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Previous research has provided insight into teachers' adaptations during instruction (Duffy et al., 2008), yet it has not been determined what knowledge teachers draw upon to make their decisions. Therefore, this study examines the knowledge teachers draw upon to make adaptations during instruction. Two case studies were conducted with first-grade teachers during science and social studies instruction. I observed to collect the adaptations the teachers made during instruction and in post-lesson interviews I asked the teachers to confirm the adaptations, to give rationales for why they adapted and to explain the knowledge they drew upon to make the adaptation. Adaptations, rationales, and knowledge categories were coded and analyzed to determine the categories of knowledge teachers relied upon to make adaptations during lessons. I found the categories of adaptations, rationales, and knowledge the two teachers used were related to one another, but not in the way that I had anticipated. The teachers used categories of adaptations, rationales and knowledge that seem to put students at the foundation of thoughtfully adaptive research.

CASE STUDIES OF TWO TEACHERS:
THE KNOWLEDGE TEACHERS
DRAW UPON TO ADAPT

by

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CHAPTER I

INTRODUCTION

The purpose of this research study is to explore the relationship between two teachers' thoughtfully adaptive instances when teaching literacy during science and social studies and the knowledge they draw upon to make the adaptations.

Effective teaching involves a wide range of decisions before, during, and after instruction (Clark & Peterson, 1986). The decisions made during instruction could possibly be the most demanding and difficult to understand due to the lack of time for thinking "in the moment." Previous research has provided insight into teachers' decisions during instruction (Duffy et al., 2008), yet it has not been determined what knowledge teachers draw upon to make their decisions.

Rationale

Exemplary teacher research supports teachers' interaction and responsiveness to students as needs arise during instruction (Florio-Ruane, Raphael, Highfield, & Berne, 2004; Pressley, Allington, Wharton-McDonald, Block, & Morrow, 2001). Teachers who change instruction are opting to respond to student need rather than follow a rigid plan or script. Although planning is a necessary part of a successful lesson, it is possible that the adaptations teachers use within the lesson allow for optimal learning to take place. That is, the adaptations or decisions that occur when a teacher attempts to scaffold student learning, or provides a response to an unanticipated student contribution, or diverges

from the lesson plan, or publicly states a change of plan during the lesson are crucial, according to Galda and Guice (1997).

As teachers make adaptations, it is assumed they draw upon knowledge they have gained. Experts support broad theories of knowledge that teachers use with students (Darling-Hammond & Bransford, 2005; Grossman, 1995; Shulman, 1987). The knowledge teachers use to adapt may be more narrow than the knowledge of teaching as a whole. The wide knowledge that teachers use includes aspects of a teachers' entire day, planning periods, and much more. Specifically understanding the knowledge teachers use to adapt may provide insight into how teachers make decisions and may reveal the particular kinds of knowledge teachers use to make adaptations. Discovering this information can inform further research about preparing new and experienced teachers to adapt their instruction and develop their knowledge to support students during instruction.

Previous research (Duffy et al., 2008) sought to record teacher instances of adaptations to establish that teachers make these types of changes in their instruction. My pilot study research was based on that research, and revealed some preliminary differences between two teachers in the knowledge they used to adapt instruction. The findings showed that one teacher made slightly more adaptations and referred to a broader range of knowledge than the other. The next step is to dig deeper into the knowledge teachers use to make adaptations by looking at the differences in the two teachers over a longer period of time, in other subject areas, and with more time for reflection.

The Problem

Teacher responsiveness during instruction is supported by exemplary teacher research (Pressley et al., 2001). We know from research on thoughtfully adaptive teaching that teachers make adaptations and provide rationales for making adaptations, but we do not know what knowledge teachers draw on to adapt their instruction. The purpose of this study is to explore the knowledge that teachers use when making adaptations. The research questions are:

- Are the number and type of adaptations and rationales and the quality of adaptations and rationales tied to the number and type of categories of knowledge a teacher draws upon?
 - How many, what types and what quality are the adaptations and rationales of the two teachers?
 - What categories of knowledge and how much knowledge does each teacher report drawing upon?

My conceptual framework is illustrated in Appendix A. Adaptive teaching is in the center of the map and occurs in one of four ways; either a diverge from the lesson plan, a public statement of change in the plan, an attempt to scaffold student learning, or to provide a response to an unanticipated student contribution (Duffy et al., 2008). In order to fully understand the knowledge teachers are using to adapt, the type of adaptation must first be collected. Teachers explain their rationales for adapting so that the observer will understand the context and events leading up to the adaptation and the

reasons the teacher adapted. Finally, the teacher describes the knowledge used to make the adaptation to help teach new teachers how to adapt instruction.

Significance

Understanding the knowledge that teachers use when making adaptations during instruction will help us explore how we can instruct preservice and inservice teachers to better respond to student needs. As the kinds of knowledge teachers use to make adaptations is understood, we can begin to determine the best ways to share this information with other teachers. Finally, the relationships between adaptations and knowledge will give further insight into how adaptations are made.

Background

The knowledge used to make adaptations during teaching involves various aspects of teachers' understanding and implementation of instruction. To review the background of the knowledge teachers use to adapt, I must first review what we know about adaptive teaching and what we know about teacher knowledge.

Research on Thoughtfully Adaptive Teaching

Research on Teacher Decision Making

As far back as Dewey (1938), researchers have been talking about the complexity of teaching. Dewey emphasizes that in the classroom, "observation alone is not enough" (p. 68). The role of the teacher goes far beyond planning and delivering instruction to students. Motivation research certainly supports active engagement among students during instruction, but we must also consider the engagement and thoughtful nature of the

teacher during instruction as well. Teachers must be able to make changes and respond as students interpret information and begin to make sense of subject matter.

There was a large shift in the 1980's from the dominant field of process-product research to a focus on teacher decision making. It was at this point that researchers began to connect teachers' thought processes to teachers' actions in the classrooms (Clark & Peterson, 1986). Thought process, at this point, was viewed from various domains including planning, interactive thoughts, and teacher theories and beliefs. Various studies were conducted on teacher planning concluding multiple purposes, types and routines of teacher planning (Clark & Elmore, 1981; Morine-Dersheimer, 1977). In these studies teachers were asked to respond to researchers through think alouds about their planning, keeping journals and interacting in stimulated recall interviews. The link was made at this point from planning to classroom instruction. Clark and Peterson (1986) summarize this area of research by stating that, "the finer details of classroom teaching are unpredictable and therefore not planned" (p. 267).

Further, Clark and Peterson (1986) provide a review of research that includes twelve studies from 1975-1983 on teachers' decisions during instruction. These twelve studies show a trend in the decision making research of the 70's and 80's in recognizing the value of the teacher during instruction. The majority of the studies conducted between one and three observations. Most contain between six and twenty participants in their studies. Only one study (Wodlinger, 1977) conducts multiple observations (ten) of one teacher and this study was an unpublished dissertation. Across six of these studies the largest percentage of interactive thought among teachers was directed toward the learner.

This information has led to my study by giving us reason to continue to understand the process the teacher goes through to support the learner.

Teachers' interactive thoughts were also studied during this time period, largely through stimulated recall interviews (Fogarty, Wang, & Creek, 1982; Morine & Vallance, 1975). These interviews consisted of a videotaped lesson or segment of a lesson that was played back for teachers to share what they were thinking at designated points. This area of research concluded various categories of teachers' interactive thoughts including perceptions, interpretations, anticipations, and reflections (Marx & Peterson, 1981). There was a divide at that point, which showed interactive decisions occurring at a high frequency during lessons (Fogarty et al., 1982; Morine & Vallance, 1975), while Lowyck (1980) said that interactive decisions did not occur as frequently. This may be a definitional issue where one set of researchers tend to describe interactional thinking as any thought a teacher has at the designated point in the stimulated recall interview and the other set defined interactive thought as those thoughts that occurred only when the lesson was not going well. Borko and Shavelson (1990) reviewed the decision making research again a few years later reiterating that, "teachers are professionals who make reasonable judgments and decisions in a complex, uncertain environment" (p. 312).

As teachers' in-the-moment decisions continued to be discussed, scaffolding was seen as a moment when many adaptive decisions were made. Although experienced teachers plan to scaffold instruction, it may also be in the moment of instruction that a teacher realizes a need to scaffold to help a student understand. Many (2002) found, over a seven month time period, that teachers said their scaffolding was to, "aid students in the

development of more complex conceptual understandings and to support students' development of a repertoire of strategies for learning or for sharing what they had learned" (p. 405). Maloch (2002) also pushed the research forward by focusing on student-centered talk. She found a variety of scaffolds that teachers used to support students in literature discussion groups. Teachers' scaffolded instruction by direct and indirect elicitations, modeling, highlighting of strategies, and reconstructive recaps.

As teachers present unanticipated scaffolds during instruction, metacognitive thought moves them to think about their plans in new ways. Some refer to teacher metacognition as a central aspect of teacher instruction, meaning teachers thinking about their thinking (Baker, 2005). Lin, Schwartz, and Hatano (2005) emphasize the aspects of teaching that are non-routine and pop up unexpectedly for teachers' responses. Their study involved two case studies in which teachers implemented a new technology program. Teachers made changes to the implementation of the program. After the instruction of each lesson, teachers in this study used self-report reflection about these "adaptive metacognitions." My study involves the interactive nature described here, but continues to refine the actual moment of the adaptation and teachers' reasoning behind it.

Some prefer self-regulated to the term metacognition to understand how teachers regulate their decisions during teaching. Teachers who have characteristics of self-regulated learners are open to gaining different perspectives and seek support that will help them face instructional challenges (Butler, Lauscher, Jarvis-Selinger, & Beckingham, 2004). When teachers have become self-regulated, they know what strategies to use when they need help, and how to find it. Instructional challenges require

a shift in conceptual knowledge, not just memorization of procedures (Butler, et al.).

Self-regulated teachers have the ability to become decision makers, reflective practitioners, and independent learners (Randi, 2004).

Reflective practice has generally been described as post-lesson thought about the success of the lesson and plans for future lessons. Risko, Roskos, and Vukelich (2002) discuss three levels of reflection: descriptive, comparative and critical at the top level. Descriptive involves describing the problem while comparative involves taking different perspectives about the problem. The critical level involves establishing new ideas and taking action. Adaptive teaching in this study involves taking action in the moment rather than after the lesson or in future lessons.

Romano (2006) has also studied similar decisions during instruction in her research. She refers to these instances as “bumpy moments” in which, “the teacher engages in reflection to make an immediate decision about how to respond to a particular problem in practice” (Romano, 2006, p. 974). Four participants teaching grades 1-6 with 3-28 years of experience, self-recorded “bumpy moments” in their teaching and were interviewed every other week for 12 weeks. The categories that emerged from this study included management, preparation, and time management. Furthermore, all of the teachers in the study reported thinking about particular students or groups as the focus of their thoughts during instruction. These thoughts suggest a continued need to determine how teacher interaction and adaptations change lessons for reasons other than those listed in Ramano’s study.

It is important to understand the adaptive moment from the teacher's perspective. There may be much more occurring during the decision than an observer can capture with an observation. As Shulman (2004) emphasizes, "We must try to understand teachers' actions and reactions from their perspective in the classroom because what may look like foolishness to an observer in the back of the room may look like the only route to survival from around the teachers' desk" (p. 264).

Thoughtfully Adaptive Teaching—Our Studies

Documentation of adaptive teaching has been recorded most recently in research by Duffy et al. (2008) and Duffy et al. (2006). Thoughtfully adaptive teaching, as Duffy et al. (2008) define it is, "a form of executive control in which teachers modify professional information and/or practices in order to meet the needs of particular students or particular instructional situations within the framework of the lesson plan" (p. 161). My study, like Duffy et al.'s (2008), uses the term "thoughtfully adaptive teaching" to refer to the in-the-moment changes during teaching. Their studies reveal that thoughtfully adaptive instances exist and that teachers have rationales for such adaptations.

Adaptations in the study were initially thought to occur in three different ways: either in attempt to reengage students in a task, to address pragmatic concerns, or to assist students in understanding instruction (Duffy et al., 2006). Further coding in the summer of 2007 revealed two main categories that I plan to use to define, as well as code adaptations in the current study (Duffy et al., 2008). The thoughtfully adaptive team, consisting of six team members, including me, found that the data revealed seven types of adaptations that teachers make shown in Table 1.

Table 1. Adaptations (Duffy et al., 2008)

Adaptations
1 - Modifies lesson objective
2 - Changes means by which objectives are met (e.g. materials, strategy, activity, assignment, procedures or routines)
3 - Invents examples, analogy or metaphor
4 - Inserts a mini lesson
5 - Suggests a different perspective to students
6 - Omits/inserts activity or assignment
7 - Changes planned order of instruction

The rationales teachers use to explain their adaptations were categorized as well.

This was an important distinction between the actual adaptation and the rationale the teacher provided. During my study I am looking at teachers' rationales such as those in Table 2.

Table 2. Rationales for Adaptations (Duffy et al., 2008)

Rationales for Adaptations
A - Objective not met
B - Challenge/Elaborate
C - To teach a specific strategy or skill
D - To help students make connections
E - Uses knowledge of student(s) or classroom dynamics to alter instruction
G - Checking student understanding
H - Anticipation of upcoming difficulty
I - To manage behavior
J - To manage time
K - To promote student engagement

The quality of both, the adaptations and the rationales, have also been studied with the thoughtfully adaptive research team (Duffy et al., 2008). In the summer of 2007, quality rubrics/ratings were developed to distinguish between the quality of one

adaptation from another. Three categories were established: considerable metacognitive thought, thoughtful (medium), and minimal thought required to make the adaptation (See Appendix B). As adaptations and rationales were coded, each was also given a quality rating by the team. Considerable metacognitive thought must show exemplary or creative use of professional knowledge or practice and be associated with the larger goal the teacher holds for literacy growth. Thoughtful medium ratings were given to adaptations and rationales that are tied to the specific lesson objective or goal. Finally, the minimal thought quality rating was given to adaptations and rationales if it required little thought, was fragmented or unclear, used incorrect professional knowledge or practice, or did not contribute usefully to the lesson objective.

The adaptations and rationales for making adaptations provide the foundation for my study. The adaptations and rationales categories help determine the way the teachers use adaptations during instruction. The quality of both reveals aspects of thoughtfully adaptive teaching that will aid in teaching others to be more adaptive.

The Pilot for this Study

The purpose of my pilot study was to explore the relationship between the nature of two teachers' thoughtfully adaptive instances during guided reading lessons and the knowledge they drew upon to make these adaptations. Two first-grade teachers were selected to participate based on their willingness to share and their effectiveness to show student growth on required Developmental Reading Assessments. The two first-grade teachers were observed once a week for seven weeks in the fall of 2007. Thoughtfully adaptive instances during guided reading instruction were collected and confirmed with

the teachers during post-lesson interviews. Additionally, post-lesson interviews provided information on teachers' rationales for adapting and the knowledge teachers used to make adaptations. Adaptations and rationales were categorized into the previously established codes with the thoughtfully adaptive research team. Both adaptations and rationales were also rated for quality. Categories of teacher knowledge were compared to Grossman's (1995) six categories of teacher knowledge: knowledge of content, knowledge of learners and learning, knowledge of general pedagogy, knowledge of curriculum, knowledge of context and knowledge of self. Each case study was analyzed individually and then the two were compared to each other.

The results revealed some differences among Ms. Johnson and Ms. Dawson (pseudonyms) in the thoughtfully adaptive instances and in the knowledge used to make adaptations. Ms. Johnson adapted more often and in more ways than Ms. Dawson. The quality ratings among the adaptations also showed that Ms. Johnson's adaptations were more highly rated than Ms. Dawson. This pattern continued with the rationales the teachers gave. Ms. Johnson provided a larger variety of rationales than Ms. Dawson. Ms. Johnson had more high quality rationales than Ms. Dawson, which further showed that the two teachers used differing reasons for adapting. Finally, the knowledge categories continued to support the findings that Ms. Johnson used a wider range of knowledge than Ms. Dawson. Ms. Dawson tended to rely on a few types of adaptations, rationales, and types of knowledge to adapt her instruction during guided reading, while Ms. Johnson relied on multiple categories and used higher quality of adaptations and rationales.

The findings in the pilot study revealed some information about the knowledge the two teachers used to adapt. The purpose of pursuing a similar study with these two teachers is to look specifically at how these two teachers differ in their knowledge to adapt and explore further the relationship of the categories they use. During the pilot study qualitative differences were noted about Ms. Johnson in addition to the adaptations, rationales, and knowledge used. Despite the fact that the two teachers planned together, Ms. Johnson seemed to provide more opportunities for students to foster independent learning and students seemed to engage in a deeper level of thinking. Further, Ms. Johnson seemed to have more cognitive control (Duffy, Roehler, & Putnam, 1987) over her adaptations, meaning she knew why and how she would go about adapting her instruction.

I felt that there were more differences that did not emerge because of the way the study was designed. One teacher seemed to encourage independent thinking more than the other. Students in her room knew how to work independently while the other teacher walked the students through each step of an assignment. Yet, these differences did not show a relationship to the adaptations in the pilot study. So I am restudying the same two teachers but changing several aspects designed to yield deeper insights. The changes in my study include a longer data collection period, another reflective probe to gather more insights from teachers, and instruction in science and social studies.

My study explores the two teachers' knowledge used to adapt for ten weeks and twenty observations. This duration is almost twice as long and includes twice as many

observations as the pilot. Completing a longer study will enable me to determine the consistency of the differences among the teachers.

My study also involves a difference of using deeper reflective probes after the post-lesson teacher interviews. The post-lesson interviews provide valuable initial responses from teachers. Yet, the additional independent reflection time afforded teachers the opportunity to provide more information about the knowledge teachers used to make the adaptations.

Finally, I gathered observations within another subject area of literacy in science and social studies lessons to provide more open tasks to observe. Because it was assumed that the two teachers plan together and present similar tasks during the lessons, my new study will rate tasks to provide evidence of this consistency. Two studies under the thoughtfully adaptive team found evidence that the openness of the task is connected to the adaptive nature of the teacher (Parsons, 2008a; Scales, 2009). In my study, I am looking at literacy in science and social studies because these areas tend to provide more tasks that are open. It was assumed that more open tasks would allow teachers to make the necessary changes and respond to students, while tasks that were closed had less room for teachers to modify instruction.

Summary—Thoughtfully Adaptive Teaching

The previous research on thoughtfully adaptive teaching has developed from teacher thinking and decision making of the 1970's and 80's into what we are now calling thoughtfully adaptive teaching. Teachers make changes in the moment to their instruction to meet the needs of their students. The next step is to further understand the

knowledge teachers use to make adaptations so that we can better prepare teachers in teacher education programs.

Teacher Knowledge

Knowledge is at the core of teacher education programs and the foundation of teaching and learning (Mumby & Russell, 1995). Teachers' understanding of a subject matter and ability to share information with students comes from the foundations of knowledge they have gained. At the most basic level, knowledge of the curriculum is shared and developed in our students. Therefore, we must consider the knowledge teachers use to make adaptations. While teachers' rationales for adapting during instruction provide some insight into teacher thinking, they only give us information about the teachers' reasons for adapting. The knowledge teachers make use of to make the adaptations may be a more in depth aspect of adaptations than the two previously studied aspects: the type of adaptation and the rationale for the adaptation (Duffy et al., 2008). Cognitive control over professional knowledge is what Duffy et al. (1987) describe as an essential aspect to teachers' responsive elaborations during instruction. This means that teachers are aware of and are metacognitive about the knowledge they are using and are able to share that knowledge with others. Yet the relationship between teachers' knowledge and thoughtful adaptations has not been established.

Various Categorizing Systems

Historically, knowledge has been viewed as the key aspect of a teacher's ability in the classroom. Knowledge is still being explored as a newer understanding in education. Only within the past 20 years have researchers begun to understand the complexity of

teacher knowledge (Connelly, Clandinin, & He, 1997; Mumby, Russell, & Martin, 2001). Teachers in the past have been seen as the providers of knowledge for their students. Much of the focus of teacher education for teacher candidates has been on declarative and procedural knowledge. Many of the current reform methods and results of No Child Left Behind (NCLB) have focused on the procedural knowledge perceived by policy makers to raise test scores (Grier & Hulcombe, 2008).

In an effort to understand knowledge better, researchers began to categorize even further the various aspects of teachers' knowledge. Carter (1990) separated information processing, pedagogical content knowledge, and practical knowledge to emphasize the vastness of teacher knowledge needed in the classroom. The information processing aspect of knowledge is explained as a teacher thinking about teaching. Practical knowledge encompasses the classroom context as well as teachers' thinking-in-action, which is more closely tied to the practical everyday aspects of teaching. Schon (1983) referred to the type of thinking that teachers need to do in the classroom on a daily basis as reflection in action. Even the best laid plans of teachers have unexpected occurrences. It is during these moments that teachers must decide whether and how to deal with the unplanned event. It is this "thinking-in-action" aspect of knowledge that may be most closely tied to thoughtfully adaptive teaching. Finally, pedagogical content knowledge has been linked to the subject matter teachers need to convey to their students as well as how it is delivered to the students. These categories give a basis for understanding teacher knowledge but are quite broad in attempting to understand specific types of knowledge.

Hiebert, Gallimore, and Stigler (2002) discuss teacher knowledge in terms of practitioner knowledge. A major component of practitioner knowledge includes the direct link of working to solve problems in practice. Practitioner knowledge is also detailed, specific and concrete, meaning that teachers use the knowledge they have in a specific situation with particular materials and students. Finally, the authors state that practitioner knowledge is integrated. Rather than using a specific category of knowledge in a situation the knowledge is intertwined. The distinguishable characteristics of practitioner knowledge includes the collaborative sharing of knowledge, verifying the accuracy of knowledge gained and the desire to improve one's knowledge.

Darling-Hammond and Bransford (2005) also suggest three categories of knowledge that teachers use in the classroom: knowledge of students, knowledge of teaching, and knowledge of instructional strategies. Knowledge of students refers to teachers' knowledge of individuals or groups of students' needs, backgrounds, strengths and weaknesses. Knowledge of teaching reading refers to a teacher's understanding of the language arts curriculum and/or best practices in reading instruction. Finally, knowledge of instructional strategies signifies a teachers understanding of management of behavior and strategies for scaffolding learning. While Darling-Hammond and Bransford provide a clear and concise model for teacher knowledge, their model may be too broad and perhaps not sensitive enough to contextual issues to fully understand the knowledge used in making adaptations. It may help to break these categories down further to understand specific aspects of each type of knowledge.

Lampert (1985) focused her research on two aspects of teacher knowledge. Lampert studied teachers knowledge used to manage dilemmas in the classroom. This is much like the knowledge teachers use to make adaptations. Yet, Lampert only focuses on teachers' knowledge of self and knowledge of students in making these types of choices. It is interesting that Lampert narrowed knowledge to these two categories and may give support in narrowing the focus of knowledge used to make adaptations. However, this model seems too narrow to fully understand the knowledge used to adapt.

Similar to Lampert's (1985) ideas about managing classroom dilemmas, the knowledge that teachers access to make instructional decisions during teaching has recently been explored by Schepens, Aelterman, and Van Keer (2007). This study was conducted with ten preservice teachers and focused on teachers' interactive cognitions, or thoughtful adaptations, during lessons. Stimulated recall interviews were used to record lessons and conduct interviews following the observation. Most interesting and consistent with research on teacher decision making, "thoughts about teacher pupil interaction" was one of the most frequent cognitions for teachers during lessons.

Hapgood, Kucan, and Palincsar (2007) recently presented research in this area at a meeting of the *American Education Research Association*. Their study included teacher planning, conducting a survey of comprehension knowledge and teachers' responses to hypothetical situations during instruction. Knowledge of a variety of instructional moves used to respond to students and knowledge of assessing and diagnosing students were key motives in this research. Results revealed teachers' tendencies to rely on one strategy or concept more than others, such as responding to student background knowledge more

than other instructional moves. While only a few types of knowledge may be used by teachers, the foundation for understanding the knowledge must be broad to capture the knowledge the teachers use effectively in adapting.

Two studies conducted by Meijer, Verloop, and Beijaard (1999, 2002) created a much broader category framework for the Schepens et al. (2007) study noted above. Their focus was on teachers' practical knowledge, in which they developed six categories to describe the types of knowledge that teachers use for instruction. Their knowledge categories included; subject matter knowledge, student knowledge, knowledge of student learning and understanding, knowledge of purposes, knowledge of curriculum, and knowledge of instructional techniques.

Connelly et al. (1997) discusses personal practical knowledge in a broader sense than Meijer et al. (1999, 2002). Connelly et al. described the type of knowledge that teachers use in everyday aspects of teaching as teachers' personal practical knowledge. This type of knowledge is described as a more personal approach to understanding, which includes teachers' past experiences, present interactions, future plans and reflections. Personal practical knowledge situates knowledge as a construct that teachers develop over a lifetime of experiences rather than information independent of learners.

Shulman (1987) focuses on broad categories of professional subject matter knowledge similar to the categories from Meijer et al. (1999, 2002). Shulman developed seven categories including content knowledge, general pedagogical knowledge, curriculum knowledge, pedagogical content knowledge, knowledge of learners and their characteristics, knowledge of educational contexts, and knowledge of educational ends,

purposes, and values. These categories begin to dissect the knowledge teachers use into aspects of teaching that could be used to code the data on the knowledge teachers use to adapt.

Grossman's (1995) categories focus on teachers' knowledge and professionalism. Grossman identifies six categories of teacher knowledge; knowledge of content, knowledge of learners and learning, knowledge of general pedagogy, knowledge of curriculum, knowledge of context and knowledge of self. Grossman refers to knowledge of content as subject matter knowledge as well as pedagogical content knowledge of subject matter, such as the beliefs and conceptions regarding the purposes for teaching subject matter and the knowledge of students' understanding of the subject matter as significant aspect of the knowledge teachers must possess. Knowledge of learners and learning refers to learning theories as well as understanding development of students. Grossman defines the knowledge of general pedagogy as the classroom organization and management teachers use to teach. The fourth category, knowledge of curriculum, demonstrates teachers' understanding of the process and development of curriculum within and across grade levels. Knowledge of context involves teachers awareness of multiple settings embedded in schools including local, historical, and cultural foundations. Finally, Grossman explains the knowledge of self as teachers' conception of personal values, dispositions, educational philosophy, and goals for students and teaching. These categories open up the aspects of knowledge. The addition of the knowledge of self to this category system brings in teachers' personal philosophies into teachers' knowledge for teaching.

Grossman's (1995) categories consist of a broad range and seem to represent the majority of research on teacher knowledge. Additionally, Grossman's six categories include aspects that cover basic understandings for teachers' knowledge such as the knowledge of curriculum and the knowledge of content, but they also cover topics that include context and teacher values. Having these broad categories of knowledge help determine the categories of knowledge that teachers draw upon to adapt. Therefore, I have chosen to use Grossman's categories of knowledge as the foundation for this study.

The following table displays the categorizing systems discussed in the previous section. The various categories of knowledge overlap in some instances and some systems have categories suggested only by one source. The table is organized to show the areas that are similar among the knowledge categorizing systems. The rows in the table show similarities in the systems. Grossman's (1995) categories of knowledge overlap various other systems and represent the majority of the suggested categories of knowledge. Additionally, she includes knowledge of self, which represents a teacher's personal vision and values in the classroom. Grossman's broad representation of teacher knowledge was selected as the foundation to understand the knowledge teachers use to adapt.

There was significance in the categories that were not used at all by teachers in my pilot study, such as the knowledge of curriculum. Even though both had curriculum objectives listed for every lesson, in the lesson plan and posted for the students, neither teacher referred to her knowledge of curriculum in the adaptations made. Additionally, knowledge of self and knowledge of context each only had one response in the pilot.

Table 3. Categorizing Systems of Knowledge

Lampert, 1985	Shulman, 1987	Grossman, 1995	Darling-Hammond & Bransford, 2005	Meijer, Verloop & Beijaard, 2002
	Content Knowledge	Knowledge of content		Subject matter knowledge
Knowledge of students	Knowledge of learners and their characteristics	Knowledge of learners and learning	Knowledge of students	Knowledge of student learning and understanding
	General Pedagogical Knowledge	Knowledge of general pedagogy	Knowledge of teaching	
	Curriculum Knowledge	Knowledge of curriculum	Knowledge of instructional strategies	Curriculum Knowledge
	Knowledge of educational context	Knowledge of context		
Knowledge of self		Knowledge of self		
	Knowledge of educational ends, purposes, and values			Knowledge of purposes
	Pedagogical Content Knowledge			
				Student knowledge
				Knowledge of instructional techniques

There was significance in the categories that were not used at all by teachers in my pilot study, such as the knowledge of curriculum. Even though both had curriculum objectives listed for every lesson, in the lesson plan and posted for the students, neither teacher

referred to her knowledge of curriculum in the adaptations made. Additionally, knowledge of self and knowledge of context each only had one response in the pilot. It could be that experienced teachers have “expert blind spots” and do not mention this as a piece of the knowledge they used (Darling-Hammond & Bransford, 2005). It could be that adaptations require certain kinds of knowledge rather than the broadness expected from the Grossman categories.

Other Ways to Examine Knowledge

A change in knowledge may also contribute to teachers adaptations in the classroom. Dole and Sinatra (1998) emphasize teacher involvement and the ability to make sense of the message in order for there to be a change in knowledge. Just as a teacher responds to a student in the moment that a child does not understand or questions information, the teacher is processing what he/she knows to respond to the student. At the same time, there is a conceptual change, in that the teacher had not anticipated the response or she would have planned for such an occurrence in the lesson plan. So, the teacher must be able to comprehend the message the student sends and make the conceptual change to respond (Dole & Sinatra, 1998).

Another theory that involves a change in knowledge is transformative learning theory. Transformative learning theory involves a person’s frame of reference which includes past experiences, conceptions, values, feelings and conditioned responses (Mezirow, 1997). Transforming a person’s frame of reference involves critical reflection, contesting beliefs, and taking action on reflective insight. This type of transformative learning is the type of realization that a teacher may draw upon when making a

thoughtful adaptation. Shulman and Quinlan (1996) emphasize that teachers transform their knowledge to connect their own prior knowledge and to the dispositions of their learners. By adapting in the classroom to meet the needs of students, it is the transformative aspect of knowledge that teachers may be employing.

Posner, Strike, Hewson, and Gertzog (1982) discuss a dissatisfaction that causes a person to make a change, while others attribute the change to issues such as a stake in the outcome, an interest in the topic or being emotionally involved as key factors in why an individual would make a change (Chaiken & Stangor, 1987; Gaskins, 1996; Hidi, 1990). Dole and Sinatra pose that, “high elaboration occurs when individuals engage in effortful, analytical processing of information” (p. 121). They discuss this type of change and elaboration in vague terms of reflection and response, yet in my study there is a focus on the in-the-moment, thoughtful adaptations and how the teacher responds to the students.

Additionally, teacher development may play a role in knowledge. Cochran and Jones (1998) established that experienced teachers have a stronger understanding of pedagogical content knowledge than novice teachers. Jacobson and Spiro’s (1995) cognitive flexibility theory emphasizes that it is not enough to have knowledge, but one must be able to use it in multiple complex ways. My study continues work in this area by exploring the knowledge teachers say they use to make adaptations rather than just understanding the knowledge teachers possess. Further, experienced teachers are used as participants rather than novice teachers. If experienced teachers have a broader, deeper knowledge base then we need to understand how these teachers use their knowledge first. Once there is an understanding of the knowledge experienced teachers use to make

adaptations, we can begin to discover ways to transfer this kind of knowledge to novice teachers.

Summary—Knowledge

Teachers' adaptations during instruction may require various types of knowledge. Knowledge used to adapt instruction may require a higher level of thought because it is required in the moment of teaching rather than in planning stages, post reflection stages, or other areas of teaching. While declarative and procedural knowledge are necessary components of teacher knowledge, the type of knowledge used to make adaptations may require more than these original aspects of knowledge or may require a reliance on certain aspects of identified areas of knowledge.

My study uses Grossman's (1995) categories of knowledge as a foundation of teacher knowledge to make adaptations. Grossman's six categories of knowledge provide a clear representation of research on teacher knowledge. The categories that Grossman suggests are broad enough to help gain an understanding of the knowledge teachers use to adapt. Yet, other forms of knowledge may be at the root of teachers adaptations and will be considered. The knowledge that teachers access in making adaptations during instruction is a significant aspect to this study because this information can directly impact teacher education. If we are able to identify the types of knowledge that teachers use when making adaptations, then we will know better how to teach new teachers to be adaptive during instruction.

Theoretical Perspective

Theoretically, the study of teacher adaptations is based in social cognitive theory (Vygotsky, 1978). Social cognitive theory suggests a reciprocal interaction between the environment, the person, and their behavior (Bandura, 1986). The theory highlights student learning through modeling, making teachers' abilities to model and reflect in their teaching important. The ability of teachers to support students is therefore tied to teachers' abilities to scaffold and respond to students during instruction. Lessons that incorporate scaffolding, student collaboration, and discussion provide the opportunities for teachers to be responsive to students (Florio-Ruane et al., 2003; Galda & Guice, 1997; Maloch, 2002).

Instructionally, social cognitive theory is most easily observed during scaffolding. Adaptations have been consistently seen in the midst of scaffolding (Duffy et al., 2006). As teachers see that students have difficulty with texts or do not understand a concept, teachers scaffold information to help students develop full comprehension (Many, 2002). Researchers argue that students must be active participants in literacy learning. Students' active participation is a result of opportunities to engage with other students in the lesson, with the teacher and with the text. Rather than following a set of procedures, teachers who are adaptive, provide opportunities to respond to students as need arises.

Definitions

Thoughtfully adaptive teaching (TAT) is defined as a teacher action that (a) is non-routine, proactive, thoughtful, and improvisational; (b) includes a change in

professional knowledge or practice; and (c) is done to meet the needs of a student or an instructional situation (Duffy et al., 2008).

Adaptations were identified either by an attempt to scaffold student learning, to provide a response to an unanticipated student contribution, a divergence from the lesson plan, or a public statement of change of plan during the lesson. They were confirmed by the teacher.

Rationales were identified by any reason or explanation teachers give for adapting instruction during a lesson.

For the purpose of this study, knowledge was defined and categorized by six categories of teacher knowledge: knowledge of content, knowledge of learners and learning, knowledge of general pedagogy, knowledge of curriculum, knowledge of context, and knowledge of self (Grossman, 1995).

Lesson plans for this study were written or typed and include essential questions, objectives from the standard course of study, activating strategies, cognitive teaching strategies, and summarizing strategies.

Tasks were rated only for the purpose of documenting that the two teachers use the same kinds of tasks in teaching the lessons. For the purpose of this study, tasks are defined as any assignment in which students write.

Conclusion

The knowledge teachers say they use when adapting and explaining the rationales for their adaptations were explored in this study. The chapter has outlined the problem and research questions for the study. Reviews of the research on thoughtfully adaptive

teaching and teacher knowledge have been discussed. Finally, the theoretical perspective for the study has been provided and definitions for significant topics used throughout the study have been explained.

CHAPTER II

METHODS

Overview

During my study I conducted two case studies of first-grade teachers during literacy instruction in science and social studies to explore the relationship between the knowledge the teachers used to make adaptations. To better understand how teachers make adaptations, I looked specifically at the knowledge teachers used for making adaptations during instruction. The pilot for this study revealed some differences in the way that the two teachers adapted instruction and the rationales they provided for adapting. For this study, I made several changes to the methodology used in the pilot study. I studied them for a longer period of time, a teacher reflection sheet was added to further teacher insights after post-lesson interviews and I changed the instructional focus from guided reading to science and social studies. These changes were made to increase the chances of discovering differences between the two teachers and the knowledge they used to adapt their instruction. The research questions for the study were:

- Are the number and type of adaptations and rationales and the quality of adaptations and rationales tied to the number and type of categories of knowledge a teacher draws upon?
 - How many, what types and what quality are the adaptations and rationales of the two teachers?

- What categories of knowledge and how much knowledge does each teacher report drawing upon?

The two case studies took place over the course of 11 weeks. Each teacher was observed two times per week for a total of 20 observations each. Each observation took approximately 30-50 minutes with teacher interviews following for approximately 10-15 additional minutes. During the observation, the task was rated on the task rubric. I had teachers review adaptations and record further reflections on their knowledge and rationales used to make the adaptations within one week of the observation. Lesson plans were collected as well.

Participants

My sample of participants was a purposive sample (Maxwell, 2005). I chose two first-grade teachers who were willing to participate and to provide open feedback about their instruction. These two teachers were extreme cases because both have been nominated for “Teacher of the Year” for their school and both say they use project-based instruction. The reading inventory scores from the previous school year showed that both teachers were effective in moving students toward first-grade goals. Both had 69% of their students on grade level reading by the end of the school year as measured by the Developmental Reading Inventory (DRA). Further, both had an average of six levels of reading gain in each student over the course of the first-grade school year. Additionally, I worked with both teachers when I served as the curriculum facilitator in their school two years prior to the study, and I have conducted two pilot studies with the teachers on thoughtfully adaptive instruction. This was the third case study with these two teachers.

Ms. Johnson is Caucasian and has taught for 31 years. She was voted “Teacher of the Year” for the primary school two years prior to the study. Additionally, she has her National Boards Certification and a Master’s Degree in Education. Ms. James is involved in multiple school committees and professional development. Ms. Dawson has taught for 20 years and is African American. She was voted “Teacher of the Year” three years prior to the study at the primary school. Ms. Dawson is involved in school climate and is a cheerleader for the staff and her students. The two teachers are close friends and spend large amounts of time together planning. Their classrooms are right next door to one another and they constantly share resources and check on one another. Both teachers agreed to weekly observations of project-based science and/or social studies instruction integrated with literacy. During these observations I stayed for two hour blocks of time, twice a week to provide time for observations of teachers and provide time for interviews of teachers.

Table 4. Summary of Participants

	Years Teaching	Years at Conor Elementary	Race/Gender	Nationals Boards	Master’s Degree
Ms. Johnson	31	31	W/F	Yes	Yes
Ms. Dawson	20	4	B/F	No	No

Research Site

The site for this study was Conor Elementary School (pseudonym). I was able to gain access to this school through the principal. Two teachers agreed to observations and

participation in the study. This school serves pre-Kindergarten through fifth-grade students. This suburban school is a Title I school with 65% of the 571 students enrolled receiving free or reduced lunch. This was the second year the school has been in operation. There was a merger during the previous year of a primary school, serving pre-kindergarten through third grade and fourth and fifth grades that were housed at the middle school. The racial makeup of the student body is approximately 22% Caucasian, 45% African American, 19% Hispanic, 4% Asian, and 10% multi-racial.

Since Conor Elementary School is a Title I school, the district lowered the class size at the K-2 level in this school. These two teachers had an average of 15 students in their classrooms during this school year. Resource classes and reading specialists provided extra pull-out support during the science and social studies blocks of the teachers' days. The pull-outs led to an even smaller class size for the majority of the lessons. Ms. Johnson had four of her students pulled by the reading specialist during the time and Ms. Dawson had three of her students pulled by the English Language support teacher. During each lesson these students returned and the teachers caught them up on the lesson in a small group. The teachers had minimal behavior problems during my visits. Each had approximately one child that needed extra support following directions during the lessons. Additionally, teachers were required to use a computer program daily with their students. The program consisted of reading and math tutorials. Because of the difficulty in managing multiple students on the computer each day, the teachers used parts of the science and social studies time to complete this task. Approximately three students per visit were finishing up the computer program during the first ten minutes of

the lessons. The teachers had small groups of students for the lessons observed because of the class size and various other resources provided for their students.

Description of the Methods

Case Studies and Relevant Criteria

Case studies have been cited by researchers as a significant way to gather information on a few subjects over a period of time (Stake, 2005; Stoecker, 1991). Case studies provide an in depth look at a specific phenomenon (Stake, 1995), such as thoughtfully adaptive teaching. For this particular instance, case studies were the most appropriate way to study the complex issues of the classroom along with the thoughts and understanding teachers have about their instruction. Although case studies lack the data to provide statistical generalizations, they can give us information about what these two successful teachers are doing in their classrooms with adaptations. Stake (2000) refers to this as natural generalizations or the similarities revealed within the context of the two classrooms. In this study, I make analytic generalizations to explain the knowledge teachers are using to adapt. The study contains two case studies that were conducted in the fall of 2008 with first-grade teachers.

Procedures and Schedule

The research was conducted over the course of 10 weeks during the fall semester of 2008, starting the week of September 29th through the week of December 8th. I observed and interviewed in both classrooms two days a week for approximately two hours per visit. Visits were conducted between 11:00 a.m. and 2:15 p.m. There were 20 observations for each teacher for a total of 40 observations in all.

Schedule of Observations

Week 1 – Tuesday, September 30 and Thursday, October 2

Week 2 – Tuesday, October 7 and Thursday, October 9

Week 3 – Thursday, October 16

Week 4 – Tuesday, October 21

Week 5 – Tuesday, October 28 and Thursday, October 30

Week 6 – Thursday, November 6 and Friday, November 7 (Election Day and teacher workday)

Week 7 – Thursday, November 13 and Friday, November 14 (Veterans Day Holiday this week)

Week 8 – Tuesday, November 18 and Friday, November 21

Week 9 – Monday, November 24 and Tuesday, November 25 (Thanksgiving Holiday this week)

Week 10 – Tuesday, December 2 and Thursday, December 4

Week 11 – Monday, December 8, Tuesday, December 9 and Wednesday, December 10

Data Collected

Throughout the 11 weeks, four types of data were collected. First, I collected field notes during observations of science and social studies lessons twice a week. Second, interviews of teachers after each lesson were tape recorded to confirm adaptations, collect teachers' rationales for the adaptations, and gather teachers' knowledge about the adaptations. Third, teachers reflected independently about the knowledge and rationales

they used to adapt on a recording sheet within a few days of the lesson observation.

Finally, teachers provided their lesson plans to compare the plan to the actual lesson.

Observations

Observations, post-lesson interviews, independent reflections, and lesson plans were the primary methods of data collection for teachers in this study. Observations of lessons were conducted twice a week to record teacher adaptations and the openness of the tasks teachers assigned during the lessons. For the purpose of the study task were defined as any assignment in which students write. Written tasks were rated on authenticity, collaboration, challenge, student directed, and sustained aspects of the assignment. Adaptations were identified either by an attempt to scaffold student learning, provide a response to an unanticipated student contribution, a divergence from the lesson plan, or a public statement of a change of plan during the lesson. This revealed the kinds of adaptations made. The observation protocol was used to record thoughtfully adaptive instances and to record running notes for identifying the context in which the adaptation occurred (See Appendix C). I also used the task rubric to rate the tasks teachers assigned during the lessons (See Appendix D). Tasks were rated to determine any differences in the way the teachers implemented the lessons and assignments. Tasks were identified as any assignment in which students write. Miller and Meece (1999) support the use of tasks that involve written assignments. Their research showed a relationship between high challenge tasks, involving writing and student motivation. Five task components adapted from the ACCESS model were evaluated to determine the openness of the task: authenticity, collaboration, challenge, student directed, and sustained (Parsons, 2008b).

Task were rated as closed (score of 5-8), moderately open (9-11), or open (12-15) on the rubric (Parsons, 2008b).

Teacher Interviews

After the lessons, teacher interviews were conducted with each teacher. These interviews were conducted to gather information about teachers' adaptations, rationales, the quality of both and the knowledge teachers used to make the adaptations. The interview protocol for teachers consisted of three questions (See Appendix E). The first two interview questions on adaptations and rationales have been used in prior studies on thoughtfully adaptive teaching (Duffy et al., 2008). The third interview question was used in my pilot study to gather the teachers' knowledge they used to adapt. The first question asked: "When I saw you doing _____ during the lesson, was that a spontaneous change, something you had not planned?" This question established whether or not the instance the observer noted was in fact an adaptation. The second question was: "Why did you make that change?" This question was used to reveal teachers' rationales for making adaptations. The third question was: "If you were trying to help another teacher, what kind of knowledge would you tell him or her to use to make this change?" This question helped determine the types of knowledge the two teachers used to make adaptations. These three interview questions were repeated for each thoughtfully adaptive instance recorded during the observed sessions. These interviews lasted between 10-15 minutes. All interviews were transcribed and analyzed. The transcription allowed for analysis of adaptations, rationales, the quality of both, and the knowledge teachers used to make the adaptations. Quality for the adaptations and rationales was rated with the

thoughtfully adaptive research team (see Appendix B). Quality was assigned a rating of minimal thought, thoughtful or considerable thought.

Teacher Reflection Recording Sheets for Knowledge and Rationales

Teachers in the study received a recording sheet of the adaptations they made in the lessons during the next observation session. The recording sheet included the adaptations and context of the adaptation from the lesson. For example, if the teacher was observed on Tuesday, then she received the adaptations from the previous lesson on Thursday while the observer was there for the next observation. The teacher reviewed the adaptations and used the recording sheet to add additional reflections about the reasons the teacher adapted (the rationales) and the knowledge used to make the adaptations (see Appendix F). These reflections gave teachers more time to reflect on their knowledge and rationales rather than having to respond in a time constrained interview.

Lesson Plans

In addition, teacher lesson plans were collected prior to observations to review the plans for the lesson and compare changes made during instruction. This information helped determine when adaptations and changes to lesson plans were made. Lesson plans for the study included essential questions, objectives from the standard course of study, activating strategies, cognitive teaching strategies, and summarizing strategies.

Summary of Data Collected

The four sources of data for the study provided various evidences for how teachers used their knowledge to adapt instruction in science and social studies. Observations, post-lesson teacher interviews, teachers' reflection recording sheets, and

lesson plans were collected to reveal the knowledge teachers used to adapt during instruction.

Methods of Data Analysis

To analyze data collected in teacher observations and interviews, I used a taxonomy approach (Spradley, 1980) to categorize the relationships of teacher knowledge and adaptations. For each area of interest (adaptations, rationales, and knowledge), I categorized data into previously established codes for each case study. Codes for adaptations and rationales were developed with the thoughtfully adaptive research team (Duffy et al., 2008). Adaptations were coded into seven categories and rated on the quality of the adaptation. Quality was assigned to adaptations with a rating of minimal thought, thoughtful or considerable thought. Rationales were coded into ten categories and rated on quality as well. Rationales that teachers provided during the interviews and on the recording sheets were coded and compared for differences in responses. Both adaptations and rationales were coded with one other member of the thoughtfully adaptive research team and checked by a third member to reach consensus for all codes. Knowledge was coded into six categories of teacher knowledge (Grossman, 1995). The knowledge teachers shared in the interviews and the knowledge teachers shared on the recording sheets were coded with these categories and compared. Knowledge categories were coded with one other member simultaneously and agreement was reached for each code.

After categories were established, I compared adaptations and rationales and the quality of the adaptations and rationales to the knowledge teachers used for Case Study 1

and Case Study 2 separately. Then I compared the adaptations and rationales, the quality of the adaptations and the rationales, and the knowledge teachers used from Case Study 1 to Case Study 2. Under each case study analysis I reviewed the research questions as follows.

Central Question

The central research question for the study was: Are the number and type of adaptations and rationales and the quality of adaptations and rationales tied to the number and type of categories of knowledge a teacher draws upon? To answer the overarching question I had to answer the sub questions first.

Sub Question 1

The first sub question for the study was: “How many, what types and what quality are the adaptations and rationales?” In order to answer this question, I first categorized the adaptations and rationales and the quality of the adaptations and rationales. Then the adaptations and rationales and the quality of the adaptations and rationales discovered from Case Study 1 were compared to Case Study 2. Each piece of data was analyzed as follows.

Data analysis adaptations and rationales. Interviews with teachers were conducted, tape recorded and transcribed. For each case study, I observed for adaptations and confirmed with the teacher during post-lesson interviews. During the post-lesson interview I asked, “When I saw you doing _____ during the lesson, was that a spontaneous change, something you had not planned?” Taped interviews were transcribed and analyzed. Two team members were present for initial

coding and codes were checked by a third team member. The description of the adaptation the teacher made was discussed with the thoughtfully adaptive research team using the following adaptation codes in Table 5.

Table 5. Adaptations

Adaptations
1 - Modifies lesson objective
2 - Changes means by which objectives are met (e.g., materials, strategy, activity, assignment, procedures or routines)
3 - Invents examples, analogy or metaphor
4 - Inserts a mini lesson
5 - Suggests a different perspective to students
6 - Omits/inserts activity or assignment
7 - Changes planned order of instruction

The teachers' rationales for the adaptations during the lesson gave insight into why adaptations were made and what teachers hoped to accomplish. Teachers' rationales for making adaptations were collected during the post-lesson interviews. Teachers were asked, "Why did you make that change?" after confirming that an adaptation was made. The answers were tape recorded and transcribed. The rationales were coded with the thoughtfully adaptive research team by type using the rationale codes in Table 5. Two members of the research team were present to establish the codes and a third member checked the codes. Additionally, teachers completed a written reflection chart to share the reasons they made each adaptation. These charts were completed within one week of the observation. The charts were combined with the knowledge teacher reflection chart. Teachers' answers on the reflection chart for rationales were coded and compared to the

interview answers to reveal any differences in the post-lesson interview and reflection answers. The following codes were used for categorizing rationales.

Table 6. *Rationales for Adaptations*

Rationales for Adaptations
A - Objective not met
B - Challenge/Elaborate
C - To teach a specific strategy or skill
D - To help students make connections
E - Uses knowledge of student(s) or classroom dynamics to alter instruction
G - Checking student understanding
H - Anticipation of upcoming difficulty
I - To manage behavior
J - To manage time
K - To promote student engagement

The quality of the adaptations helped bring understanding to the thoughtfulness of adaptations and rationales. The quality ratings were assigned to the adaptations and rationales teachers provided for adapting instruction and then compared to teacher knowledge categories. Again, each case was analyzed separately and then compared.

Codes for quality ratings on adaptations and rationales were based on Appendix B and were coded with the research team. Two members of the team were present to establish codes and a third checked codes. Quality ratings were placed either in one of three categories; considerable metacognitive thought (high), thoughtful (medium), and minimal thought (low) required to make the adaptation. Quality ratings were assigned to teacher adaptations and rationales from the post-lesson interviews and assigned to the teacher rationale reflection sheets. Each teacher's interview and reflection sheet rationale responses were compared for differences in the quality of the rationales.

Case study comparisons of adaptations and rationales. I repeated the previous analysis for adaptations and rationales for Case Study 2. I compared Case Study 1 to Case Study 2. I listed the adaptations categories and quality ratings for Case Study 1 and compared the adaptation categories and quality ratings to Case Study 2. I listed the rationale categories and quality rating for Case Study 1 and compared the rationale categories and quality ratings for Case Study 2. I looked for consistencies and differences among the two teachers in the adaptations, rationales, and quality ratings.

Sub Question 2

The second sub question for the study was: “What categories of knowledge and how much knowledge does the teacher report drawing upon?” In order to answer this question, I first categorized the knowledge the teachers said they used. Then the knowledge teachers said they used from Case Study 1 were compared to Case Study 2. Each piece of data was analyzed as follows.

Data analysis knowledge. Teachers were asked about the knowledge they used to adapt; “If you were trying to help another teacher, what kind of knowledge would you tell him or her to use?” Knowledge was analyzed through patterns in transcript interviews. The six categories for knowledge, adapted from Grossman (1995) are: knowledge of content, knowledge of learners and learning, knowledge of general pedagogy, knowledge of curriculum, knowledge of context, and knowledge of self. Reliability was established through a two team coding with both members present and agreement met for 100% of the codes. Both members coded the knowledge categories simultaneously. The rules established for each category of knowledge were used to assign codes.

Table 7. Knowledge Categories (Adapted from Grossman, 1995)

Knowledge Categories
I - Knowledge of content Subject matter knowledge – more knowledgeable is emphasized more Pedagogical content knowledge of subject matter – beliefs and conceptions regarding purposes for teaching subject matter, knowledge of students’ understandings and misunderstandings of particular topics within a subject matter
II - Knowledge of learners and learning Learning theories, physical, social, and psychological and cognitive development of students Motivational theory and practice Ethnic Socioeconomic Gender diversity Helping students make connections
III - Knowledge of general pedagogy Classroom organization and management General methods of teaching Closure, scaffolding, responding to incorrect responses
IV - Knowledge of the curriculum Process curriculum development School curriculum within and across grade levels Integrating areas of the curriculum
V - Knowledge of context Multiple settings embedded – school, district, state Students and families – local community Historical, philosophical, cultural foundations of education
VI - Knowledge of self Personal values Dispositions Strengths/weaknesses Educational philosophy Goals for students Purposes for teaching

Additionally, teachers completed a written reflection chart to share the knowledge used to make each adaptation. These charts were completed within one week of the observation. The knowledge in the reflection chart was coded separately from the

knowledge shared in the interview. Knowledge codes from the interviews and knowledge codes from the teacher reflection sheets were compared. This information revealed whether or not the two teachers shared more understanding of the knowledge they used to adapt with independent reflection time.

Case study comparisons for knowledge. I repeated the previous analysis for the knowledge teachers used to adapt for Case Study 2. I compared Case Study 1 to Case Study 2. I listed knowledge categories for Case Study 1 and compared the knowledge categories to Case Study 2. I looked for consistencies and differences among the two teachers in the knowledge used to adapt.

Answering the Central Research Question

The central research question for the study was: Are the number of adaptations and rationales and the quality of adaptations and rationales tied to the number of categories of knowledge a teacher draws upon?

After establishing the knowledge the teachers used to adapt, the types of adaptations and rationales and the quality of the adaptations and rationales used, I looked for patterns in each case study separately. To do this, I listed all the adaptations and the quality ratings, all the rationales and the quality ratings, and the knowledge teachers said they used and grouped them to see if some areas were used more frequently than others. I did this for Case Study 1 and Case Study 2 separately. I then compared the adaptations and quality ratings from Case Study 1 to Case Study 2, the rationales and quality ratings from Case Study 1 to Case study 2, and the knowledge from Case Study 1 to Case Study

2. I looked for a common pattern between the adaptations, rationales, and knowledge categories.

Tasks

As noted in Chapter I, I did not ask a research question about tasks. However, it was necessary to establish that the two teachers implemented the same tasks because previous research has linked the openness of the task to the number and level of adaptations (Parsons, 2008a). Since the two teachers planned together, it was assumed that the tasks they implemented would be similar. The task rubric was used to document the similarity in the tasks the two teachers used. Tasks were rated using the tasks rubric (Parsons, 2008b). The task rubric is listed in Appendix D and contains five categories; authenticity, collaboration, challenge, student directed and sustained. This rubric was used in the past by the thoughtfully adaptive research team. Spearman's Rho was previously used to determine the inter-rater reliability of the task rubric across 30 ratings. The results indicated an inter-rater reliability of .832, which establishes high reliability in using the rubric to rate the openness of tasks (used by Parsons and Scales in their individual dissertations).

Validity

Issues of trustworthiness have been widely reviewed through Guba's (1981) four constructs; credibility, transferability, dependability, and confirmability. Credibility was achieved through triangulation of adaptations with observations, collection of lesson plans, and interviews. Knowledge and rationales were collected in two ways; through interviews and teacher self reflection. Members of the research team agreed on all codes

with three member checks on adaptations and rationales and two member checks on knowledge categories.

Transferability continues to be developed through the multiple case studies that have been conducted with the thoughtfully adaptive research team. This study is the ninth study in a collaborative case study effort to understand teachers' thoughtful adaptations. It is the third conducted by me. As we continue to gain an understanding of how multiple teachers adapt their instruction across multiple cases, we can collaboratively say how this information transfers to various situations.

Dependability was achieved in this study through the multiple ways in which the data collection is described. This is further indicated in the research crosswalk (see Table 8), as well as the triangulation of the data collected to answer the research questions.

Confirmability was achieved through by preventing bias in coding. All codes for adaptations and rationales were coded with one other member and checked by a third member of the research team. Codes for knowledge were coded with one other team member simultaneously. I confirmed adaptations with the teachers and the rationales and knowledge teachers used were determined by teachers own responses. These data collection and coding methods were steps taken to ensure that the results were free of bias.

Limitations

The limitations of this study involved time. Project based learning and open tasks, usually involve multiple days of student interaction and work. I was only able to observe twice a week and may have missed some significant aspects of lessons.

Table 8. Research Crosswalk

	Observations: Note adaptations Qualitative notes	Post-lesson interviews of adaptations, rationales, and knowledge.	Teacher self-report of rationales and knowledge through teacher reflection and recording sheets	Lesson Plans
Are the number and type of adaptations and rationales and the quality of adaptations and rationales tied to the number and type of categories of knowledge a teacher draws upon?	X Identify adaptations	X Categorize adaptations/rate quality Categorize rationales/rate quality Categorize knowledge Compare Ms. Johnson to Ms. Dawson	X Categorize knowledge in reflection sheet Categorize rationales/rate quality in reflection sheets Compare rationale and knowledge in recording sheets to teacher post-lesson interview responses Compare Ms. Johnson to Ms. Dawson	X Compare lesson plans to what actually happens to identify adaptations
How many, what types and what quality are the adaptations and rationales?	X Identify adaptations	X Categorize adaptations/rate quality Categorize rationales/rate quality Compare Ms. Johnson to MS. Dawson	X Categorize rationales and quality in reflection sheets Compare rationales and quality from teacher post-lesson interview responses to rationales and quality in recording sheets Compare Ms. Johnson to Ms. Dawson	X Compare lesson plans to what actually happens to identify adaptations
What categories of knowledge and how much knowledge does the teacher report drawing upon?		X Categorize knowledge Compare Ms. Johnson to Ms. Dawson	X Categorize the knowledge used to adapt from self-report Compare to the knowledge teachers say they use in the self-report to post-lesson interviews Compare knowledge used Ms. Johnson and Ms. Dawson	

Additionally, one teacher taught a combination class of first-grade and second-grade students. I made sure to include only first-grade students and lessons as part of this study. Yet, this context was somewhat different from the other first-grade only room and influenced the curriculum and planning of the two teachers in the study.

Conclusion

The previous studies on thoughtfully adaptive teaching have provided good insight into the adaptations and rationales teachers use when teaching. My pilot study gave some indication that one of these teachers uses adaptations, rationales, and knowledge more broadly than the other. Looking at the categories of knowledge, adaptations, and rationales these two teachers use, reveals more about how they adapt in their classrooms. Understanding the two teachers' knowledge used to adapt will help us move toward working with preservice teachers to become thoughtfully adaptive.

CHAPTER III

RESULTS

Introduction

The purpose of the study was to explore the knowledge two teachers' used to adapt instruction. Two case studies were conducted of two first-grade teachers that included 40 observations, post-lesson interviews, teacher reflection sheets, and collection of lesson plans. This data was collected to discover more about the two teachers' adaptations and rationales, the quality of both, and the knowledge the teachers drew upon to make those adaptations. The research questions for the study were:

- Are the number and type of adaptations and rationales and the quality of adaptations and rationales tied to the number and type of categories of knowledge a teacher draws upon?
 - How many, what types and what quality are the adaptations and rationales of the two teachers?
 - What categories of knowledge and how much knowledge does each teacher report drawing upon?

Case Study 1

Ms. Johnson Adaptations, Rationales, and Quality Ratings (Sub Question 1)

The sub questions for the study needed to be answered in order to answer the central research question. The first sub question for the study was: How many, what types and what quality are the adaptations and rationales?

Ms. Johnson Adaptations

Across the eleven weeks and 20 observations, Ms. Johnson adapted 59 times. On average she adapted 2.95 times per lesson. The majority of the time, 38 times, or 64%, she used an adaptation that “invented an example, analogy or metaphor.” An example of Ms. Johnson adapting in this way was when she was reading, *Frogs* (Gibbons, 1994), to the class. The non-fiction book said that frogs can jump ten times their body length. The teacher stopped reading and asked the students, “Can you jump 10 times your body length? That would be like standing right here (next to the front of the room) and jumping all the way across the room. Can you do that?” The students responded in unison, “No.”

The second most common code that Ms. Johnson used was “omits/inserts planned activity or assignment,” with eight, or 14% of the adaptations in this area. An example of this kind of adaptation was during a lesson on life cycles. The teacher had four pictures on the overhead of human development for the human life cycle to review. She had a student come to the overhead and choose which one came first in the cycle. The student pointed to the picture of the adults/parents, which was incorrect. Then she said, “How about between these two?” (the baby and the toddler). He still looked a little confused so

she said, “Take away the ones (pictures) that don’t come first.” At this point the student was able to take away every picture except the one that showed the first step in the human life cycle.

The third most common code Ms. Johnson used in adapting was “change means by which objectives are met,” with 6, or 10% of the adaptations in this category. An example of this kind of adaptation was used during a read-aloud. While reading the book *Sarah Morton’s Day* (Waters, 1989), the teacher stopped reading after a few pages and reviewed the text by saying, “Let’s go back and think of all the things she has done so far.” The students named—got dressed, cooked, fed chickens, and milked the cow. The teacher said, “These are all things she has to do in the morning.”

Ms. Johnson also “inserted a mini lesson” four times and “suggested a different perspective” three times, but did not use “modifies lesson objective” or “changes planned order of instruction” at all during the 20 observations.

Ms. Johnson quality of adaptations. The adaptations were rated on the quality of the thought required for the teacher to make the adaptation. The majority of the 59 adaptations, 43 or 73%, were coded as requiring minimal thought. Of the adaptations in the minimal thought category, 33 were in the adaptation category of “invents examples, analogy, or metaphor.” The previous example where the teacher discussed frogs jumping 10 times their body length was coded as the adaptation “invents examples, analogy or metaphor” with a quality rating of minimal thought. Fifteen, or 25% of the adaptations were rated in the thoughtful category. The most common adaptation that was rated thoughtful was also “invents example, analogy, or metaphor” with five. An example of a

thoughtful rated adaptation was when the teacher was doing a lesson on wetlands and habitats. When discussing the pond as a habitat, the teacher mentioned that there was a pond that they saw every day, the retention pond. She told them that it was manmade to catch the runoff from the parking lot. The class took a walk during the recess period to look at the retention pond. This adaptation was coded as “invents example, analogy, or metaphor” and the quality rating was thoughtful.

Only one, or 2% of the 59 adaptations, was rated as requiring considerable thought. This adaptation was coded as “inserts a mini lesson.” The one adaptation that was rated with considerable thought quality was coded as a “mini lesson.” In the lesson the teacher wanted the students to come up with qualities of a good president. The students had a little bit of difficulty with this and she said, “What would be a good personality trait? Close your eyes for a minute, think about somebody who you would like to grow up and be like and is always doing the right thing.” Then she told them to, “think of somebody else who is not doing the right thing. What are the qualities of that person that you admire?” After this, several students named people from the community. A student named police and the teacher wrote “someone who follows laws” on the chart, a student named ambulance and she wrote “people who are sick are taken care of,” someone said fireman and she wrote “someone who keeps us safe.” Table 9 shows the adaptations and quality ratings for Ms. Johnson.

Table 9. Ms. Johnson Adaptations and Quality Ratings

	#	Considerable	Thoughtful	Minimal
Modifies lesson objective	0	0	0	0
Changes means by which objectives are met (e.g., materials, strategy, activity, assignment, procedures or routines)	6	0	3	3
Invents examples, analogy, or metaphor	38	0	5	33
Inserts mini-lesson	4	1	3	0
Suggests different perspective to students	3	0	0	3
Omits/inserts planned activity or assignment	8	0	4	4
Changes planned order of instruction	0	0	0	0
Total	59	1	15	43

The table shows the adaptations that Ms. Johnson used across the 20 observations. It shows the most commonly used category as “invents, example, analogy or metaphor.” The table also shows that the majority of the adaptations were rated as requiring minimal thought.

Ms. Johnson Rationales during Post-Lesson Interviews

Across the 20 observations of Ms. Johnson, she provided 58 post-lesson rationales for the adaptations to her instruction. Ms. Johnson’s most common rationale was, “challenge or elaborate” with 18 responses, or 31%, in this category. An example of this type of rationale was when the teacher discussed the retention pond and took the students outside to see it at recess. She said:

The retention pond has created a habitat for the Canadian geese and the ducks and the turtles and the frogs and all the other animals now. But there I am, again, trying to teach globally. I want the students to pay attention to what's going on around them. Think about what you see and why it's there. If I can't develop their appreciation or get them to appreciate the world around them I think I'm not doing my job.

The second most common post-lesson rationale Ms. Johnson used was “objective not met” with 13 responses, or 22%. After the adaptation, when the teacher helped the student discover the first step in the human life cycle, she shared a rationale that was coded as “objective not met.” The following was her response to the reason she adapted in that way.

Actually I was kind of surprised that Alexander (pseudonym) didn't know the answer immediately; that he would have chosen the parents. So then I thought, well you know, I need to make sure that he understands what I'm asking him to do so I'll make him focus on the two younger pictures first and then choose between those two. Developmentally these kids... maybe he's not able to look at all four. Maybe he was looking at the one. Those parent pictures were darker and it made me wonder if he was able to distinguish between the four pictures. So I wanted to narrow it down to two.

The third most common category used by Ms. Johnson was “to help students make a connection” with 12 responses, or 21%. For example, when the teacher discussed the frogs jumping ten times their body length, her rationale was coded “to help students make a connection.” She said:

I thought I'd give them something concrete to hold on to. Ten times a frog's length to them is meaningless but when you put it in perspective to be all about them. They're very consumed with themselves. If I can attach it to their body, then it makes their understanding higher and it also is more meaningful and they're more apt to listen to how astounding that actually is. Ten times the body length is pretty amazing that they can jump that far.

Other categories of rationales that Ms. Johnson provided were “anticipating upcoming difficulty” with six responses or 10%, “uses knowledge of student(s) or classroom dynamics to alter instruction” with four responses or 7%, “checking student understanding” with four responses or 7%, and “to teach a specific strategy or skill” with one response or 2%. The categories of “to manage behavior,” “to manage time” and “to promote student engagement” were not used at all during the interview responses to rationales.

Ms. Johnson Rationales Reflection

The reflection sheets were used to gather teachers’ rationales after the interview in order to give the teachers more time to provide other thoughts. Across the 20 observations, Ms. Johnson provided 59 reflective rationales for adapting her instruction. This was one more rationale than in the interview. The difference in numbers can be attributed to uncodable or missing data. Additionally, Ms. Johnson responded differently on some of the reflection sheets than she did in the interview. There were nine times out of the 59 adaptations that she offered rationales in the post-lesson interview and gave a different response on the reflection sheet.

The most common category of reflective rationales provided by Ms. Johnson on the reflection sheets was “challenge or elaborate” with 20 responses in this category, or 34%. An example of this type of rationale used in the reflection sheet was when the teacher was doing a lesson on habitats. Ms. Johnson discussed with students that salt water fish have to live in salt water and pond fish or fresh water fish have to live in fresh

water. During the adaptation a student said, “So a shark can’t live in a pond.” The teacher agreed and said that she wanted them to know that:

You can’t take something out of water and move it to another type of water. The chemicals from tap water would kill the tadpoles or fish. They aren’t choosing to live there so we have to put a solution in the water to take out the chemicals.

Her rationale from the reflection sheet read:

I am trying to foster the importance of preserving animals’ habitats during our study. I am quite certain that most of my students see “water” as the same without regard to the source from which it comes.

The second most common reflective rationale provided by Ms. Johnson was “to help students make connections” with 14 responses, or 24%. For example, when the teacher discussed the retention pond and took the students outside to the retention pond during recess, her rationale was coded as “to help students make a connection” from the reflection sheet. Her rationale response for this adaptation from the interview, discussed in the previous paragraph, was coded as “to challenge or elaborate.” On the reflection sheet, Ms. Johnson wrote:

I wanted to teach the students that some ponds are “natural” and some have been created to help our environments because of habitats that have been destroyed due to man. I wanted to let the students look at the retention pond as quickly as possible to make the connection to a concrete object—the retention pond—in an effort to make a student to the world connection.

Again, this rationale was coded as “to help students make a connection.”

The third most common reflective rationale that Ms. Johnson gave was “objective not met” with eight responses, or 14% in this category. After the adaptation where the student had difficulty sequencing the cards of the human life cycle she wrote:

I really thought this would be a very easy sequence to identify. However, when the student showed confusion I wanted to make the decision easier for him in an effort to be successful.

This was the same code given to her interview response for this adaptation.

Ms. Johnson also offered several other reflective rationales including, “checking student understanding” with 5 responses or 9%, “anticipation of upcoming difficulty” with 4 responses or 7%, “to teach a specific strategy or skill” with 4 responses or 7%, “uses knowledge of student(s) or classroom dynamics to alter instruction” with 2 responses or 3%, “to manage behavior” with one response or 2%, and “to promote student engagement” with one response or 2%. Ms. Johnson did not use the rationale category “to manage time.” Overall, only minor differences emerged between Ms. Johnson’s post interview rationale and reflective rationale categories.

Ms. Johnson quality of rationales. Quality ratings were assigned to the rationale post-lesson interview responses and the reflection sheet responses for each teacher. Ms. Johnson shared 58 rationales during the post-lesson interview for the adaptations. The majority of the rationales, 33 or 57%, were coded as minimal thought. The most common minimal thought rationales in the post-lesson interviews were in category A “objective not met” with 9 in this category. For example, a minimal thought “objective not met” was

when the teacher adapted by explaining the difference between syllables and symbols.

Her rationale from the interview was:

I thought that would be fairly easy for them and I knew that we were going to eventually have to define them but I never realized that they would confuse the word symbols with syllables. I did it because I needed to clarify that misinformation.

This post-lesson interview rationale was coded as requiring minimal thought.

Twenty-six of the 58 rationales in the post-lesson interviews were rated as thoughtful. The most common post-lesson interview rationales in the thoughtful rationale category were in the category of “challenge or elaborate.” For example, a thoughtful rationale in the post-lesson interview was when the teacher shared her rationale for discussing the retention pond. She said:

I was trying to teach globally. Pay attention to what’s going on around you. Think about what you see and why it’s there. If I can’t develop their appreciation or get them to appreciate the world around them I think I’m not doing my job.

Ms. Johnson had no post-lesson interview rationales rated in the “considerably thoughtful” category.

The rationales were also rated on the teacher reflection sheets. Ms. Johnson had 59 rationales that were rated from the reflection sheets. The majority of the reflective rationales, 47 or 80% were coded in the minimal thought category. The most common rationale category rated as “minimal” on the reflection sheet was “challenge or elaborate” with 10 responses. A minimal thought “challenge or elaborate” on the reflection sheet was when Ms. Johnson adapted by asking the students why the pilgrims left England

during a lesson on Thanksgiving. The students had difficulty coming up with the answer and the teacher shared that, “They didn’t want to go to the King of England’s Church. That’s called persecution. They were being persecuted because they wanted to go to their own church.” Her reflection rationale for this adaptation was, “I wanted the students to understand the history behind the Pilgrims wanting to come to America.”

There were 11 rationales rated as thoughtful quality for Ms. Johnson in the reflection sheets. The most common category in the thoughtful ratings was also “challenge or elaborate” with six responses. A thoughtful rationale on the reflection sheets for this category was shared in the previous paragraph when the teacher was discussing her rationale for talking with the students about the retention pond. Ms. Johnson had only one rationale rated in the “considerably thoughtful” category on the reflection sheet. This rationale was also in the category of “challenge or elaborate.” This adaptation occurred during a lesson on rules and laws. A portion of a read-aloud book discussed Rosa Parks and the bus boycott. A student didn’t understand what happened to Rosa Parks and the teacher explained that, “rules have not always been fair. In history rules haven’t been fair for African Americans but also for women.” Her rationale on the reflection sheet said:

I wanted the students to understand how difficult it is to create laws and how things are in constant change. I think it’s important for students to realize that laws have been unfair not only because of color but also gender.

The quality ratings of rationales for Ms. Johnson show a difference between the post interview rationales and reflective rationales (see Table 10). There were twice as many thoughtful rationales in the post-lesson interviews as in the reflection sheets.

Table 10. Ms. Johnson Rationales and Quality Ratings for Interviews and Reflections

Rationales	Interviews	C	T	M	Reflections	C	T	M
A - Objective not met	13	0	5	9	8	0	1	7
B – Challenge /Elaborate	18	0	10	8	20	1	6	13
C - To teach a specific strategy or skill	1	0	1	0	4	0	1	3
D - To help students make connections	12	0	5	7	14	0	2	12
E - Uses knowledge of student(s) or classroom dynamics to alter instruction	4	0	2	2	2	0	0	2
G - Checking student understanding	4	0	2	2	5	0	1	4
H - Anticipation of upcoming difficulty	6	0	1	5	4	0	0	4
I – To manage behavior	0	0	0	0	1	0	0	1
J - To manage time	0	0	0	0	0	0	0	0
K - To promote student engagement	0	0	0	0	1	0	0	1
Total	58	0	26	33	59	1	11	47

The table shows the rationales provided by Ms. Johnson during the post-lesson interview and on the reflection sheets. The table shows that her most commonly used category was “to challenge or elaborate.” The table also shows that the majority of the rationales were rated as requiring minimal thought. Yet, the post-lesson interviews had more thoughtful rating than the reflections for Ms. Johnson.

Ms. Johnson Knowledge

The second sub question for the study was: What categories of knowledge and how much knowledge does the teacher report drawing upon? Teachers were interviewed immediately following the observations about the adaptations and the knowledge they used to adapt. The interviews were tape recorded and transcribed.

Ms. Johnson Knowledge from Post-Lesson Interviews

Ms. Johnson responded to the knowledge used to adapt 62 times during the post-lesson interview. Across the 20 observations, Ms. Johnson said she used the “knowledge of learners and learning” 23 times or 37%. For example, when Ms. Johnson helped the student who had a difficult time sequencing the human life cycle cards, she said that she used “knowledge of learners and learning.” She said:

You want every child to feel successful and Alexander (pseudonym) is kind of fragile. Well, all of them are, but he’s a little immature anyway so I always want him to feel successful. I know that he’s got the ability but if you ask a child a question and they can’t get it, then I feel like it’s our responsibility to rephrase it or maybe like I said, if it’s too much for him to look at, at one time, to narrow it down for him just so he can come up with the right answer. You don’t always just give them one chance to answer. Give them multiple chances until they’re successful. It’s my job to rephrase it a different way.

Ms. Johnson’s second most common category of knowledge was “knowledge of general pedagogy” with 12, or 19%, responses in this category. For example, when the students were confused about the difference between the words syllable and symbol, the teacher explained her knowledge as “knowledge of general pedagogy.” She said:

Listen closely because it took a second response, an incorrect response for me to link to what the first one had said and then I saw the pattern. They couldn’t say

syllable but they were defining what syllables were. So I think that you have to listen closely to their responses. I could have just as easily said, no and said what a symbol is but I think we need to try to figure out what they're talking about as teachers and then clarify that misconception.

Ms. Johnson's third most common category of knowledge was "knowledge of content" with 11 responses, or 18% in this category. To demonstrate, Ms. Johnson referred to "knowledge of content" in the adaptation about frogs jumping ten times their body length. She explained her knowledge in this way:

Try to link things especially when you're talking about animals. They've actually watched people jump. They have a good understanding of how far, how long jumps can be and just try to link it to that knowledge if you really want them to understand the characteristics of whatever you happen to be studying about, whether it's emotions or physical traits or whatever.

Ms. Johnson's three lowest categories of knowledge were "knowledge of self" with 7 responses or 11%, "knowledge of context" with 5 responses or 8%, and "knowledge of curriculum" with 4 responses, or 7%.

Ms. Johnson Knowledge from Reflections

To give teachers more time for reflection and thought, teachers also shared the knowledge they used for adapting their instruction on teacher reflection sheets within one week of the observation. Ms. Johnson responded on the reflection sheets that she used knowledge 63 times, one more time than in the interview. In some instances Ms. Johnson shared multiple kinds of knowledge used to make an adaptation, which is why the total number of knowledge used is different in the interview responses. Across the 20 observations of Ms. Johnson, she said that she used "knowledge of learners and learning"

35 times, or 56% on the reflection sheet. The second most common category of knowledge that Ms. Johnson said she used in the reflection sheet was “knowledge of general pedagogy” with 12, or 19% responses. The third most common category of knowledge that Ms. Johnson used in her reflections was “knowledge of content” with seven responses or 11%. Examples of these same three categories were given in the previous paragraph. The three lowest categories of knowledge in the reflection of Ms. Johnson were “knowledge of context” with four responses or 6%, “knowledge of self” with three responses or 5%, and “knowledge of curriculum” with two responses or 3%. The following tables show the responses from Ms. Johnson about the knowledge she used to adapt in the interview and on the reflection sheets.

Table 11. Ms. Johnson Knowledge Comparison Interviews/Reflections

	Ms. Johnson Interview	Ms. Johnson Reflection
I - Knowledge of content	11	7
II - Knowledge of learners and learning	23	35
III- Knowledge of general pedagogy	12	12
IV - Knowledge of curriculum	4	2
V - Knowledge of context	5	4
VI - Knowledge of self	7	3
Total	62	63

The table shows that there was little difference in the way Ms. Johnson responded to the knowledge used to adapt in the post-lesson interview and in the reflection. It also

shows that Category II is the most commonly used category in the interview and in the reflection.

Figure 1 shows the comparison of the knowledge responses for Ms. Johnson in the post-lesson interviews and in the reflections. This graph shows the same information as the previous table, but in a different format. Again, Category II, “knowledge of learners and learning” was the most commonly used category by Ms. Johnson in the interviews and the reflections.

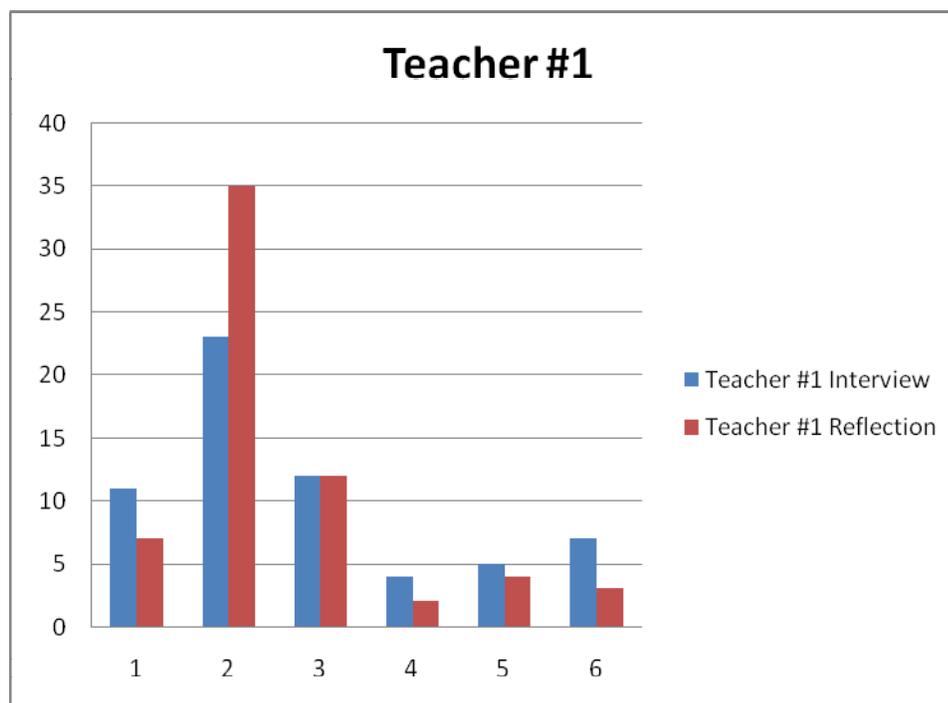


Figure 1. Ms. Johnson Bar Graph: Knowledge in Interviews and Reflections

***Ms. Johnson Comparison of Adaptations, Rationales, and Quality Ratings to
Knowledge***

Ms. Johnson used five of seven categories of adaptations with 64% of the adaptations in one category, “invents examples, analogy, or metaphor.” The next most commonly used category of adaptations was “omits/inserts planned activity or assignment” with 14% of the time. These two categories account for 78% of the adaptations that Ms. Johnson used. The majority, 73% of the adaptations, were rated as requiring minimal thought. There were fifteen adaptations that were rated as thoughtful and one that was rated as requiring considerable thought. Together, these two categories show that Ms. Johnson used thoughtful or used considerable thought in adapting 27% of the time.

She used seven of ten categories of rationales for the adaptations in the post-lesson interview. She had three categories that had similar use, “challenge or elaborate” 31% of the time, “objective not met” 22% of the time and “to help students make connections” 21% of the time. This covers 74% of her rationales in the post-lesson interviews. Ms. Johnson had little difference in the rationale categories used in the reflection. She used nine of the ten categories for rationales in her reflections. Similar to the post-lesson interview rationale responses, she used “challenge or elaborate” 34% of the time, “to help students make connections” 24% of the time, and “objective not met” 14% of the time. This covers 72% of her reflection responses with the same rationales as the post-lesson interviews.

There was a difference in the quality of the rationales in the post-lesson interviews and the reflection sheets. During the post-lesson interviews, Ms. Johnson had a thoughtful rating on 26, or 45% of her rationales. There were 33 or 57% of the rationales in the minimal thought rating during the post-lesson interview responses. In the reflection sheets, Ms. Johnson had 11 thoughtful and one considerable thought, or 20% of her rationales in these categories. For the reflection sheets, 47 or 78% of the rationales were rated as requiring minimal thought. The post-lesson interviews revealed a difference in the way Ms. Johnson responded to the rationales for adapting; post-lesson interview responses for rationales tended to be more thoughtfully rated than her reflection sheets.

Ms. Johnson used all of the six categories of knowledge when describing her knowledge used to make adaptations during instruction in the post-lesson interviews. She said that she used three categories the most; “knowledge of learners and learning” 37% of the time, “knowledge of general pedagogy” 19% of the time, and “knowledge of content” 18% of the time. These three categories account for 74% of the categories of knowledge that she says she used in the post-lesson interviews. On the reflection sheets, Ms. Johnson also used all of the six categories of knowledge. The same three categories were used the most; “knowledge of learners and learning” 56% of the time, “knowledge of general pedagogy” 19% of the time, and “knowledge of content” 11% of the time. These three categories account for 75% of the knowledge responses Ms. Johnson gave in her reflections. There is little difference in the way Ms. Johnson responded in the post-lesson interview and on the reflection sheets for the knowledge used to adapt.

Conclusion Case Study 1

The results show that Ms. Johnson uses a few types of adaptations often. She relies on similar rationales for most of her adaptations and relies on similar types of knowledge for most of the adaptations. She uses all the knowledge categories while using the majority of the adaptation and rationale categories. The overall quality of her adaptations and rationales is relatively low. The only exception is when Ms. Johnson responds orally to the rationales for adapting, when her quality is much higher. The categories Ms. Johnson used all seem to be focused on students. When Ms. Johnson used the adaptation category of “invents example, analogy, or metaphor,” she gave rationales to “challenge or elaborate” and said that her knowledge was of “learners and learning.”

Case Study 2

Ms. Dawson Adaptations and Rationales

The sub questions for the study needed to be answered in order to answer the central research question. The first sub question for the study was: How many, what types, and what quality are the adaptations and rationales?

Ms. Dawson Adaptations

Across the 11 weeks and 20 observations, Ms. Dawson adapted her instruction 41 times. On average she adapted 2.05 times per lesson. The most common adaptation that Ms. Dawson used was “invents example, analogy, or metaphor” with 21 or 51%, of the adaptations in this category. An example of this type of adaptations was during a lesson on Veterans Day. Ms. Dawson discussed the military with the students during the lesson. The students were confused about the meaning of the word military. The teacher called

the students over to the computer to show them some clip art of soldiers. She said that these people go out and fight for our country and protect us.

The second most common code that Ms. Dawson used was “changes means by which objectives are met” with 14 or 34%, adaptations in this category. An example of this type of adaptation was during a read-aloud. While reading the big book, *Tadpole to Frog* (Moore & Tryon, 1991), a student noticed that the story was repetitive and had the words “on my grandpa’s farm” on each page. So the teacher said that she would read the beginning of each page and see if they could finish it since the story was repetitive. Then she read and paused for students to fill in the repeating portions at the end of each page.

The third most common adaptation used was “suggests different perspective to students” with only three or 7%, of the adaptations in this category. An example of this type of adaptation was during a lesson on wants and needs. During the lesson a student suggested a mom as a need. The teacher said, “Some people might have a mom or have a dad that takes care of them or grandparents.”

She used each of the following categories once during the 20 observations; “inserts a mini lesson,” “omits/inserts planned activity or assignment,” and “changes planned order of instruction.” Ms. Dawson did not use “modifies lesson objective” at all during the observed lessons.

Ms. Dawson quality of adaptations. The adaptations for Ms. Dawson were rated for the thoughtfulness of the adaptation. There were 41 adaptations identified for Ms. Dawson. The majority of the adaptations, 35 or 85%, were coded as requiring minimal thought. Of the adaptations in the minimal thought category, 17 were in the adaptation

category of “invents examples, analogy, or metaphor.” For example, during a lesson on rules and laws the teacher discussed the meaning of respect. She said that she showed respect for the lunchroom that day by picking up trash around their table and cleaning up after the students.

There were five, or 12%, adaptations that were rated in the thoughtful category. The most common adaptation rated thoughtful was also “invents examples, analogy, or metaphor” with three. For example, the adaptation mentioned above when the teacher shared clip art pictures of soldiers on the computer was rated as thoughtful. Only one or 2% of the 41 adaptations was rated as requiring considerable thought. This adaptation was also coded as “invents examples, analogy, or metaphor.” This adaptation occurred during a lesson on symbols. When discussing the meaning of the word symbol the teacher put several symbols on the board and discussed each one (Aa, +, =, a peace sign,!). Then she said that a symbol is a mark or sign that means something. Table 12 shows the adaptations and quality ratings for Ms. Dawson.

Table 12. Ms. Dawson Adaptations and Quality Ratings

	#	Minimal	Thoughtful	Considerable
Modifies lesson objective	0	0	0	0
Changes means by which objectives are met (e.g., materials, strategy, activity, assignment, procedures or routines)	14	0	1	13
Invents examples, analogy, or metaphor	21	1	3	17
Inserts mini-lesson	1	0	1	0
Suggests different perspective to students	3	0	0	3
Omits/inserts planned activity or assignment	1	0	0	1
Changes planned order of instruction	1	0	0	1
Total	41	1	5	35

The table displays the data for Ms. Dawson's adaptations. It shows that her most commonly used adaptation was "invents examples, analogy, or metaphor." It also shows that the majority of the adaptations were rated as requiring minimal thought.

Ms. Dawson Rationales during Post-Lesson Interviews

The teachers shared the reasons they adapted during post-lesson interviews. Across the 20 observations of Ms. Dawson, she provided 41 rationales for adapting her instruction in the post-lesson interviews. Ms. Dawson's most common category of post-lesson interview rationales was "to help students make a connection" with 18 responses, or 44%. In the adaptation where Ms. Dawson shared with the students that she picked up trash and food in the cafeteria to show respect, she provided a rationale that was coded "to help students make connections." The following is Ms. Dawson's post-lesson interview rationale for this adaptation:

I felt a need to do it because there was lots of trash left around and first of all, the students know better. I just felt like that was a good time to give an example of showing respect for our school.

The second most common rationale that Ms. Dawson gave for adapting her instruction in the post-lesson interviews was "objective not met" with 11 responses, or 27%. For instance, when Ms. Dawson adapted by showing the students examples of various symbols on the board her rationale was coded "objective not met." In the post-lesson interview she said, "They were confused about the terminology of symbols. In order for them to understand it, I wanted to try the pictures so they could make that connection."

The third and fourth most common rationale Ms. Dawson gave during the post-lesson interviews were “challenge or elaborate” with four responses or 10% and “check student understanding” with four responses, or 10%. For example, “challenge or elaborate” was used as a code during a lesson on wants and needs. The teacher prompted a discussion on all the ways we use water. The students suggested several uses of water including, a bath, to drink, to stay hydrated, and to wash hands. To explain why she did this, Ms. Dawson gave this rationale that was coded “challenge or elaborate.”

I hadn't planned on doing that but I wanted that to come up, that water is something that everybody needs and I was trying to guide them into thinking . . . knowing what we use water for. Some people just take a lot of these things for granted and we shouldn't.

An example of “check student understanding” was when the teacher was doing a lesson on habitats and had the students get in a line to share one place that animals live as part of the closure for the lesson. This was not in the lesson plan. Her post-lesson interview rationale for doing this adaptation was:

Originally they were going to share the pictures from their flip book but we ran out of time. So I wanted to make sure that they could tell me a place where the animals lived. I felt like that was just a quick ticket out the door.

Ms. Dawson also used several other categories of rationales in the post-lesson interview responses; “uses knowledge of student(s) or classroom dynamics to alter instruction” with two responses or 5%, “to manage time” with one response or 2%, and “to promote student engagement” with one response or 2%. Three categories were not

used at all in the post-lesson interview rationale responses; “to teach a specific strategy or skill,” “anticipation of upcoming difficulty” and “to manage behavior.”

Ms. Dawson Rationales from Reflections

On the reflection sheets, Ms. Dawson responded to the rationales 40 times, one less than in the interview. The differences in numbers can be attributed to uncodeable or missing data. The most common category of rationales that Ms. Dawson provided in the reflection sheets was, “to help students make connections” with 17 responses, or 43%. This was the same as her most common category in the interview. In responding to the adaptation on showing respect in the lunchroom Ms. Dawson’s written reflection said:

I did this because the opportunity was there for me to discuss respect. I was able to give the children an example of respecting property. This was a great opportunity to reinforce that word.

The second most common category of reflective rationales was “objective not met” with 11 responses, or 28%. This category was also the second most common in the post-lesson interviews. In the reflection, Ms. Dawson referred to the adaptation where she gave examples of symbols by writing or drawing some on the board. She said, “The children did not understand what a symbol meant. Therefore, I felt it necessary to draw symbols so that students could make a connection of symbols and their representations.”

The third most common reflective rationale that Ms. Dawson provided was “challenge or elaborate” with four responses, or 10%. For the adaptation where Ms. Dawson discussed the uses of water, her reflection was also coded as “challenge or

elaborate.” She wrote, “I did this because I wanted students to see the importance of water and how it is certainly a need.”

Several other categories were used as reflective rationales for adapting instruction; “checking student understanding” with three responses or 5%, “uses knowledge of student(s) or classroom dynamics to alter instruction” with two responses or 5%, “to promote student engagement” with two responses or 5%, and “to manage time” with one response. Ms. Dawson did not use several categories; “to teach a specific strategy or skill,” “anticipation of upcoming difficulty,” and “to manage behavior.” Overall, only minor differences emerged between Ms. Dawson’s post-lesson interview rationales and her reflective rationales.

Ms. Dawson quality ratings for rationales. The quality ratings were assigned to the rationales for the post-lesson interview responses and the reflection sheet responses for Ms. Dawson. Ms. Dawson shared 41 rationales during the post-lesson interviews for the adaptations. The majority of the rationales for the post-lesson interviews, 35 or 85%, were coded as minimal thought. The most common minimal thought adaptations in the post-lesson interviews were in category D “to help students make connections,” with 17 in this category. When providing the example of showing respect in the lunchroom, the teacher’s rationale was coded as requiring minimal thought. There were six rationales rated in the thoughtful category for the post-lesson interviews. The most common adaptations in the thoughtful rationale category were in the rationale category of “objective not met.” The rationale that Ms. Dawson provided for the adaptations of

drawing symbols on the board was rated as thoughtful. Ms. Dawson had no rationales rated in the “considerably thoughtful” category for the post-lesson interviews.

The rationales were also rated on the teacher reflection sheets. Ms. Dawson had 40 rationales that were rated from the reflection sheets. The majority of the rationales from the reflection sheets, 32 or 80%, were coded in the “minimal thought” category. The most common reflective rationale category used in the minimal thought quality rating was “to help students make connections.” Ms. Dawson’s response in the reflection about the discussion on respect in the lunchroom was also coded as requiring minimal thought. There were eight adaptations rated as thoughtful quality for Ms. Dawson in the reflection sheets. The most common category in the thoughtful ratings was also “to help students make a connection” with five responses. For example, when Ms. Dawson was reading a story during a lesson on the election, she discussed the governor of the state and the mayor of the city. In reflection rationale she wrote:

I had not planned on doing this. However, I wanted students to understand that we have a governor of (the state) as well as a mayor of (the city). In case students hear this information in another class or at home maybe they will be able to make a connection.

Ms. Dawson had no rationales rated in the “considerably thoughtful” category from the reflection sheets. Overall, Ms. Dawson had minor difference between the quality ratings for the rationales from the post-lesson interviews and the reflections. Table 13 shows the rationales and quality ratings for Ms. Dawson from the post-lesson interviews and the reflection sheets.

Table 13. Ms. Dawson Rationale and Quality Ratings for Interviews and Reflections

Rationales	Interviews	C	T	M	Reflections	C	T	M
A Objective not met	11	0	4	7	11	0	2	9
B Challenge /Elaborate	4	0	0	4	4	0	0	4
C To teach a specific strategy or skill	0	0	0	0	0	0	0	0
D To help students make connections	18	0	1	17	17	0	5	12
E Uses knowledge of student(s) or classroom dynamics to alter instruction	2	0	0	2	2	0	0	2
G Checking student understanding	4	0	1	3	3	0	0	3
H Anticipation of upcoming difficulty	0	0	0	0	0	0	0	0
I To manage behavior	0	0	0	0	0	0	0	0
J To manage time	1	0	0	1	1	0	0	1
K To promote student engagement	1	0	0	1	2	0	1	1
Total	41	0	6	35	40	0	8	32

The table shows the rationales for Ms. Dawson from the post-lesson interviews and the reflections. It shows that “to help students make connections” was the most commonly used category by Ms. Dawson. The majority of the quality ratings were rated as minimal thought.

Ms. Dawson Knowledge

The second sub question for the study was: What categories of knowledge and how much knowledge does the teacher report drawing upon? Teachers were interviewed

immediately following the observations about the adaptations and the knowledge they used to adapt. The interviews were tape recorded and transcribed.

Ms. Dawson Knowledge from Post-Lesson Interviews

Ms. Dawson responded to the knowledge used to adapt 41 times during the post-lesson interview. Across the 20 interviews of Ms. Dawson she said that she used the “knowledge of learners and learning” 30 times, or 73%. During a lesson on wetland habitats, the teacher discussed an alligator egg looking similar to eggs we buy in the grocery store. To share her knowledge used to make this adaptation she said:

Sometimes you have to take information that you know and relate it; like yourself to situations or events. I tried to relate the egg to life at home; things they see at home to make it easier for them to understand.

The second most common knowledge category that Ms. Dawson said that she used in the post-lesson interview was, “knowledge of content” and “knowledge of general pedagogy” with each having three responses, or 7% each. For example, “knowledge of content” was used as a code when discussing an adaptation like the one where the student noticed that the story was repetitive on each page saying, “on my grandpa’s farm.” The teacher allowed the students to fill in the repetitive portions of the rest of the book as she read. The knowledge she said she used for this was:

In our guided reading groups we’ve been talking about things like that . . . about rhyme or repetition; how things are repeated. I just thought it would just be a good time to reemphasize it.

“Knowledge of general pedagogy” was used as the code for the adaptation where she had students line up to tell one place that animals live as a ticket out the door. Her response to the knowledge she used was:

Flexibility is the key and I wanted to just come up with something real quick to make sure they understood it and I felt like getting in line and having them go back to their seats was a way that they could tell me real quick and I knew that they understood where the animals lived.

The three categories mentioned the least in the post-lesson interviews were, “knowledge of context” with two responses or 5%, “knowledge of self” with two responses or 5% and “knowledge of curriculum” with one response or 2% of the time.

Ms. Dawson Knowledge from Reflections

Ms. Dawson also responded to the knowledge she used to adapt on a reflection page. Across the 20 reflection sheets from the observations, Ms. Dawson responded 40 times, one less than in the interviews. The most common knowledge category that Ms. Dawson said she used to make an adaptation in the reflection was “knowledge of learners and learning” with 27 responses, or 68%. For example, when the teacher compared the alligator egg to eggs we buy at the grocery store her knowledge was coded as “knowledge of learners and learning.” She wrote:

In order for students to gain an understanding of a skill or content area you need to allow students an opportunity to make connections. In this case, I wanted students to make a connection from eggs in the grocery store to alligator eggs.”

The second most common category Ms. Dawson said she used in the reflections to adapt was, “knowledge of general pedagogy” with five responses, or 13%. For

example, when the teacher used the ticket out the door and had students line up to tell one place that animals live, she said her knowledge was in this category. She said, “I knew that I wanted the children to understand the objective. One way to do this was to have them state it orally. We call this “ticket out the door.”

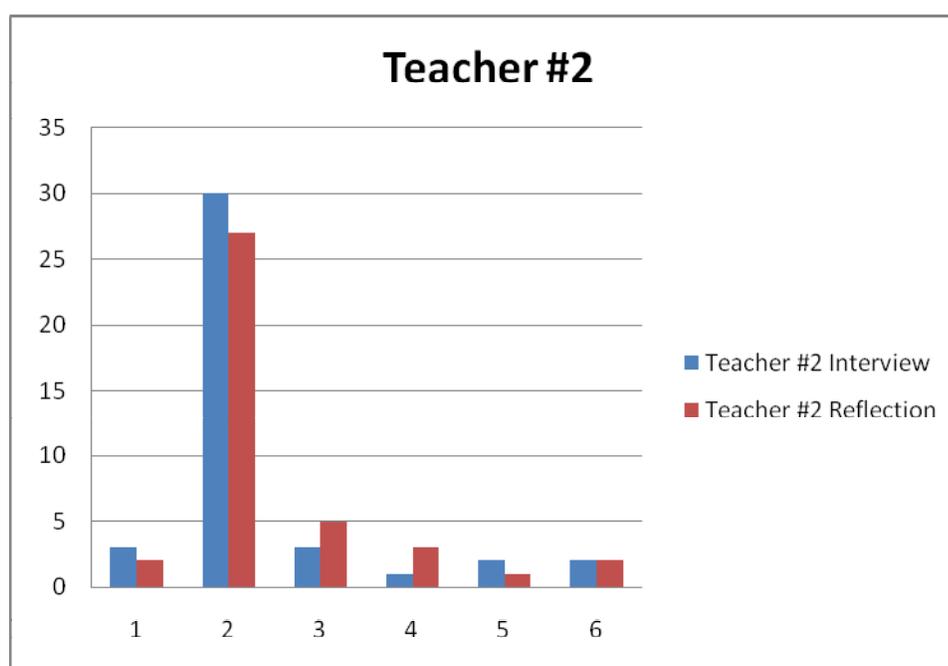
Ms. Dawson’s third most common knowledge category that she said she used in the reflection was “knowledge of curriculum” with three responses, or 8%. For example, during the lesson on rules and laws, the teacher gave several examples of cause and effect and related it to rules and consequences. To discuss her knowledge she wrote on the reflection sheet, “Any time you can integrate a content area of study, do this. It once again helps students to make connections and better understand through prior knowledge.”

The three categories that Ms. Dawson said that she used the least in the reflections were “knowledge of content” with two responses or 5%, “knowledge of self” with two responses or 5%, and “knowledge of context” with one response or 3%. Table 14 and Figure 2 show the knowledge Ms. Dawson said she used in the interviews and in the reflections.

Table 14 and Figure 2 show the comparison of the knowledge Ms. Dawson used to adapt in her responses in the post-lesson interviews and in the reflection sheets. Both had the most commonly used category of knowledge as “knowledge of learners and learning.”

Table 14: Ms. Dawson Knowledge Comparison Interviews/Reflections

	Ms. Dawson Interview	Ms. Dawson Reflection
I – Knowledge of content	3	2
II – Knowledge of learners and learning	30	27
III – Knowledge of general pedagogy	3	5
IV – Knowledge of curriculum	1	3
V – Knowledge of context	2	1
VI – Knowledge of self	2	2
Total	41	40

**Figure 2. Ms. Dawson Bar Graph: Knowledge in Interviews and Reflections**

The above table and figure show that there was little difference in the way Ms. Dawson responded in the interview than in the reflection. They show that category 2 “knowledge of learners and learning” was the most common type of knowledge that Ms. Dawson said she used to adapt.

Ms. Dawson Comparison of Adaptations, Rationales, and Knowledge

Ms. Dawson used six of seven categories of adaptations with 51% of the adaptations in one category, “invents examples, analogy, or metaphor.” The next most commonly used category of adaptations was “changes means by which objective was met” with 34% of the time. These two categories account for 85% of the adaptations that Ms. Dawson used. The majority, 85% of the adaptations, were rated as requiring minimal thought. There were five adaptations that were rated as thoughtful and one that was rated as requiring considerable thought. Together, these two categories show that Ms. Dawson used thoughtful or considerable thought in adapting 15% of the time.

Ms. Dawson used seven of ten categories of rationales for the adaptations in the post-lesson interview. She had two categories that had similar use, “to help students make a connection” 44% of the time and “objective not met” 27% of the time. This covers 71% of her rationales in the post-lesson interviews. Ms. Dawson had little difference in the rationale categories used in the reflection. She also used seven of the ten categories for rationales in her reflections. Similar to the post-lesson interview rationale responses, she used “to help students make a connection” 43% of the time and “objective not met” 28% of the time. This covers 71% of the reflective rationales with the same rationales as the post-lesson interviews.

There was little difference in the quality of the rationales in the post-lesson interview and the reflection sheets. During the post-lesson interviews, Ms. Dawson had a thoughtful rating on 6 or 15% of her rationales. There were 35, or 85%, of the rationales in the minimal thought rating. In the reflection sheets, Ms. Dawson had 8 thoughtful, or

20% of her rationales in these categories. For the reflection sheets, 32 or 80% of the rationales were rated as requiring minimal thought. Ms. Dawson used all of the six categories of knowledge when describing her knowledge used to make adaptations during instruction in the post-lesson interviews. She said that she used one category the most, “knowledge of learners and learning” 73% of the time. On the reflection sheets, Ms. Johnson also used all of the six categories of knowledge. The same category was used the most, “knowledge of learners and learning” 68% of the time. There is little difference in the way Ms. Dawson responded in the post-lesson interview and on the reflection sheets for the knowledge used to adapt.

Ms. Dawson used categories of adaptations, rationales, and knowledge that seem to be related to one another. The adaptation category of “invents example, analogy, or metaphor” is related to the rationale category of “to help students make a connection.” So, she helps students make a connection by providing an example, analogy or metaphor. The knowledge category of learners and learning seems connected to the other two categories as well. While trying to help students make a connection she provides an example with her knowledge of learners and learning. All of these categories seem to have students as the focus of adaptive teaching.

Conclusion Case Study 2

The results show that Ms. Dawson uses a few types of adaptations often. She relies on similar rationales for most of her adaptations and relies on similar knowledge for most of the adaptations. She uses all the knowledge categories while using the

majority of the adaptation and rationale categories. The overall quality of her adaptations and rationales was low.

Comparison of Case Study 1 to Case Study 2

Comparison of Adaptations

Across the 40 observations of the two teachers there were 100 adaptations identified. Some minor differences were revealed in the way the two teachers adapted. Ms. Johnson adapted 59 times or an average of 2.95 times per lesson over the 20 observations. Ms. Dawson adapted 41 times or 2.05 times per lesson over the course of the 20 observations. They also adapted differently in the other categories. Ms. Johnson had eight adaptations in “Omits/inserts planned activity or assignment.” She also had six adaptations in “change means by which objective is met.” Ms. Johnson had less than four adaptations in all other categories. Ms. Dawson had more adaptations (14) in “change means by which objective is met” and very few in the other categories (less than 3).

Although the two teachers adapted in a variety of ways, some categories were used more than others. The most common adaptations used were “invents example, analogy, or metaphor” with 59 of the adaptations in this category. Ms. Johnson had 38 in this category and Ms. Dawson had 21. Neither teacher used the first category of adaptations, “modifies lesson objective.” Ms. Johnson used five of the seven categories while Ms. Dawson used six of the seven categories. The quality of the adaptations for the two teachers was also similar. Both had the majority of their adaptations rated as requiring minimal thought and a relatively low number of thoughtful adaptations. Ms. Johnson had 27% of her adaptations rated as thoughtful or considerable and Ms. Dawson

had 15% of her adaptations rated as thoughtful or considerable. Each teacher had only one adaptation that was rated as requiring considerable thought. Table 15 shows the number of adaptations in each category for each of the two teachers.

Table 15. *Teacher Comparison Adaptations*

	Ms. Johnson	Ms. Dawson
Modifies lesson objective	0	0
Changes means by which objectives are met (e.g., materials, strategy, activity, assignment, procedures or routines)	6	14
Invents examples, analogy, or metaphor	38	21
Inserts mini-lesson	4	1
Suggests different perspective to students	3	3
Omits/inserts planned activity or assignment	8	1
Changes planned order of instruction	0	1
Total	59	41

Table 15 shows the comparison of the adaptations that Teacher # 1 and Ms. Dawson used. Both had the most common category as “invents examples, analogy, or metaphor.”

The bar graph in Figure 3 shows the adaptations that the two teachers used. Both used category 3, “invents examples, analogy or metephor” the most. Ms. Johnson appears to use this category even more than Ms. Dawson, but there are little other differences noted.

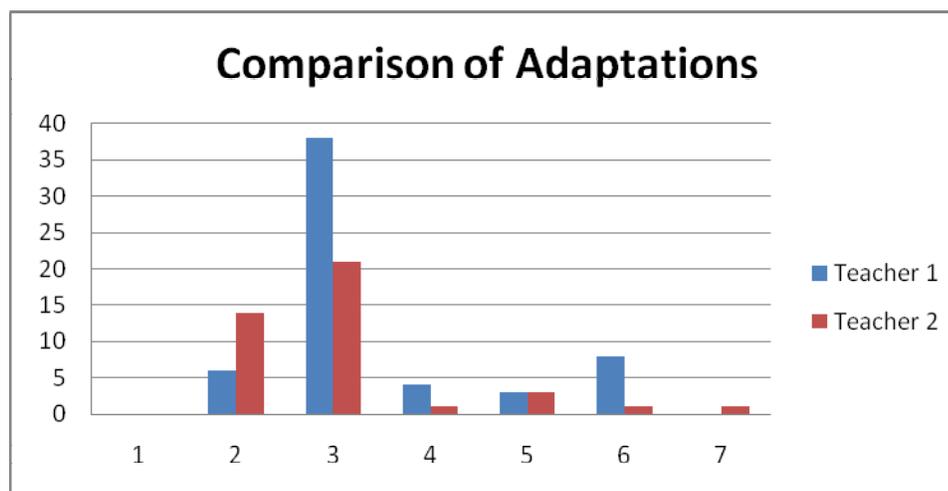


Figure 3. Bar Graph of Ms. Johnson and Ms. Dawson Adaptations

Table 16 shows the quality ratings of the adaptations between Ms. Johnson and Ms. Dawson. Both have the majority of their adaptations rated as requiring minimal thought. Ms. Johnson uses slightly more thoughtful adaptations than Ms. Dawson.

Table 16. Comparison of Adaptation Quality Ratings

	Considerable	Thoughtful	Minimal
Ms. Johnson	1	15	43
Ms. Dawson	1	5	35

Comparison of Rationales

Across the 40 observations there were 100 adaptations identified. For the 100 adaptations there were also an average of 100 rationales provided. Some differences that emerged included a gap in the category “challenge or elaborate.” Although both teachers had this category in the top three of their categories, Ms. Johnson had it as her most commonly used category with an average of 19 times used and Ms. Dawson had it as her

third most commonly used category with only four times used across the 20 observations. Additionally, Ms. Johnson provided rationales in category C, “to teach a specific strategy or skill” three times while Ms. Dawson did not use this category at all. Again, Ms. Johnson used category H “anticipation of upcoming difficulty” five times while Ms. Dawson did not use this category at all. The final difference in the two teachers’ rationales was in the quality of the rationale ratings. Ms. Johnson had more thoughtful rationales during the post-lesson interviews than in the reflections with 45% thoughtful rationales in the post-lesson interviews and only 20 % in the reflections. Ms. Dawson had similar level of thoughtfulness in the post-lesson interview and the reflections with 15% thoughtful ratings in the post-lesson interview and 20% in the reflections.

Some similarities between the two teachers also emerged in the rationales they offered. Both teachers used the categories of rationales similarly. Ms. Johnson provided rationales in the post-lesson interviews from seven out of ten categories and nine out of ten categories in the reflections. Ms. Dawson provided rationales from seven of the ten rationale categories in the post-lesson interview and in the reflections. Ms. Johnson and Ms. Dawson both had rationale category A “objective not met,” category D “to help students make connections,” and category B “challenge or elaborate” as the three highest used categories. Both used category G “check student understanding” an average of four times. Both used categories I “to manage behavior,” category J “to manage time,” and category K “to promote student engagement” one time or less each. They also had similar use of category E “uses knowledge of student(s) or classroom dynamics to alter instruction” with Ms. Johnson using it three times and Ms. Dawson using it two times.

Table 17 shows the average rationales for Ms. Johnson and Ms. Dawson. The table shows the rationales that Ms. Johnson and Ms. Dawson gave in response to the adaptations they used during instruction. It shows that Teacher #1 used “to challenge and elaborate” the most, while Ms. Dawson used “to help students make a connection” the most. Figure 4 shows the same information for Ms. Johnson and Ms. Dawson in their use of rationales.

Table 17. Teacher Comparison Rationales

	Ms. Johnson	Ms. Dawson
A Objective not met	11	11
B Challenge /Elaborate	19	4
C To teach a specific strategy or skill	3	0
D To help students make connections	13	18
E Uses knowledge of student(s) or classroom dynamics to alter instruction	3	2
G Checking student understanding	4	4
H Anticipation of upcoming difficulty	5	0
I To manage behavior	.5	0
J To manage time	0	1
K To promote student engagement	.5	1
Total	59	41

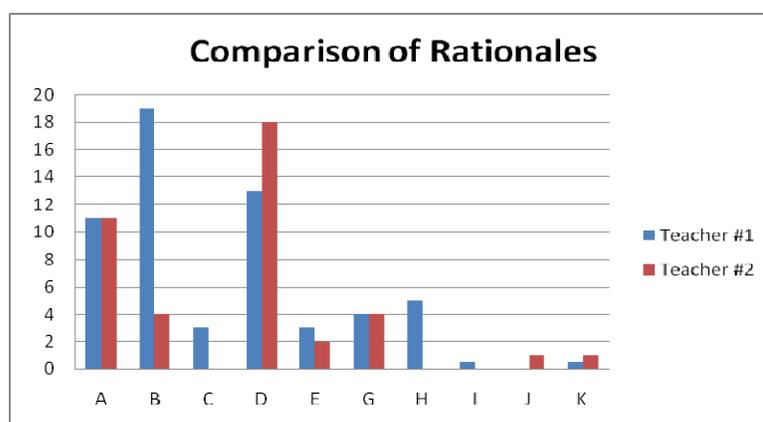


Figure 4. Bar Graph: Teacher Comparison of Rationales

Table 18 displays the quality of the rationales the two teachers used. The majority of the rationales were rated as requiring minimal thought. Ms. Johnson used a larger amount of thoughtful adaptations than Ms. Dawson in the post-lesson interviews.

Table 18. Comparison Quality of Rationales

	Rationales Post-lesson Interviews			Rationales Reflections		
	Considerable	Thoughtful	Minimal	Considerable	Thoughtful	Minimal
Ms. Johnson	0	26	33	1	11	47
Ms. Dawson	0	6	35	0	8	32

Comparison of Knowledge

Across the 40 observations the two teachers shared the knowledge they used to adapt instruction in post-lesson interviews and on reflection sheets. The teachers responded 104 times with a type of knowledge they used to make an adaptation. There were some minor differences that emerged. Ms. Johnson used “knowledge of content” nine times and “knowledge of general pedagogy” 12 times. Ms. Johnson used the other categories less than six times each. Some adaptations had multiple codes if a teacher shared more than one type of knowledge used to adapt. Ms. Johnson had seven instances where she shared more than one type of knowledge that she used to adapt. Ms. Dawson had one instance where she shared more than one type of knowledge to adapt.

Both teachers used all six of the categories when discussing knowledge in the post-lesson interview and in the reflections. Both teachers used “knowledge of learners and learning” as their most common category. There was little difference in the way that

both teachers shared in the post-lesson interviews and in the reflections. Table 19 and Figure 5 show the comparison of the two teachers' average use of knowledge.

Table 19: Teacher Comparison of Knowledge

	Ms. Johnson	Ms. Dawson
I Knowledge of content	9	2
II Knowledge of learners and learning	29	29
III Knowledge of general pedagogy	12	4
IV Knowledge of curriculum	3	2
V Knowledge of context	5	2
VI Knowledge of self	5	2
Total	63	41

Table 19 shows the comparison of the knowledge used to adapt for Ms. Johnson and Ms. Dawson. On average Ms. Johnson and Ms. Dawson use the category “knowledge of learners and learning” the most. Figure 5 shows the comparison of the two teachers' knowledge used to adapt. The chart shows little difference between the two teachers.

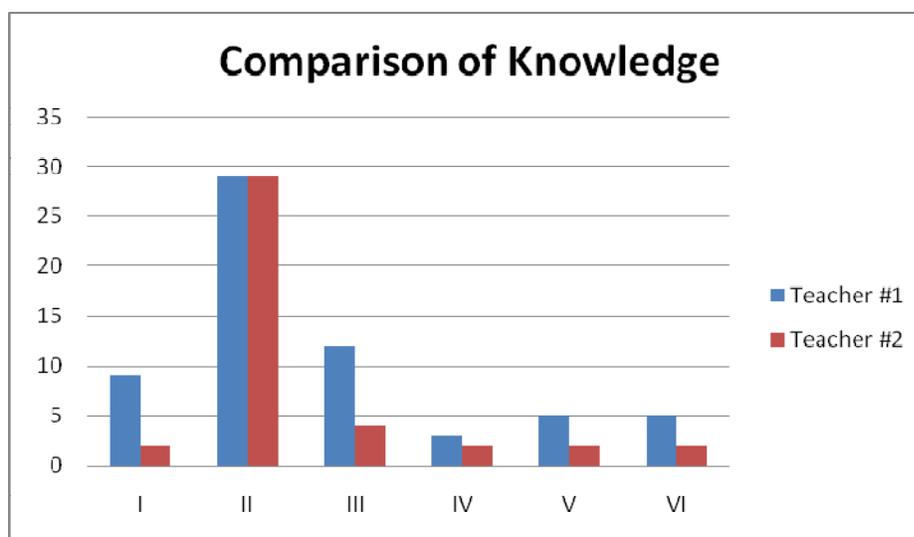


Figure 5. Bar Graph: Teacher Comparison of Knowledge

Comparison of Tasks

Tasks were rated to document that both teachers used similar task in the study. The two teachers planned together and implemented the same lesson plans. Rating tasks allowed me to focus on knowledge rather than the differences in the tasks the two teachers were implementing. In 39 of the 40 observations, the tasks for both teachers were rated as closed. Essentially there was no difference in the way the teachers used tasks. Task use was documented to show no differences but the expectation that science and social studies would generate more open tasks did not occur. Table 20 shows the openness of the tasks for Ms. Johnson and Ms. Dawson.

Table 20. *Tasks Ratings*

	Ms. Johnson	Ms. Dawson	Total
Closed	20	19	39
Moderately Open	0	1	1
Open	0	0	0
Total	20	20	40

The table shows the overall task ratings of the two teachers. All tasks were rated as closed except one.

Table 21 shows the individual observations and comparisons of tasks for the two teachers. Again, the chart shows that both teachers' tasks were rated as closed for the majority of the tasks.

Table 21. Task Ratings for Individual Observations

	Ms. Johnson	Ms. Dawson
Observation 1	5	5
Observation 2	7	0
Observation 3	8	8
Observation 4	7	4
Observation 5	5	4
Observation 6	6	6
Observation 7	0	0
Observation 8	8	9
Observation 9	6	7
Observation 10	5	6
Observation 11	4	4
Observation 12	7	7
Observation 13	6	6
Observation 14	7	0
Observation 15	6	6
Observation 16	5	5
Observation 17	5	4
Observation 18	5	5
Observation 19	0	0
Observation 20	6	6
Total	108	92

Table 21 shows the task rating for each of the teachers for each observation.

There was little difference between the two teachers' use of tasks.

Summary of Results

The central research question for the study was: Are the number and type of adaptations and rationales and the quality of adaptations and rationales tied to the number and type of categories of knowledge a teacher draws upon? The results from the study show that both teachers' use of adaptations, rationales, and knowledge categories are related to one another. They rely heavily on one category of adaptations, "invents example, analogy, or metaphor," two categories of rationales, "challenge or elaborate" or "to help students make a connection," and one category of knowledge, "knowledge of learners and learning." All of these categories seem to be connected to students. Additionally, the majority of the adaptations and rationales were rated as requiring minimal thought. The only exception was that Ms. Johnson had nearly half of her rationales in the post-lesson interviews rated as thoughtful, while only six of Ms. Dawson's post-lesson interview rationales were rated as thoughtful. All other categories of adaptations and rationales were rated as requiring minimal thought. The tasks rated also showed little difference between the two teachers. All the tasks except one were rated as closed. Closed tasks may be related to the minimal thought in the adaptations and in the rationales. Parsons' (2008a) research showed a relationship between open task and thoughtful adaptations and rationales. The same relationship between thoughtfulness and adaptations and rationales emerged in this study. The adaptations, "invents example, analogy, or metaphor" may also require less thought. The categories of adaptations, rationales and knowledge that the two teachers used to adapt seem to focus on students

and put all other areas of teacher knowledge in the background during in the moment adapting instruction.

CHAPTER IV

DISCUSSION

Introduction

Thoughtfully adaptive teaching occurs while teachers are instructing students. This study looks at how teachers use their knowledge to make adaptations during instruction.

Summary of the Study

Previous research on teachers' knowledge focuses on the knowledge of teaching as a whole rather than the knowledge teachers' use in the moment of making an adaptation. In this study, I examined the adaptations teachers made during instruction, the rationales they offered for adapting and the knowledge the teachers said they used to make these adaptations.

Two case studies were conducted over the course of eleven weeks and 40 observations. Two first-grade teachers were observed twice a week during science and social studies instruction. Observations allowed me to collect the adaptations the teachers made during instruction and to rate the tasks the teachers were using. The tasks were only used to document the differences among the tasks teachers implemented. In post-lesson interviews, I asked the teachers to confirm the adaptations, give rationales for why they adapted and explain the knowledge they drew upon to make the adaptation. In reflections teachers also responded with rationales and the type of knowledge they used to make the

adaptations. Adaptations were coded to reveal how the teachers adapted and the quality of each adaptation. The rationales were coded from the post-lesson interview and the reflections. The quality of each rationale was also rated to reveal the reasons the teachers adapted. Knowledge was coded and categorized to determine the categories of knowledge teachers relied upon to make adaptations during lessons.

Through this research, I found that the two teachers used certain categories of adaptations, rationales and knowledge more often than others. The categories of knowledge also seem to be related to the categories of adaptations and rationales in that they were all focused on students. Both teachers used categories of adapting, with the majority of the adaptations in the category “invents example, analogy, or metaphor.” The majority of the adaptations were rated as requiring minimal thought. The teachers had three rationale categories in their top three used: to help students make connections, objective not met, and to challenge or elaborate. These categories had small variation in the amount of use from the two teachers. Again the majority of the rationales were rated as requiring minimal thought. The only exception was that Ms. Johnson had nearly half of her rationales in the post-lesson interviews rated as thoughtful, while only six of Ms. Dawson’s post-lesson interview rationales were rated as thoughtful. All other categories of adaptations and rationales were rated as requiring minimal thought. The knowledge the teachers said they used had the majority of the knowledge categories in the “knowledge of learners and learning” category. Additionally, the tasks rated showed that the two teachers used the tasks in the same way in their classrooms. All the tasks except one were rated as closed.

Discussion of Findings

The specific categories of knowledge the teachers used give insight into the categories of adaptations and rationale categories. Therefore, the following discussion includes two major considerations. First, a discussion of the central research question reveals the implications for the number, types and relationship of adaptations, rationales, and knowledge the teachers said they used to adapt. Second, potentially different ways to think about the research question are discussed. These two considerations lead to suggestions for future research in thoughtfully adaptive teaching.

Central Question

The central question driving this research study was: Are the number and type of adaptations and rationales and the quality of adaptations and rationales tied to the number and type of categories of knowledge a teacher draws upon? As stated above, the categories that the two teachers used are related to one another, but not in the way that I anticipated. The teachers used categories of adaptations, rationales and knowledge that seem to put students at the foundation of their adaptive teaching. I thought that some differences in the teachers would reveal a relationship between higher level adaptations and the number of categories a teacher used in adaptations, rationales, and knowledge. However, the teachers used adaptations, rationales, and knowledge similarly.

There are two major explanations for the observed relationships in the knowledge, adaptation, and rationale categories. First, the data showed that the two teachers used adaptations that “create an example, analogy or metaphor” the most. Usually teachers gave the rationale “to help students make a connection” or “to challenge or elaborate”

when using this type of adaptation. Both make sense in that when teachers are providing an example, analogy or metaphor for the students, they are trying to help them make a connection to their own lives or to something they have already learned. Additionally, both teachers say that they used the “knowledge of learners and learning” the most. This also makes sense in that the teachers use what they know about young learners and what they know about particular students to make connections and give examples during the lessons. Since both teachers had the majority of their adaptations and rationales rated as requiring minimal thought, it could be that giving examples, analogies, or metaphors are quick responses to students and do not require a great deal of thought.

Another possible explanation for the narrow use of knowledge and the number of minimally thoughtful adaptations and rationales is the current state of education. The No Child Left Behind act (NCLB) has resulted in packaged deals that leave out professional decisions in many of America’s schools. Adaptations require the ability to make professional decisions in the moment. Packaged programs may be able to use knowledge of students in general and how average first-graders learn, yet are unable to accommodate the need to respond to students individual needs, make connections and provide examples that are unique to the students in that individual class. Only the teacher who has a relationship and knowledge about the students in her class can accommodate students with her knowledge of learners and learning. The teachers in this study were not forced to use this kind of scripted program but are working under the pressures of the current policy era. Ms. Johnson even mentioned that she used to use integrated units that incorporated the entire curriculum throughout the day. She said that she was unable to

continue those kinds of integrated units with the pressures and demands of the data driven school system. The school district they work in is driven by test scores and pressures to perform. This policy environment could explain the minimal thought used to make adaptations and the level of the tasks the teachers used in their classrooms.

In sum, there seems to be a logical progression from adaptations that provide an example, analogy, or metaphor to rationales for helping students make a connection to the knowledge of learners and learning. It may be natural for the knowledge teachers use when adapting to focus on students since the core of thoughtfully adaptive teaching is student learning. On the other hand, these types of adaptations may require minimal thought and result from the current state of educational policy in America.

Potential Different Ways to Think about this Research Question

The connections between the categories of knowledge and the categories of adaptations and rationales lead to potential ways for us to consider this research from other perspectives. Three possibilities are: (a) the focus of students as the primary source of knowledge the teachers used may give insight into the roots of adaptive teaching; (b) the methodological definitions may need to be reconsidered; and (c) there may be other ways to attain rich data on thoughtfully adaptive teaching.

How to Think Differently about the Narrow Range of Adaptations, Rationales, and Knowledge

Categories of knowledge of teaching as a whole were used to code (Grossman, 1995). The teachers used all six of Grossman's categories but relied on one in particular to adapt. "Knowledge of learners and learning" was the category of knowledge that was

used the most by both teachers in the study. I originally thought that there would be a broader distribution of the knowledge the teachers used to adapt. Yet, the data from these observations showed the majority in the “knowledge of learners and learning” category.

In addition to earlier explanations, there seem to be two additional explanations for the focus on this particular category of knowledge. One may be that the teachers had a narrow range of knowledge. They may not have as much understanding and knowledge in the other categories. Yet, on the other hand it may be possible that thoughtful adaptations at their core are focused on students. Thoughtfully adaptive teaching (TAT) is defined as a teacher action that (a) is non-routine, proactive, thoughtful, and improvisational; (b) includes a change in professional knowledge or practice; and (c) is done to meet the needs of a student or an instructional situation (Duffy et al., 2006). The third aspect of the TAT definition focuses on students and instructional situations. The knowledge teachers use to adapt may be more focused on students than we thought before.

Additionally, rationales as well as adaptations are focused on students. All but one rationale category, “to manage time,” have students as the focus. Because the teachers provided reasons for adapting that focused on students, it is also appropriate that the knowledge they draw upon is focused on students.

Since we know that the teachers use certain categories of adaptations, rationales, and knowledge more frequently than others, it may be more productive to study the categories used most rather than to encourage teachers to use a wider range of adaptations, rationales and knowledge. The particular categories used may be the most

appropriate ones to use for adapting instruction. Since the majority of the adaptations, rationales, and knowledge fell in one or two categories for both teachers, it may help to define those categories further. The adaptation category of “invents example, analogy, or metaphor” may be the most appropriate adaptation to make in most instructional situations. Are there certain types of examples that teachers use more? How can we teach other teachers to make these kinds of adaptations? The rationale categories of “to make connections for students” and “to challenge or elaborate” are the reasons teachers gave most frequently for adapting. Should we look closer at these categories? Are the connections for specific students or for the whole class? What ways do the teachers challenge the students? How do teachers develop their rationales for adapting? Are the rationales developed in the moment of teaching or are they developed over time? Finally, the knowledge category of “knowledge of learners and learning” was referred to the most as the type of knowledge the teachers used to adapt. How is the knowledge of learners and learning developed? Is this knowledge of specific students or of students in general? Is this knowledge static or fluid? The current coding systems for adaptations, rationales, and knowledge have helped determine the categories used the most. Now the current codes may need to be refined to take a closer look at the categories used rather than to encourage teachers to use a greater variety of categories.

Methodological Definitions

The methodological definitions of knowledge, tasks, and adaptations may be too narrow to fully understand how teachers use their knowledge to adapt instruction.

Considerations on how to broaden and develop these definitions further are discussed in the following sections.

Knowledge. The two teachers in the study used the categories of knowledge that Grossman (1995) suggested. While it may be appropriate that the teachers focused on students with the “knowledge of learners and learning” when adapting, there is also the possibility of other types of knowledge or sub categories of knowledge the teachers are using that were not captured in the study. Grossman’s “knowledge of self” was one category that the teachers rarely said they used. The way the interview questions and responses were worded may have driven teachers to focus on the students rather than their personal philosophies of teaching like in the “knowledge of self.” The personal practical knowledge that Connelly et al. (1997) describe may be tied to the “knowledge of self” and the “knowledge of learners and learning” described by Grossman (1995). The focus of personal practical knowledge is on teachers’ use of knowledge in everyday aspects of teaching. This type of knowledge is described as a more personal approach to understanding, which includes teachers’ past experiences, present interactions, future plans and reflections. Personal practical knowledge situates knowledge as a construct that teachers develop over a lifetime of experiences rather than information independent of learners. To capture other aspects of knowledge, such as the “knowledge of self,” the methods of data collection may need to be revisited. Adding an interview question focused on how the adaptation relates to teachers’ individual philosophies or visions might help us understand “knowledge of self” better. Additionally, “knowledge of self”

may be better captured when looking at multiple phases of instruction, including planning, the actual lesson, and reflection.

In sum, the teachers in the study said that they used the “knowledge of learners and learning” the most. While this focus on students may be the most logical knowledge used to make adaptations, there may also be more to fully understanding teacher’s knowledge in thoughtfully adaptive teaching. Asking teachers about their knowledge used to adapt in such a general way, may have revealed a shortcoming in other types of knowledge, such as the “knowledge of self.” Restructuring interview questions to specifically ask about the “knowledge of self” when adapting, may reveal a deeper understanding of other aspects of knowledge teachers use to adapt.

Tasks. The purpose for rating tasks was to document any difference in the teachers’ implementation of the tasks in their individual classrooms. However, the majority of the tasks over the course of the study were rated as closed. Rating the tasks was successful in this aspect. There was little difference among the two teachers in the way they implemented tasks with their students. However, the hope was to observe open tasks. I changed the context in the study from guided reading in the pilot to science and social studies with the assumption that these subject areas would involve literacy skills with more open tasks. Unfortunately, these two teachers used closed tasks for the majority of the lessons observed.

Parsons’ (2008a) research on tasks suggests that tasks may influence the quality of teachers’ adaptations. Two of his teachers with more open tasks, adapted at higher

levels and had higher level rationales. My study shows the other end of the spectrum; the teachers used low level tasks, had lower level adaptations and lower level rationales.

However, there is another possible explanation. Tasks were defined as any assignment in which students write. This definition is limiting for two reasons. Generally, first-grade students are able to write a few sentences, but paragraph level writing is required to receive the highest score on the rubric. Secondly, defining tasks with writing limits engagement and instructional strategies that are characteristic of other high quality instruction. The discovery of the weakness in the writing aspect of the rubric was discovered during data collection as teachers did not implement the types of tasks anticipated.

One way to revise the definition of tasks would be to review the task rubric when used with first-grade students and classrooms. There were instances during this study where lessons were rated with a 0 in the writing portion because students labeled drawings. Other instances occurred where the task was scored 1 because the students were required to write a sentence while paragraph level writing was required to receive the highest score on the rubric. Paragraph level writing with first semester first-grade students is not the norm. Some students are not writing sentences at all and some cannot write multiple sentences. Very few are writing paragraphs. Sometimes a drawing is even an appropriate way for first-grade students to express their writing. The writing portion of the rubric automatically hurts the score because most students are not writing at the paragraph level. The rubric fails to account for appropriate first-grade writing.

Quality of instruction may also be an issue to consider as we define tasks for future research with students in any grade. Throughout the study I saw lessons that were interactive and engaging yet were rated 0 on the task rubric because there was no written task for the day. For example, one lesson involved students playing a yes/no game to help students understand the concept of voting. Students each had a voting stick, one side said “yes” and the other side said “no.” Students listened to issues the teacher called out, such as “I wish I could fly” and moved to one side of the room or the other to show their vote with their voting stick. After students made their vote, they shared with each other why they voted the way they did. Another lesson involved students brainstorming a list of qualities they would like in a president. Students worked in groups to list and discuss the qualities before sharing with the whole group. Engaging learning strategies were taking place in both of these lessons. These lessons may not have been considered open tasks as we define it, yet we need to account for student engagement during instruction and other aspects of quality instruction. Interaction, hands on materials, and engagement are of utmost importance in learning for all students, not just students in lower grades. Again, the rubric fails to account for these aspects of instruction.

In sum, rating the tasks in this study showed no differences between the teachers in the way they used tasks. Even though the rubric shows that the two teachers used closed tasks for the majority of the lessons, there may be some definitional issues that account for this. The writing portion of the rubric is more appropriate for upper-grade students and does not account for the types of writing that first-grade students complete.

Additionally, quality of instruction could be developed further in the rubric to account for more engaging teaching strategies.

Adaptations. The teachers in this study appeared minimally thoughtfully, but the way data were collected may not fully show how thoughtful teachers were. Just the other day I asked Ms. Johnson for a copy of lesson plans as a sample for a course I was teaching. I knew that she would have the components I was requiring; objectives, essential questions, activating strategies, cognitive teaching strategies, and summarizing strategies for her lessons. Within a few minutes, she sent me her entire week of lesson plans via email. Her plans for one day were five pages long and included all the components that I required with ample detail. She is clearly thoughtful in her planning, yet the adaptations and rationales appear to require minimal thought.

In the past, thoughtfully adaptive team discussions have focused on adaptations that require considerable thought. One outstanding example used over and over again with the team has been a mini lesson adaptation from my pilot study. In the adaptation, the students in a guided reading group made predictions that involved the main character in the story as a boy. In actuality the main character was a girl with short hair that was wearing blue jeans. The teacher proceeded with a mini lesson to help the students discover the stereotype they made and the negative effects of making this a habit. While everyone agrees that this example is a high level adaptation, it is not the norm. It may be that most of the time good teachers plan in advance for deep themes and concepts rather than adapting on the fly. Even high level adaptations seem to be student cued within the lesson rather than something the teachers could have anticipated. Good teachers may

make small lower level adaptations more to respond to students needs but also avoid a deviation from the focus of the lesson. The teacher did not see stereotyping as a core issue or theme in the story, but there was an opportunity in which she made an adaptation. Doing an adaptation such as this too many times in the lesson would leave students unclear about the purpose of the lesson.

Additionally, the two teachers reflected on various occasions about how they would use the adaptations for future lessons and planning. The low level adaptations may be appropriate to respond to students in the moment and then plan for a deeper response in another lesson or at another time. For example, when the teacher described a retention pond to the students in the lesson she just gave a verbal illustration of the purpose of a retention pond. Yet, later during recess time, the class took a walk out to the fence on school grounds to look at the retention pond and the animals that lived there. Reflection for future planning may be another component of adaptations to reconsider for future research.

Consequently, we may need to reconsider how we define adaptations. For this study we have looked at adaptations in the moment of teaching. Yet, we may need to look at how teachers are taking these adaptations into future lessons, planning with these adaptations in mind, and reflecting about how they will use the adaptations with the students after the lessons.

How Do We Get Rich Data on Adaptations?

The study was situated during science and social studies instruction and added a new way to collect teachers' thoughts on reflection sheets. Neither of these hypotheses

yielded new understanding about thoughtfully adaptive teaching. Because these two new data collection techniques did not provide a deeper understanding about the knowledge used to adapt, it is time to consider intervening with teachers.

For this study, observations took place during science and social studies instruction with the assumption that the two teachers taught units that involved project-based instruction. Although the two teachers taught units that lasted a week or two, the tasks in the lessons were completed daily with no carry over from one day to the next. The purpose of using the task rubric to show that the two teachers used similarly rated tasks was successful. They both used closed tasks. However, the assumption that the tasks would be rated more open was not successful.

Post-lesson interviews and the reflections that I added supplemented the teachers' post-lesson rationales and knowledge used to adapt instruction. The reflections were added to this study to give teachers time for further reflection and to develop any ideas that they had about the reasons for adapting, the rationales, or the knowledge they drew upon to make the adaptation. The results showed that there was little difference between the interviews and the reflections in the compiled data. One minor difference noted was that Ms. Johnson was more thoughtful in post-lesson interviews than in the reflections. Her interviews were rated with nearly half the answers as thoughtful, while the reflections showed that the majority required minimal thought. Ms. Dawson had no difference between the quality ratings of the rationales with the majority of both in the minimal thought category. Despite this small difference, it seems that there is little evidence to support one data collection method over the other.

Intervene. The results from the study argue for an intervention to support teachers. Two possible interventions include (a) broadening the categories of adaptations, rationales and knowledge teachers use to adapt and (b) supporting teachers in building more open tasks to determine the relationship to the knowledge the teachers use to adapt. The first intervention includes assisting and training teachers in broadening their use of categories of adaptations, rationales, and knowledge used to adapt. The teachers in the study relied on very few categories of adaptations, rationales, and knowledge to adapt most of the time. Teachers may need support and understanding about how to approach problems within lessons in a variety of ways and use a larger variety of adaptations. Helping teachers develop a larger variety of adaptations may help them develop more rationales for making the adaptations. The teachers may need a deeper knowledge base in other categories of knowledge to use a greater variety of knowledge when adapting. Intervening with teachers to develop an understanding and use of other categories of adaptations, rationales and knowledge to adapt would help us understand if the categories used were the ones teachers use to adapt or if they were the only categories the teachers knew to use. After intervening, it would be interesting to see if teachers continued to rely on the same types of adaptations, rationales and knowledge to adapt.

Secondly, an intervention study training teachers to use open tasks would determine the influence on the categories used and thoughtfulness. Like Parsons' (2008a) research suggests, for two of four teachers the level of thoughtfulness might go up and the teachers may draw upon a larger variety of categories. Yet, there is also the

possibility of training teachers to use more open tasks and teachers using the same categories since adaptive teaching is a student centered approach.

Future Research

The future of thoughtfully adaptive research requires the team of thoughtfully adaptive researchers to come together to reexamine three issues. The team needs to discuss issues such as (a) appropriate tasks for various grade levels, (b) how we account for quality of instruction on the task rubric, and (c) key definitions for thoughtfully adaptive research. Because tasks have been rated in several studies, we must all come to an understanding of appropriate tasks at different grade levels. Specifically, writing at the K-2 level is quite different than writing expectations for the 3-5 level. Should there be a K-2 rubric and a 3-5 rubric? Is there a way to compose the rubric so that it works at all grade levels? Additionally, the task rubric and definition of tasks do not account for quality of instruction. Teachers in my study involved students in engaging lessons that did not have a written task. How can we define tasks to encompass quality instruction? Finally, the definition of thoughtfully adaptive teaching has focused on teachers in the moment decisions. Adaptations seem to span a broader spectrum that includes planning and reflection. Should we define adaptations that are in the moment differently than adaptations during planning and reflection?

My particular follow up research to this study would have four design changes: (a) a change in the task rubric to account for first-grade writing and quality instruction; (b) intervention to support teachers in creating open tasks; (c) collection of adaptations, rationales and teacher knowledge in planning units; and (d) collection of adaptations,

rationales, and knowledge in the reflection of daily lessons during the implementation of the units. The study would include a case study intervention with these same two teachers. These first-grade teachers could offer support in creating a task rubric appropriate for first-grade. The intervention would include instruction and support in planning of units that include open tasks. Three phases of data collection would take place. The first collection would take place in planning and would include teachers' adaptations, rationales, and knowledge used to make the adaptations. The second phase would involve the adaptations made during instruction with the students as we have collected in previous studies. Again, data collection would include adaptations, rationales and knowledge. The third phase would consist of reflection and adaptive changes to unit plans. For the third phase I would also collect adaptations, rationales, and knowledge. Teachers would share how they made reflective changes to their lessons based on understandings from each day of the unit. For example, something may happen during instruction that prompts a teacher to adapt her plan for the following day. Additional knowledge interview questions would be asked during each phase to determine the relationship of the teachers' "knowledge of self" to the adaptations they make.

Adaptations, rationales, and knowledge from phase 1, 2, and 3 would be compared to discover any differences about when certain kinds of adaptations, rationales, and knowledge are used. Tasks would be rated to see if the intervention support improves the tasks the teachers use. The three phases and the tasks for Ms. Johnson would be compared to the phases and tasks for Ms. Dawson. Two additional first-grade teachers would be added that do not participate in the intervention. Teachers that received

interventions would be compared to teachers that did not receive interventions in the tasks, adaptations, rationales, and knowledge used to adapt. The future research will open up the definitions of adaptations and tasks as well as develop a deeper understanding of adaptations, rationales, and knowledge teachers use to adapt.

Conclusion

The study of two first-grade teachers' use of knowledge to adapt revealed that the adaptations, rationales and knowledge the teachers said they used to adapt were all focused on students and were minimally thoughtful. In previous studies we have been seeking teachers who adapt in a variety of ways, yet the data from this study has brought us back to the roots of adaptive teaching – to be responsive with the students during instruction to meet their needs. Future studies with more open definitions of adaptive teaching, of tasks, and of knowledge will reveal a deeper understanding of the planning and reflection pieces of thoughtfully adaptive teaching.

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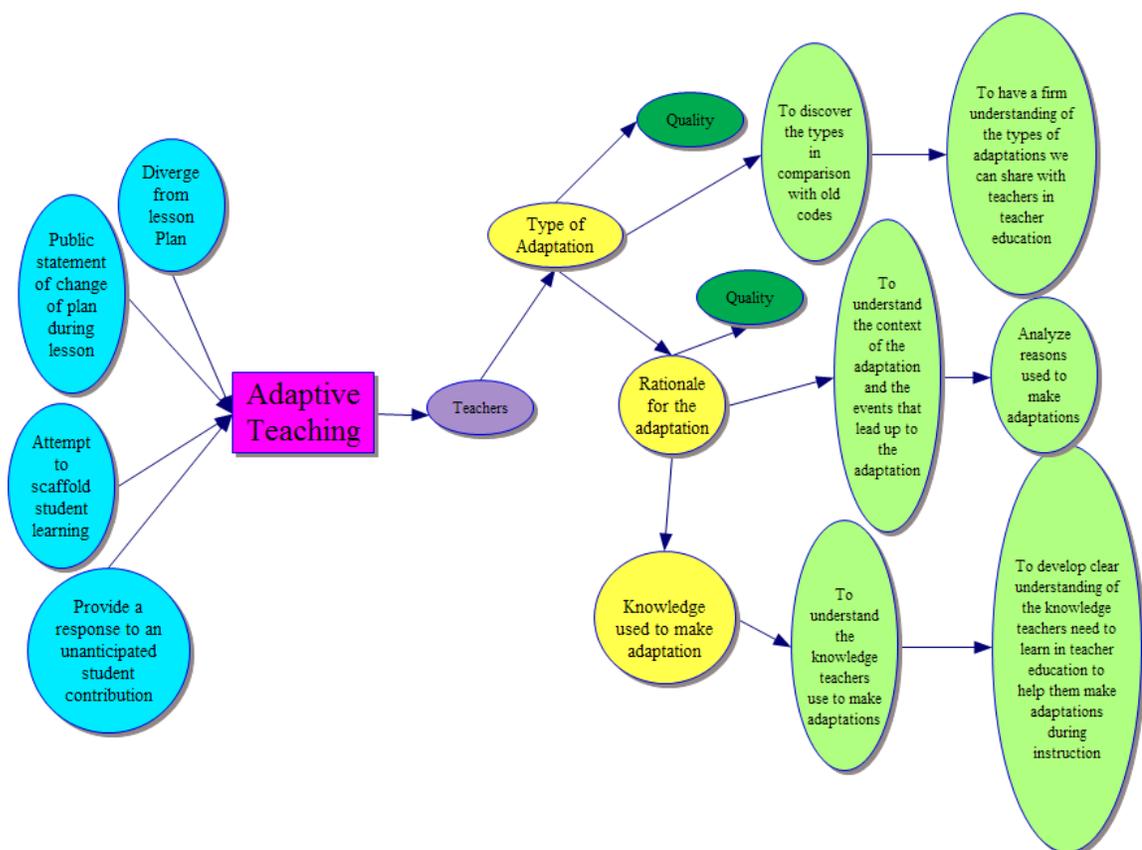
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Appendix A

Conceptual Framework



Appendix B
Quality Ratings

(Duffy et al., 2008)

Rubric for Rating Thoughtfulness of Adaptations and Rationales

Considerable Thoughtfulness (must meet both criteria)

- The teacher is showing exemplary or creative use of professional knowledge or practice
- The adaptation or rationale is clearly associated with a larger goal the teacher holds for literacy growth (i.e., the adaptation or rationale is motivated by a desire to develop a deep or broad understanding or a conceptual or attitudinal goal).

Medium

- Must be tied to the specific lesson objective or to a larger goal the teacher wants to develop
- Must not meet any of the criteria for “minimally thoughtful.”

Minimally Thoughtful

- The adaptation or rationale requires minimal thought
- The teacher’s use of professional knowledge or practice is fragmented, unclear, or incorrect
- The adaptation or rationale does not contribute to the development of either a larger goal or a specific lesson objective.

Appendix C
Observation Protocol

Teacher _____ Date _____

Adaptation	Running Field Notes

Appendix D

Task Rubric

(Parsons, 2008b)

Rubric for Rating Openness of Tasks

Date:

Describe the task and its product:

Authenticity (adapted from Duke et al., 2006/7)

- 1 – The task is limited to task that are completed primarily in school.
- 2 – The task mimics outside-of-school tasks, but has features of school-based activities.
- 3 – The task closely replicates tasks completed in day-to-day lives outside of school.

Collaboration (adapted from Miller & Meece, 1999)

- 1 – Students work alone on the task.
- 2 – Students collaborate minimally in the task.
- 3 – Students collaborate throughout the task.

Challenge (adapted from Miller & Meece)

- 1 – The task requires letter- or word-level writing.
- 2 – The task requires sentence-level writing.
- 3 – The task requires paragraph-level writing.

Student Directed

- 1 – The students have no input on the task.
- 2 – The students have input, but the choices have minimal influence on the task.
- 3 – Students have input into many substantial aspects of the task.

Sustained (adapted from Miller & Meece)

- 1 – The task takes place within one sitting.
 - 2 – The task takes place within one or two day.
 - 3 – The task spans over three or more days.
-

Appendix E
Interview Protocol

(First 2 Questions from Duffy et al., 2008)

Post-lesson Teacher Interview Questions

- When I saw you doing _____ during the lesson, was that a spontaneous change, something you had not planned? ADAPTATION

- If yes, why did you make that change? RATIONALES

- If you were trying to help another teacher, what kind of knowledge would you tell them to use? KNOWLEDGE

Appendix G

Approval from Seth Parsons to Use Task Rubric

Stephanie Davis has my permission to use the task rubric from my dissertation.

Seth Parsons
Assistant Professor
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