to many regulatory requirements that must be addressed prior to implementation of the study. Conducting non-exempt research without IRB review and approval may constitute non-compliance with federal regulations and/or academic misconduct according to ISU policy.

Detailed information about requirements for submission of modifications can be found on the Exempt Study Modification Form. A Personnel Change Form may be submitted when the only modification involves changes in study staff. If it is determined that exemption is no longer warranted, an Application for Approval of Research Involving Human Subjects will need to be submitted and approved before proceeding with data collection.

Please note that you must submit all research involving human participants for review. Only the IRB or designees may make the determination of exemption, even if you conduct a study in the future that is exactly like this study.

Please be aware that approval from other entities may also be needed. For example, access to data from private records (e.g., student, medical, or employment records, etc.) that are protected by FERPA, HIPAA, or other confidentiality policies requires permission from the holders of those records. Similarly, for research conducted in institutions other than ISU (e.g., schools, other colleges or universities, medical facilities, companies, etc.), investigators must obtain permission from the institution(s) as required by their policies. An IRB determination of exemption in no way implies or guarantees that permission from these other entities will be granted.

Please don't hesitate to contact us if you have questions or concerns at 515-294-4565 or IRB@iastate.edu.
APPENDIX B-EMAIL INVITATION

Dear Participant Name,

I am writing to invite you to participate in a part of a research study that will allow us to better understand how teachers plan to integrate technology into their literacy instruction. I would like to ask you to think aloud as you are planning an upcoming lesson in which you will be using digital tools. This will help to better understand how teachers plan their instruction and what materials they use when planning.

I will come to your classroom, or wherever you usually plan, whenever you would typically be planning your lesson and audiotape you as you plan. I will also record your computer screen, so I will be able to remember what you were doing as you were planning. While you are planning, I would like you to just think aloud, so I will know what you are thinking as you plan. If you have used thinking aloud as an instructional strategy, the process for this planning session will be very similar. There will be no time limit or restrictions; I am hoping you will just plan as you usually do.

If you are interested in participating, please email me with a time and date that will work for you. If you are not interested, please reply to this email to let me know you would not like to participate.

Thank you,

Lindsay Woodward
APPENDIX C-PRACTICE THINK-ALOUD AND EXPLANATION OF TASK

Introduction to Task

Read the following: Today, I will be asking you to think aloud as you plan a lesson for your class. Please use all of the materials you would normally use to plan and take as much time as you need. As you are planning, please construct the lesson as you would normally and do not produce any additional materials that you would not normally produce. I will first ask you to practice thinking aloud, so you can become accustomed to the process, and then I will ask you to begin planning. I may ask you what you are thinking or why you do something if you forget to think aloud at any point. Before you begin planning, I will turn on a screencasting tool and an audio recorder.

Do you have any questions about the overall session?

Practice Session

I will model thinking aloud as I count the windows in my house. I will ensure that I explain my process as I am counting, which windows I am referring to, and how I am checking to make sure I have named them all.

Ask the participant to think aloud while they count how many doors are in their house. Upon completion, give positive feedback.

If participant was unable to think aloud, model again thinking aloud about my morning routine.

Ask the participant to do the same.

Make researcher note about participant’s success with the practice task.

Beginning the session

Read the following:

- Do you have any questions about how to think aloud?
- If at any point you need to take a break or stop the session, please let me know, as that is not a problem. If you experience any adverse effects as a result of thinking aloud, you are encouraged to stop the session. Do you have any questions?
- At this point, I will begin the audio and computer recorders and ask you to begin planning your lesson.
APPENDIX D-RETROSPECTIVE VERBAL REPORT

The retrospective verbal report will be based on the concurrent verbal report given by the participant as well as the actions taken during the session. Probes will be designed in response to the concurrent verbal report and the interaction will be recorded as part of the verbal protocol session.

Retrospective probes may include the following areas: examples of probes are included:

- Resources or materials that could not be clearly identified during the concurrent session
  - How did you gain access to that website?
  - Where did the Power Point slides that you consulted come from?
- Instructional purpose of choice or decision
  - What do you anticipate students using Popplet for in this lesson?
  - When the students have time to work on their paragraph, what will you expect them to be doing?
- Clarification of instructional approach
  - Will students be working with partners or individually?
  - What materials will students use to present the information?
- Clarification of instructional goal
  - Why will you ask students to review those vocabulary words?
  - What will you ask students to use that image for?
- Thinking regarding selection of a particular material
  - Why did you select VoiceThread?
  - Why will you allow students to choose from among those print texts and the ones online?
- Additional thinking about specific comments
  - When you said _______, what did you mean?
- Identification of the sources of ideas or comments
  - You mentioned that ‘they’ usually create those materials, who are ‘they’?
  - When you ask the students to post on the website, is that a site you created?
APPENDIX E-PRE-INTERVIEW QUESTIONS

These questions will be asked during the first interview.

1) How would you describe your lesson planning process?

2) What are the most important parts of a lesson that you consider when planning a lesson?

3) What resources do you typically use when planning a lesson?

3b) What does a lesson plan typically look like for you?

4) What do you do differently when planning to integrate technology into your instruction versus using nondigital tools?

5) Has anything changed about the way you plan lessons throughout this school year? If so, why?

For the next step, I would like to schedule a time with you to do a think aloud as you plan for an upcoming lesson in which you will be using digital tools. This will help us to better understand how teachers plan their instruction and what materials they use when planning.

I will come to your classroom whenever you would usually be planning your lesson and audiotape you as you plan. I will also record your computer screen, so I will be able to remember what you were doing as you were planning. While you are planning, I would like you to just think aloud, so I will know what you are thinking as you plan. If you have used thinking aloud as an instructional strategy, the process for this planning session will be very similar. There will be no time limit or restrictions; I am hoping you will just plan as you usually do.
APPENDIX F-POST-INTERVIEW QUESTIONS

Planning and Lesson Questions

1) How would you compare the lesson you have just planned to those you typically use in your class?

2) How would you compare the planning process you used when planning this lesson to your regular, daily planning?

3) Explain what you feel the strongest, most effective element of your lesson is.

4) What were your instructional goals for the lesson you planned?

5) Describe how you considered your instructional approach and context when planning this lesson.
APPENDIX G-OBSERVATION RUBRIC

Technology Integration Lesson Observation Form

Date:
Teacher’s name
Grade level
Time observed
Observer:

Instructional goals:

Instructional approach:

Description of activity:

Observations about students:

Observations about using the tool:

Observations about the environment:

Observations about the teacher:

Observations about constraints:

Observations about instructional supports:

Observations about…

<table>
<thead>
<tr>
<th>Instructional Goal and Approach</th>
<th>Use of technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Ex: Does the technology seem appropriate to goal and approach? Reflect consideration of digital skills and multimodality? What is being learned?)</td>
<td>(Ex: Are students using the technology in the intended way? What is being produced and how?)</td>
</tr>
<tr>
<td>Constraints/Obstacles (Ex: How are they handled? What are they?)</td>
<td>Instructional supports (Ex: Is the classroom environment conducive to activity? Are resources available?)</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other</strong> (Differences in how students’ used technology, other classroom activities, etc.)</td>
<td></td>
</tr>
<tr>
<td>Criteria</td>
<td>1</td>
</tr>
<tr>
<td>----------</td>
<td>---</td>
</tr>
<tr>
<td>Instructional Goal and Approach (Curriculum-based learning objective and effective learning design)</td>
<td>Instructional goal and approach are not aligned with each other and the curriculum standards.</td>
</tr>
<tr>
<td>Technology Selection(s) (Digital materials selected to accomplish instructional goal)</td>
<td>Technology selection(s) are inappropriate, given instructional goal(s) and instructional approaches.</td>
</tr>
<tr>
<td>Contribution to Instruction Goal(s) (Specific contributions of digital tool to instruction)</td>
<td>The technology selection does not contribute to learning digital and nondigital skills.</td>
</tr>
<tr>
<td>The Technology selection does not afford the opportunity to engage in multimodal production or consumption.</td>
<td>The Technology selection affords the opportunity to engage in multimodal production or consumption.</td>
</tr>
<tr>
<td>Potential Constraints (Obstacles and barriers to instruction as a result of digital tool)</td>
<td>The constraints of using the digital tool to address the specified instructional goal have not been identified and considered.</td>
</tr>
<tr>
<td>Instruction and Reflection</td>
<td></td>
</tr>
<tr>
<td>---------------------------</td>
<td></td>
</tr>
<tr>
<td>(Classroom management, resources, and other preparation needed)</td>
<td></td>
</tr>
</tbody>
</table>

| Instructional supports to overcome potential barriers and maximize instructional opportunity are **not in place**. |
| Instructional supports to overcome potential barriers and maximize instructional opportunity are **in place**. |
| Instructional supports to overcome potential barriers and maximize instructional opportunity are **clearly in place**. |
APPENDIX I-WEEKLY TECHNOLOGY USE QUESTIONS

In which of the following ways did your students use digital technology today as part of your class?

- I did not use technology today.
- Gather images online
- Create images (Ex. drawing, using digital programs, etc)
- Read a digital book or story (Ex.- online, on a Kindle, or with a reading app)
- Watch a video online
- Create a video (Ex.- with YouTube, Jing, etc.)
- Listen to information online (Ex.- podcast)
- Create a multimedia presentation (Ex. VoiceThread or Prezi)
- Publish information to Social Networking Sites (ex. Twitter, Facebook, Edmodo)
- Gather information through social media (Ex. Finding an answer to a question by searching Twitter or posting it to Facebook)
- Post or gather resources through social bookmarking sites (Ex.- Delicious, Diigo, Pinterest)
- Use reference sites online (Ex. dictionary.com or wikipedia)
- Create a document using a Word Processor (Ex. MS Word or Google Doc)
- Use a graphic organizer tool (Ex- Popplet or Inspiration)
- Annotate digital text (Ex- highlighting or making notes using Evernote or Diigo)
- Submit work online (Ex- using Google Drive, Blackboard, or Dropbox)
- Read Fanfiction
- Write & Publish Fanfiction
- Use apps to gain additional practice with a skill (Ex- spelling practice, math practice)
- Use apps to create products that incorporate images
- Use apps to create products that incorporate audio recordings
- Use apps to create products that incorporate a combination of text, images, video, or audio
- Search for information online
- Collaborate online with students from other classes
- Did you use any digital technology not listed above? Please indicate the additional technology used: