

**TEACHERS' THOUGHTS ABOUT THE USEFULNESS OF KNOWLEDGE
AND THEIR KNOWLEDGE USE**

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ABSTRACT

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This study explores how teachers think about the usefulness of shared knowledge they obtain from external sources, such as educational theories, research, professional programs, their colleagues, and how and why they use, modify, or did not use these resources. The author interviewed fifteen lower elementary teachers, asked them to generate examples of knowledge they had obtained elsewhere on their own, and gave them knowledge artifacts to evaluate. Teachers' self-described responses to these various resources suggested that their main goal was instrumental use of knowledge, but there were various ways of using it. In addition to instrumental uses, the teachers used shared knowledge to expand and change their perspectives on teaching and learning, used it as a source to develop and produce their own practical knowledge, used it to reflect on their practice, to confirm and justify their practice, and used it as a reminder of other ideas. The teachers also described varied types of instrumental uses: they used shared knowledge by replicating, specifying, extending, adding, reducing, and changing it. They either modified or did not use shared knowledge when they thought that there were reality constraints, when they thought the knowledge was not relevant to their contexts and students,

when it did not fit their own philosophies and styles, or when it was perceived to be ineffective, or not valid.

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To my parents

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Chapter 1: Introduction

A number of researchers have argued that a professional knowledge base for teachers is indispensable for advancing teaching to the status of other professions, such as law or medicine and for improving classroom teaching (e.g., Foray and Hargreaves, 2003; Hiebert et al, 2002). Regarding what constitutes a professional knowledge base for teaching, a body of educational research on teaching has been considered a major source of the knowledge base because of its scientific features, such as validity and generalizability, but teaching experience is also a vital source for developing teacher expertise (e.g., Clandinin, 1985; Elbaz, 1981, 1983; Goldenberg and Gallimore, 1991; Grimmer and MacKinnon, 1992; Leinhardt, 1990).

Some researchers, however, found that teachers did not think educational theories and research were useful and did not believe other teachers' practical knowledge was transferable to their classrooms (e.g., Gore and Gitlin, 2004; Hargreaves, 1996; Huberman, 1983; Joram, 2007; Landrum et al, 2002). For example, some teachers said that research is "appalling, laughable, bunk, and does not begin to hit reality" (Gore and Gitlin, 2004, p.39). Teachers are likely to believe that "No one can give you a lesson plan and say 'go to it this way' because what works for one may be poor for another" (Lortie, 1975, p.78).

Teachers' thoughts and beliefs influence their judgments and behaviors in their practice (Kagan, 1992; Pajares, 1992). When they doubt the usefulness of knowledge from external sources such as educational theories, research, and other teachers, they may tend to reject it rather than actively working to apply it into their classrooms. In this case, it would become difficult to build and develop a knowledge base for teaching that helps improve classroom teaching.

However, there are few empirical studies that have looked into how and why teachers use, modify, or do not use knowledge from external sources including theories, research, and other teachers. Most empirical studies have been concerned with whether teachers have positive or negative views of the usefulness of theories and research, and have not explored teachers' episodes and rationales through their voices.

In addition, most research has focused on the usefulness of educational theories and research rather than on the usefulness of knowledge from other teachers. Although teaching experience is an important source of a knowledge base for teaching, far less attention has been given to the usefulness of teachers' practical knowledge that teachers actually hold and use for their practice. Most studies on teachers' practical knowledge has been designed to find it, identify it, and describe it (e.g., Clandinin, 1985; Elbaz, 1981, 1983; Gallimore and Goldenberg, 1991; Grimmer and MacKinnon, 1992; Leinhardt, 1990), but much less has been said or done about further questions, such as how teachers use other teachers' practical knowledge to develop their expertise, and what factors facilitate or impede the transferability of teachers' practical knowledge.

This study investigates teachers' thoughts and beliefs about the usefulness of shared knowledge including theories, research, and other teachers' practical knowledge. In addition to checking if they perceive the usefulness positively or negatively, I look into what teachers mean by "research" and "useful" when they say that research is useful or not useful. This study also explores how and why teachers use, modify, or do not use shared knowledge by analyzing their episodes and evaluations of particular knowledge artifacts. The research questions are as follows.

Research questions

1. How do teachers think about the usefulness of shared knowledge? What do they mean by its “usefulness”?
2. In what ways do teachers use or modify shared knowledge?
3. Why do teachers modify or not use shared knowledge?

This dissertation has nine chapters. In this chapter, I address the background of my research, the research questions, and the definition of the main term. In Chapter 2, I review literatures of the usefulness of knowledge from major sources: studies of teachers’ thoughts and beliefs about the usefulness of educational theories and research; and studies on teachers’ practical knowledge.

In Chapter 3, I describe the research design and its general logic, the data collection instruments, the participants, and the data collection procedure, and the data analysis procedure. I discuss which method is the most appropriate for the research questions, and why I chose the research method with respect to the various methods of previous research. I describe the survey and two interview sessions I used for data collection, including the interview structure, protocols, and knowledge artifacts that were used as prompts. I address how I recruited the teacher participants, how I surveyed and interviewed them, and how I analyzed the data.

In Chapter 4, I report the results of the survey that asked teachers’ thoughts and beliefs of the usefulness of knowledge from educational theories, research, and other teachers. Then, I describe teachers’ concepts and images of educational research and theories, and illustrate themes often repeated in the teachers’ explanations of their knowledge use.

In Chapter 5, I describe and discuss what the teachers meant by “useful” and how they used knowledge from external sources such as educational theories, research, and other teachers. These findings came from both the teachers’ episodes and their evaluations of the knowledge artifacts.

In Chapter 6, I illustrate various types of knowledge use and modification. In Chapter 7, I address the reasons that teachers modified or did not use knowledge. These two chapters’ findings came from the analysis on teachers’ episodes in which they used, modified, or did not use knowledge from external sources.

In Chapter 8, I describe how teachers evaluated the knowledge artifacts that I gave them in the second interview. Finally, in Chapter 9, I summarize and discuss findings of the five chapters and address the implications of the findings, limitations of my study, and directions for future research.

Chapter 2: Literature review

This chapter is divided into five sections. First, I review various meanings of knowledge use and its usefulness when teachers use knowledge from external sources such as educational theories, research, and other teachers and evaluate it as useful for their practice. Since teacher knowledge has two important sources, research and teaching experience (Fenstermacher, 1994), I first review empirical studies of teachers' thoughts and beliefs about the usefulness of educational theories and research. Next, I illustrate possible rationales that teachers might use to discount research-based knowledge. In the fourth section, I review the literature on teachers' practical knowledge and their thoughts about its usefulness. Last, based on the literature, I define the term *shared knowledge*.

2.1. The various meanings of “knowledge use”

A number of researchers have explored how teachers think the usefulness of educational research, but they did not make clear the meanings of “usefulness.” However, it is significant to clarify and reveal what teachers mean by knowledge use and usefulness when they say that they use it or evaluate it as useful for their practice. Without clarifying its meanings, it would not be correct to discuss teachers' thoughts about knowledge use and its usefulness. For example, it is possible that some criticize a particular shared knowledge because they assume shared knowledge is useful only when it tells teachers what to do in classrooms. In contrast, others could respond that it is useful because it makes them see differently their practice. In this case, if a researcher report only teachers' perceptions of whether or not shared knowledge is useful without revealing their different meanings of usefulness, it causes misunderstandings.

Though there is almost no direct and explicit concern about what teachers mean by the usefulness of shared knowledge, several researchers indicated that teachers tend to evaluate the

usefulness of shared knowledge from the perspective of instrumental utilization (e.g., Gitlin et al, 1999; Gore and Gitlin, 2004; Joram, 2007; Zeuli, 1991). They found that many teachers expect that research findings will tell them “solutions to problems” and “exactly what to do in every situation.” This view is also called a problem-solving model (Weiss, 1979) or engineering model (e.g., Hammersley, 1997): research should be able to tell practitioners which is the best technique for dealing with a particular kind of problem. This expectation comes from “Enlightenment ideals” that regard research findings as a best tool to solve practical problems and ultimately improve practice because they are based on scientific evidence (Tom, 1980).

However, it would be difficult to satisfy the enlightenment ideals because educational research, as part of social science, yields time-and context-bound knowledge (Shavelson, 1988; Tom, 1980; Weiss, 1980) “Solutions” that educational research provides would not work across all contexts. In addition, teaching is very complex and uncertain, and individual teaching context is idiosyncratic: influential variables in the context are multiple, instable, and unpredictable (e.g., Huberman, 1983). Moreover, if we consider even the interactions between the variables, “We enter a hall of mirrors that extends to infinity” (Cronbach, 1975, p. 119).

Any educational research, however elegant and thorough it is, still struggles to deal with all variables and their interactions that affect outcomes in learning and teaching. The various instable factors and their infinite interactions have tended to make research context-dependable and not very powerful for practice. Regarding these natures of social science research and complexity of teaching, the instrumental utilization of research seems to have remained elusive.

Some researchers have argued that there is another meaningful way in which research contributes to practice (e.g., Weiss, 1980; Shavelson, 1988). Their main point is that research is able to improve practice by expanding or changing conceptual understandings about educational

phenomena. Contrast to the engineering model above, this is called “Enlightenment model,” in which research provides information that corrects assumptions or alters the context in which teachers view some aspect of their situation (e.g., Hammersley, 1997). Weiss (1980) investigated how policymakers actually use research, and concluded that they mostly use research findings conceptually rather than instrumentally. She found that social science research helped policymakers gain new or better insight into the complex issues with which they deal. In a similar vein, Shavelson (1988) argued that the contribution of research does not lie in providing immediate and specific applications but rather in constructing, challenging, or changing the way people think about problems. For example, he argued that research on cooperative learning has changed the ways some teachers see the organization of learning groups in their classes.

The researchers have discussed instrumental uses and conceptual uses with regard to educational theories and research findings, but these ways of knowledge use can be applied to all shared knowledge including explicit practical knowledge. In my practicum research, I found that teachers think that their colleagues’ ideas are useful conceptually as well as instrumentally. For example, the teachers participating in the study believed that their colleagues’ ideas were valuable because they could hear “another point of view” on particular practice.

In addition to these two main ways of using shared knowledge, there were three other ways of using research-based knowledge (Rickinson, 2003). Practitioners use research to justify their practice or concerns, reflect on practice, and investigate practice. Research can provide personal affirmation of practitioners’ practices, and it could be used as a frame with which to reflect on practitioners’ own practice. Finally, practitioners can use research can be used to help conducting some research of their own.

In this study, I look into what teachers mean by “usefulness” when they say shared knowledge is useful or not useful. In addition, I check what teachers mean by educational

research because I found in my pilot interviews that some teachers had obscure or different definitions of research from popular definitions of researchers. For example, several teachers meant educational research by all information from college courses. However, some information that they nominated was just popular teaching tactics. In a similar vein, Zeuli (1991) found that most teachers of his participants, nine of thirteen, have narrow or unclear conceptions of educational research. For instance, they do not regard historical or philosophical studies as educational research, and give incorrect definitions of educational research.

2.2. Teachers' perceptions of educational research

A number of researchers have conducted empirical research to explore what teachers think and believe about educational research (e.g., Gore and Gitlin, 2004; Joram, 2007; Landrum et al, 2002; Lortie, 1975). They used mostly qualitative methodology to reveal teachers' thoughts and beliefs that cannot be easily captured by quantitative methods (e.g., Gitlin et al, 1999; Groth and Bergner, 2007; Gore and Gitlin, 2004; Joram, 2007; Lortie, 1975), and some of them quantified qualitative data to identify patterns or to compare groups (e.g., Gore and Gitlin, 2004; Joram, 2007). A few researchers used only quantitative methods to investigate teachers' perceptions about shared knowledge (e.g., Landrum et al, 2002).

A key finding in these studies was that teachers believed research-based knowledge was rarely useful for their practice (e.g., Gitlin et al, 1999; Gore and Gitlin, 2004; Landrum et al, 2002; Lortie, 1975). For example, Gore and Gitlin (2004) asked 85 pre-service teachers and 147 in-service teachers in the U.S. and Australia to respond to questionnaires and interviews regarding their views of educational research. They found that the majority of teachers did not think research-based knowledge to be useful for their practice because they believed that it tended not to offer technical and instrumental advice.

By the similar methodology, Gitlin et al (1999) investigated whether inquiry-oriented teacher preparation programs affects pre-service teachers' views of educational research. Their participants were 17 elementary pre-service teachers and 20 secondary pre-service teachers. They found that pre-service teachers believed that research's main role was to determine effective teaching methods, but it failed to provide applications to teaching and that the programs did not change much pre-service teachers' negative views of educational research.

Joram (2007) found that teachers generally thought that research-based knowledge had limited generalizability because individual teaching contexts were idiosyncratic. She compared the beliefs and thoughts about the generalizability and falsifiability of research-based knowledge between the three groups of pre-service teachers, in-service teachers, and teacher education professors by interviews, mostly using two dilemma vignettes.

The first vignette described second-grade mathematics lesson, and it aimed to elicit participants' beliefs about educational research in evaluating the efficacy of the lesson. The second vignette, in which a researcher recommended a teacher that her student-centered approaches should switch to more constructive approaches, aimed to assess participants' beliefs about whether teachers should accept research that is discrepant with their beliefs.

In Joram's study, seven pre-service teachers, nine in-service teachers, and seven professors participated. She found that in general, pre-service teachers believed that shared knowledge was highly particularistic and could not be falsified. In contrast, most professors believed that shared knowledge could be generalized and also falsified. Most of the experienced teachers doubted the generalizability of shared knowledge and they had varied views about the falsifiability of shared knowledge.

In his dissertation study, Zeuli (1991) investigated teachers' beliefs on the influence of research. He provided participants with three vignettes that represented different views of educational research. The first vignette described a teacher's view that "research should provide strategies and techniques but never gives answers to practice," the second view was "research should and would directly impact teaching," and the last one was "research expands understanding." He asked participants to choose one of them that is most representative to their views of educational research, and asked questions of which statements of the chosen vignette they agree and why they eliminate other two vignettes.

In Zeuli's study, the participants were thirteen teachers. Two of them chose the first view, six chose the second, and five chose the last. He found the similar result that teachers mainly viewed research as pragmatic tools with the findings of other studies (Gitlin et al, 1999; Gore and Gitlin, 2004; Joram, 2007), but in contrast to the previous studies, he found that the majority of his participants, eleven of thirteen teachers had positive expectation of research.

In sum, the researchers have generally reported that teachers did not think research useful for teaching (e.g., Gitlin et al, 1999; Gore and Gitlin, 2004; Joram, 2007). Most empirical studies have been concerned with whether teachers had positive or negative views of the usefulness of research, but did not explore their rationales through their voices—for example, the researchers have reported "teachers think that research is not useful because it does not hit reality," but they have not asked teachers what they mean by "usefulness" and did not investigate "*which* research findings do not hit *which* reality."

My study first looks into the meanings of "usefulness" and "research" when they say research is useful or not useful. I investigate the meanings of "usefulness" through teachers' episodes in which they used, modified, or did not use shared knowledge and their evaluations of

particular knowledge artifacts. Since my study describes the usefulness of shared knowledge through teachers' voices, it provides more accurate and richer meanings of the usefulness of shared knowledge.

2.3. Possible rationales teachers might use to discount shared knowledge

There is no empirical research on the question why teachers do not think knowledge from educational theories, research, or their colleagues as useful or do not use it—at least as far as I know, but some conceptual studies suggested possible explanations for this question (e.g., Kennedy, 1997; Tom, 1985). According to the studies, teachers tend not to think educational theories and research as very useful for teaching when (a) it is descriptive or explanative rather than prescriptive; (b) it lacks relevance; (c) it fails to represent classroom realities; (d) it lacks validity. Although these explanations are meant to explain why teachers devalue educational research, they could help us understand why teachers think that knowledge from other sources too has limited usefulness. For example, relevance would be an important criterion for evaluating the usefulness of teachers' practical knowledge: teachers would not think particular practical knowledge from their colleagues as useful when it lacks relevance to their students.

First, when educational research is descriptive or explanatory, teachers may not think it useful because it is not likely to tell teachers what to do in their classrooms. When research-based knowledge fails to provide teachers with specific, technical prescriptions for their teaching they are likely to think that research is not very useful for practice (e.g., Gitlin et al, 1999; Groth and Bergner, 2007; Gore and Gitlin, 2004; Joram, 2007; Zeuli, 1991). This explanation implies that what teachers want from research are specific and technical prescriptions that can be easily used at the classroom level rather than descriptions or explanations of educational phenomena: they require “research that can be applied, not just considered” (Gore and Gitlin, 2004).

Second, when educational research lacks relevance to practice—research does not deal with their concerns and problems—, teachers are likely to think that research-based knowledge is not very useful for them (Kennedy, 1997). With regard to teaching, Kennedy said that the kinds of problems teachers actually have could be different from the kinds of problems researchers are trying to solve. Since researchers are not likely to address the questions and concerns that teachers have about their practice, it happens that teachers think that researchers' findings lack relevance and eventually evaluate them as not useful. In the similar vein, Weiss (1980) pointed out that social scientists were often uninterested in issues of relevance to practitioners, and that researchers' formulations of problems in research often did not match decision makers' definitions of problems.

Third, when educational research does not represent the ordinary realities of teachers, teachers are likely to criticize that research findings are too ideal and unrealistic to be applied to practice—teachers often complain that scholars, ensconced in their Ivory towers, do not recognize classroom realities. Teachers may argue that they do not have enough resources and time to implement research findings or suggestions. In addition, they may think that there are always more things that need to be considered beyond research implications. For example, although researchers suggest that discovery learning promotes students' cognitive abilities, when students are not familiar with this kind of learning, and they need to pass state-level exams in two months, the suggestions from discovery learning are likely to look unrealistic to teachers. In this case, teachers tend to think that researchers fail to consider real classroom contexts even if their suggestions have recognizable educational value.

In a similar vein, Kennedy (2005) investigated why reform ideals mostly have failed in practice. One of her explanations was that reform ideals themselves might be unrealistic in

everyday teaching; the kind of teaching that reformers seek might require more time and energy than teachers actually had; the ideals could not be all attained simultaneously because they often conflicted with each other. As an example, she found that teachers tended to suppress intellectual engagement because they believed that they must maintain lesson momentum and cover given content. She explained that reformers had idealized visions of intellectually stimulating lessons, but they tended not to address the difficult trade-off between intellectual engagement and content coverage in realities.

Fourth, when educational research lacks validity, teachers tend to doubt its usefulness. There are two kinds of validity: internal validity is about internal logic—whether the cause-effect relations are valid within research; and external validity is concerned with applying research findings to other persons and settings. There is no doubt that when research lacks internal validity, the research findings are likely not to produce the same results in other contexts because the research is not trustworthy itself. However, satisfying the condition of internal validity does not mean that external validity is also automatically fulfilled. It is possible that research lacks external validity in spite of its reasonable internal validity. The external validity issue is about whether or not research findings are generalizable and transferable enough to be applied into other teaching contexts. When research lacks external validity, the research findings are rarely applied to contexts other than the one in which the researcher carried out her research.

These four explanations above are not based on empirical data. In this study, I look into if the explanations are persuasive in teachers' actual episodes where they use, do not use, or modify knowledge and their evaluations of knowledge artifacts. More specifically, I adopt a survey that asks teachers' perceptions of the usefulness of knowledge from external sources regarding the explanations. Then, through analyzing teachers' episodes and evaluations, I

explore if the explanations are persuasive and if there are other explanations besides the four explanations.

2.4. Literature on teachers' practical knowledge

Although there has been a persistent concern about the usefulness of educational research (e.g., Gore and Gitlin, 2004; Kennedy, 1997; Huberman, 1983; Weiss, 1980), much less attention has been given to the usefulness or transferability of teachers' practical knowledge. It may be because many consider a body of archived research findings a major source of a professional knowledge base for teaching. This view assumes that teachers learn little from their experience, and a hierarchical relationship between researchers and teachers—researchers produce scientific knowledge for teaching, and teachers as consumers use it to improve their teaching (e.g., Carter and Doyle, 1996).

In contrast, there is another persuasive and powerful view that sees teaching as a craft: teachers learn a lot from experience, and competent teaching is beyond the application of research to practice. Many scholars have argued that a practitioner needs a different kind of knowledge from theoretical knowledge (e.g., Fenstermacher, 1994; Oakeshott, 1962; Ryle, 1949; Schön, 1983).

For example, Oakeshott (1962) made a distinction between technical knowledge and practical knowledge: technical knowledge was symbolic, much like languages or signs, but practical knowledge was something that could not be expressed as such; its normal expression was in a customary or traditional way of doing or in practice. He added that technical knowledge could be learned from books, but practical knowledge could neither be taught nor learned from books. Practical knowledge could be only acquired from practice. He explained that in cookery technical knowledge might be equivalent to written recipes whereas practical knowledge was

expressed in the actual cooking activities. Since the act of cooking did not mean simply applying a recipe, memorizing the recipe did not guarantee a good dish: cooking a good meal required more than knowledge of the recipe. In the same logic, knowing research is not enough for good teaching.

In the similar vein, Schön (1983) criticized the model of technical rationality. He said, in the technical rationality model, professional activity was to apply scientific theories and techniques to tasks and problems of practice. However, he argued, since practice was characterized by indeterminate situations of ambiguity, uncertainty, uniqueness, and conflicting values, professional activity was not a technical task but “artistry.” He claimed that the model of technical rationality was not appropriate to understand the nature of professional practice regarding the role of research.

The view of teaching as a craft assumes that practitioners need practical knowledge as a different kind of knowledge from research knowledge, that practical knowledge is indispensable for competent practice, and that it is able to be learned only from experience. Traditionally, this view has been considered an obstacle to professionalization of teaching because it seems to emphasize mindless imitation of technical skills in teaching: learning to teach is to copy accumulated experimental knowledge from prior generations without criticism. However, from the view of a craft, many see that the craft of teaching involves not only technical skills but also intellectual abilities. For example, Grimmer and MacKinnon (1992) and Kennedy (1987) noted that teaching was intelligent performance requiring certain skills, proficiencies, and deliberation.

The craft metaphor assumes that teachers learn to teach a lot from teaching experience and they also produce valuable knowledge for teaching like researchers do. Based on these assumptions, a number of researchers have explored what knowledge teachers actually hold and

develop as a result of teaching experience (e.g., Clandinin, 1985; Elbaz, 1981, 1983). They have focused on capturing and describing the characteristics and forms of teachers' practical knowledge.

Regarding the features of teachers' practical knowledge, some researchers named it craft knowledge, personal practical knowledge, situated knowledge, local knowledge, and so on (Clandinin, 1985; Elbaz, 1981, 1983; Goldenberg and Gallimore, 1991; Grimmer and MacKinnon, 1992; Leinhardt, 1990). These various names of teachers' practical knowledge indicate its distinctive features from those of research knowledge: teachers' practical knowledge is personal, tacit, generated and developed in practice, and context-bound while research knowledge is *relatively* considered as objective, propositional, can be learned from books, and is context-free.

For example, Elbaz (1981, 1983) and Clandinin (1985) identified distinctive features of teachers' practical knowledge. Their concept of "personal practical knowledge" emphasized that teachers' knowledge was very personal and was generated from practice. Elbaz (1983) explained that teachers' practical knowledge "encompasses first-hand experience of students' learning styles, interests, needs, strengths and difficulties, and a repertoire of instructional techniques and classroom management skills"(p.5).

According to Elbaz (1983), teachers' knowledge had a "practical" aspect, generated and developed in practice, including knowledge about instructional routines, classroom management, student needs, and the like. She added that there was also a "personal" aspect: teachers had self-knowledge and they worked toward personally meaningful goals in their teaching. This teachers' personal practical knowledge was not found "in lists of the contents of teacher education textbooks, workshop outlines, or teacher task analysis" (Clandinin, 1985, p.362).

Some researchers put an emphasis on context-related features of teachers' practical knowledge and viewed teachers' practical knowledge as situated knowledge and local knowledge (e.g., Goldenberg and Gallimore, 1991; Leinhardt, 1990). They pointed out that teachers' practical knowledge depended on a certain context while research knowledge is relatively context-free. For example, Leinhardt (1988) defined teachers' practical knowledge as situated knowledge, which was "a form of expertise in which declarative knowledge is highly proceduralized and automatic and in which a highly efficient collection of heuristics exist for the solution of very specific problems in teaching" (p.146).

The majority of the studies on teachers' practical knowledge has explored the features and forms of teachers' practical knowledge, but a few studies briefly addressed teachers' perceptions about their colleagues' practical knowledge (e.g., Gore and Gitlin, 2004; Huberman, 1983; Landrum et al, 2002; Lortie, 1975). The studies reported that teachers usually thought that their colleagues' ideas were very valuable because it was readily accessible, trustworthy, specific, and came from people who take account of the real work of teaching.

For example, Huberman (1983) and Lortie (1975) mentioned that teachers thought their colleagues' ideas and advices were very useful. While Huberman and Lortie used interviews, but Landrum et al (2002) used a survey using Likert scale questions to compare teachers' perceptions about the value of educational information. Landrum and his colleagues surveyed teachers' perceptions of the trustworthiness, usability, and accessibility of educational information from four different sources: other teachers or colleagues, workshops and in-service presentations, college courses, and professional journals. The participants in the study were 67 general education teachers and 60 special education teachers. The researchers found that the teachers thought educational information from other teachers or colleagues more trustworthy,

usable, and accessible than educational information from college courses and professional journals.

There were not many studies on the usefulness of teachers' practical knowledge, but the key finding of the studies was that teachers tended to think explicit practical knowledge from their colleagues more useful than research knowledge. However, interestingly, some researchers found that teachers believed that others' practical knowledge also had limited usefulness for their own classrooms (e.g., Huberman, 1983; Lortie, 1975). It was often found that teachers believed that their colleagues' explicit practical knowledge might not work sometimes because their personalities and teaching styles were different and individual teaching contexts were unique: they thought that teaching context was so complex and idiosyncratic that no knowledge would be useful for all contexts regardless of its source.

While there were some conceptual studies that explained why teachers do not think research as useful for their practice, no studies addressed reasons for limited usefulness of explicit practical knowledge—there could be one potential explanation, that is, teachers' general belief in that individual context is very complex and idiosyncratic. With respect to the complexity and uncertainty of influential variables in learning and teaching, it is not surprising teachers believe that knowledge has limited usefulness regardless of its sources. For example, teachers and students—individuals in educational contexts—contribute to the uniqueness of each teaching context (Calderhead, 1988; Huberman, 1983; Joram, 2007; Lortie, 1975). Calderhead (1988) noted that teachers thought that teaching was largely a matter of personality, so individual teachers' characteristics could affect their teaching practice. For student factors, Huberman (1983) reported that teachers referred often to the personality or character of a class, insisting that cohorts along with their parents were often very different from one year to the next and

respond to different treatment. He added that “the yearly cohort change” (p. 486) was one of the main factors that make it difficult to predict or gauge input-output relations in teaching.

Regarding both research knowledge and explicit practical knowledge, there is no *empirical* research on why teachers do not use them or why they do not think knowledge as useful. In this study, I explore why teachers use, modify, or do not use knowledge including research and explicit practical knowledge by analyzing teachers’ episodes and their evaluations of knowledge artifacts.

2.5. The definition of “shared knowledge”

I need to clarify what knowledge this study is concerned about. This is because “knowledge” is a complicated concept with a long history having generations of debates about what it means, being associated with epistemology. This study is concerned about sharable knowledge of teaching, and I call it *shared knowledge* here.

As I review the literature, teacher knowledge has two sources, educational research and teaching experience (Fenstermacher, 1994). Educational researchers produce knowledge by using scientific methods that are intended to yield valid and generalizable knowledge. This is “research-based knowledge” that refers to research findings, scientific evidence, and also theoretical insights (Davies and Nutley, 2008). As well as researchers, teachers generate knowledge as a result of their teaching experience. This has been called teachers’ practical knowledge (e.g., Clandinin, 1985; Elbaz, 1981, 1983; Goldenberg and Gallimore, 1991; Grimmer and MacKinnon, 1992; Leinhardt, 1990). Both kinds of knowledge can be shared, and in this study, shared knowledge includes both research-based knowledge and teachers’ practical knowledge. Notice, though, that shared knowledge can come to teachers through a variety of

venues: research journals, university courses, curriculum guidelines, workshops, and teacher colleagues.

An important feature of shared knowledge is knowledge that can be articulated, stated in sentences, and written down. This distinguishes it from implicit knowledge. Many have pointed out that one feature of teachers' practical knowledge is that it is tacit, but not all teachers' practical knowledge is tacit. For example, Elbaz (1981) suggested three levels of practical knowledge: rules of practice, practical principles, and images. She noted that the first two levels of practical knowledge were explicit. Similarly, Orton (1993) argued that situated knowledge, as key part of teachers' practical knowledge that was deeply dependent on particular times, places, and contexts, but was not necessarily tacit. This study is interested in a subset of teachers' practical knowledge that is *explicit*, not its tacit part.

Chapter 3: Method

In this chapter, I describe the research design and its general logic, the data collection instruments, the participants, and the data collection procedures, and the data analysis. This chapter consists of six sections. In the first section, I explain why I chose the research method with respect to the various methods of previous research on similar topics. In the second and third section, I describe a survey and two interview sessions I adopted for data collection, including the interview structure, protocols, and knowledge artifacts that were used as prompts. In the fourth section, I address why and how I recruited teacher participants. The fifth section addresses how I surveyed and interviewed the teachers, and in the last section I describe how I analyzed their responses from the survey and interview.

3.1. General logic of the method

The research questions of this study are what teachers think about the usefulness of shared knowledge, how they use or modify it, and why they modify or did not use it. For these research questions, I adopted a qualitative design because it was better than a quantitative design for exploring teachers' thoughts and beliefs about the usefulness of shared knowledge, for illustrating various types of use and modification, and for looking at reasons for non-use or modification. In addition, I did a short survey to collect participants' background information and their general thoughts and beliefs about the usefulness of shared knowledge.

The first issue of the qualitative research design was whether or not observation was necessary in addition to interviews. Many researchers have used only interviews to investigate teachers' thoughts and beliefs about research-based knowledge and teachers' practical knowledge (e.g., Gitlin et al, 1999; Groth and Bergner, 2007; Gore and Gitlin, 2004; Joram, 2007; Lortie, 1975; Zeuli, 1991). Several researchers have used observations as well as interviews

because they wanted to see how teachers implement or resist reform ideals in addition to revealing their beliefs and thoughts about reform ideals (e.g., Duffy and Roehler, 1986).

Often, when researchers studied the effect of a particular workshop that provided teachers reform ideas, they used both observations and interviews: they observed how much teachers implemented the reform ideas and investigated why some teachers implemented well but others not, and they interviewed teachers about obstacles to implementing the reform ideas. For example, Duffy and Roehler (1986) looked at why teachers did not apply a reading innovation program in their classrooms. Through observations and interviews, the researchers found that some teachers did not internalize the innovation ideas because external factors, such as the classroom environment and routines constrained the innovation implementation.

Although observations would be useful in learning whether or how teachers actually adopt particular ideas, I did not employed observations in this study. It was because this study was concerned with teachers' thoughts and beliefs rather than with their actual practice: my interest was in teachers' meanings and explanations of knowledge use, modification, and non-use. More importantly, it was not my concern to evaluate teachers' use, modification, and non-use of shared knowledge. Even if I use observations, it would be very subjective and difficult to evaluate whether or not a teacher actually implemented particular shared knowledge. For example, even when I observe a lesson in which a teacher says that she applied a child-centered approach, it is possible that she did not implement the idea at all from my perspective. In addition, this study was concerned with phenomena of using shared knowledge in general rather than with those of using *particular* programs or reform ideas-- observations would be very effective to investigate why and how teachers use, modify, or do not use *particular* ones.

The second issue of the research design was which interview strategy was best for my research questions. Previous studies that I reviewed fall into two groups with respect to interview strategies. The first group studies used general and direct interview strategies to investigate teachers' perceptions of the usefulness of shared knowledge—especially teachers' thoughts about research-based knowledge. They asked teachers *directly* whether or not shared knowledge was useful as a *general* category.

For example, Gitlin et al (1999) and Gore and Gitlin (2004) used general and direct questions: they asked participants directly about the usefulness of “research” as a general category. They used the questions, such as “What are the goals of educational research?,” “Does research address your concern?,” and “How does educational research impact your classroom teaching?.” In contrast, the second group studies used specific and indirect questions. They asked teachers *indirectly* about the usefulness of shared knowledge by using *specific* vignettes or a particular set of shared knowledge. Both strategies have weaknesses that may be strengths of the other (Gall, Gall, and Borg, 2005).

The strategy of using direct and general questions has two weaknesses. First, when a researcher asks directly, participants may say stereotyped or “positive or correct” answers instead of offering what they really think and believe. Participants may repeat popular opinions of their groups or say what they learned or heard in college or workshops. In addition, it often happens that people do not even recognize and clarify their thoughts or beliefs until they are examined in specific situations.

Argyris and Schön (1974) made a distinction between “espoused theories of action” and “theories-in-use”: espoused theories of action refer to those that people *report* as a basis for actions while theories-in-use are the theories of action inferred from how people *actually behave*.

When someone is asked how he would behave under certain circumstances, the answer he usually gives is his espoused theory of action for that situation. However, the theory that actually governs his actions was his theory-in-use, which could be incompatible with his espoused theory. Such incompatibility may not be intentional because people often are not even aware of the incompatibility of the two theories.

Another weakness of the direct and general strategy is that researchers and participants use the same terms, but their meanings could be different. For example, when a researcher asks, “Do you think educational research is useful for teaching?,” participants may have different concepts of educational research or different meanings of its usefulness than those of researchers. For example, when Joram (2007) asked her participants a general and direct question, “Is educational research meaningful for you?,” she found that all the participants responded affirmatively, but only 7% of pre-service teachers and one third experienced teachers responded that they would use research to change their thoughts and practice. In this case, it would be useful to reveal what the teachers meant by “meaningful” when they responded that educational research was meaningful.

When a researcher asks teachers directly whether shared knowledge is useful for them, it is possible that some teachers answer negatively because they do not think that it often provides solutions for problems though they think that it changes their perspectives and understandings. In this case, the teachers do not think that the term “useful” applies to conceptual use of knowledge. If respondents have different understandings about the primary term in an interview, the research findings are likely not to be correct because researchers and participants use the same term but with different meanings. This indicates that researchers need to check the meanings of abstract terms, such as “research,” “useful,” “meaningful,” and “valuable.”

Several researchers have used indirect strategies by employing dilemma vignettes or particular research papers to collect participants' beliefs and thoughts about the usefulness of shared knowledge (e.g., Joram, 2007; Groth and Bergner, 2007; Zeuli, 1991). This strategy can help participants clarify and articulate their thoughts and beliefs that they may not recognize until the interviews, so researchers more possibly gain "true" responses. This is a productive strategy for researchers, but this strategy also has weaknesses.

First, the strategy using particular vignettes and prompts could raise other issues besides research questions. For example, Joram (2007) used a vignette that a researcher visited a teacher who had been using child-centered methods. In this vignette, the researcher recommended the teacher switching to more structured and teacher-centered teaching, but the teacher was satisfied with her child-centered teaching approaches. In particular, the vignette was meant to reveal teachers' beliefs about how they use research even when it is inconsistent with their beliefs about best practice. In this case, it is possible that participants' previous beliefs and thoughts with regard to child-centered teaching methods affect their responses to the vignette. For instance, if participants prefer more structured teaching styles, they could respond that the teacher in the vignette should change her practice according to the researcher's recommendations even if they do not usually believe that research is authoritative enough to change their practice. Of course, prior belief always affects one's receptivity to research findings; the task for the researcher is to learn about this relationship, not to suppress it.

Second, the strategy using particular vignettes or studies can limit participants' responses. For example, Zeuli (1991) used three vignettes, "research never gives answers to practice," "research should and would directly impact teaching," and "research expands understanding." The vignettes helped participants articulate their views, but at the same time the vignettes might

limit their views or might not represent correctly their views, because it was possible that there were other positions that the participants had, which the three vignettes did not represent, or that some participants might find that two of them represented their position—partly from this vignette and partly from that vignette. When researchers use particular examples as prompts for their interview, they may inadvertently shape teachers’ responses in a way that would not characterize their responses to questions.

When researchers have used particular studies, their typical strategy is to ask participants to read and evaluate particular research papers. For example, Groth and Berger (2005) asked twenty teachers to read studies that were grouped into three topics, motivation, NCTM standards-based curricula, and reform-oriented vs. traditional instruction, and then they asked the teachers to evaluate the research papers regarding their positive influences on practice and negative critiques about them. In this strategy, an important issue is how well individual studies represent the particular body of research. For example, in the study of Groth and Berger, it is an issue whether or not the research papers that were given to the participants represented well the body of mathematics educational research literatures. In addition, if a researcher uses this strategy, the research findings would be about teachers’ beliefs and thoughts of a particular subset of studies rather than about those of shared knowledge as a general category.

In sum, there are two interview strategies to explore teachers’ beliefs and thoughts about the usefulness of shared knowledge: a strategy of using direct and general questions and a strategy of using particular vignettes or studies. Both the strategies have weaknesses that may be the other’s strengths. I used both strategies in this study in the hope that each would complement their weaknesses in the other. In addition, this study compares teachers’ responses from the two different strategies: comparing teachers’ responses to direct questions and their actual

evaluations of particular knowledge artifacts. This comparison enable me to see whether there is a difference between what they say about the usefulness of shared knowledge to direct questions and how they actually use shared knowledge and evaluate the usefulness of particular knowledge artifacts. Especially, in my study, teachers' responses to general and direct questions about research tap their espoused theories, while their responses to particular studies, I hope, get closer to their theories-in-action. My data came mainly from interviews, so it was focused on what people say and not what people do. However, in the second interview of this study where the teachers evaluated the knowledge artifact, I was able to see how they *actually* used the artifacts in various ways but instrumental ways. Since they said how they used the artifacts like the "think-aloud" method, the data from the second interview were more than the teachers' perceptions. In the next section, I describe how I adopted the two strategies.

3.2. Structure of the survey and the interview

In this study, I used one short survey and two interview sessions to explore teachers' thoughts and beliefs about the usefulness of shared knowledge. The survey and the first interview adopted direct questions that treated shared knowledge as a general category: I asked the teachers participating in my study directly about the usefulness of shared knowledge in general and collected their own examples and episodes of how they use, modify, or do not use shared knowledge. In the second interview, I used particular knowledge artifacts and asked the teachers to evaluate the usefulness of the artifacts—this is an indirect and specific way to explore how and why they use, modify, or do not use shared knowledge.

Before the first interview, I provided my participants with a survey that asked for background information, such as the grades that they were currently teaching, the years of teaching experience they had, the highest degree they had obtained, and their experience in

conducting research. In addition, the survey asked for their thoughts about the usefulness of shared knowledge with respect to the various possible limiting factors, such as relevance, generalizability, students' characteristics, teachers' own philosophies and teaching styles, and reality constraints. I drew these factors from the previous literature and my practicum study.

The survey included two groups of questions about the usefulness of shared knowledge. One group asked whether or not teachers had ever experienced that shared knowledge was not useful: not relevant to their contexts, unbalanced, narrowed, too ideal, does not work for their students, does not work due to reality constraints, or does not fit the teachers' own teaching philosophies and styles. The other group had "even if" questions that asked whether shared knowledge could be useful even if it lacks usefulness with respect to relevance, generalizability, reality-constraints, students' characteristics, and teachers' teaching philosophies and styles. The questions in the first group corresponded to those of the second group.

In addition to checking the teachers' thoughts about the usefulness of shared knowledge, the survey facilitated the first interview. Based on the responses to the survey, in the first interview, I used follow-up questions to ask the teachers to articulate their thoughts about the usefulness of shared knowledge and to collect various examples and episodes of how teachers use shared knowledge. For example, when the teachers responded on the survey that they had found research findings were not relevant to their classrooms, I asked them to provide examples or episodes of irrelevant research. A copy of survey is in Appendix A.

In the first interview, I asked teachers directly about their thoughts and beliefs about the usefulness of shared knowledge as a general category. For example, I asked, "Do you think research findings or educational theories are useful for your teaching? If you (don't) think they are useful, why? Could you give me some examples?" and "Have you ever found that your

colleagues' ideas or advices did not work well for your classroom? Do you have any examples?" These questions represented well my research questions, but their responses could possibly be not "real." It was possible that teachers offered socially appropriate answers, or their responses could be based on stereotyped images of educational research. To make up for this weakness, in addition to the second interview, I also asked the teachers about their rationales, examples, or episodes in the first interview session. As a result, in the first interview, I acquired two kinds of data. One group was the teachers' thoughts and beliefs about the usefulness of shared knowledge in general, and the other group was teachers' own episodes in which they used, modified, or did not use shared knowledge. A copy of interview protocol is in Appendix B.

In the second interview, I asked teachers to evaluate a set of specific knowledge artifacts and asked whether they agreed with the artifacts and whether they thought the artifacts were useful for their teaching. The second interview compensated for gaps in the first interview because teachers were less likely to respond with "socially appropriate" or stereotyped answers when they evaluated specific knowledge artifacts. I piloted the second interview protocol then made some changes in it. For example, at first there was a question about whether the knowledge artifacts would work across all contexts, but I found that all the teachers of the pilot study thought none of the artifacts would work across all contexts. Therefore, I rarely use the question in the interview.

3.3. Knowledge Artifacts

I used seven artifacts to explore how teachers evaluate the usefulness of shared knowledge. They were two sets of artifacts that were on the same particular issue of education and five artifacts. In this section, I describe the knowledge artifacts and explain why I chose them.

The first set was about constructivism, or discovery learning, versus direct instruction. This set included a summary of constructivism and an empirical study that compares discovery learning and direct instruction. Both pieces were on the same topic, but they provided teachers with contrasting implications. The first described theoretical idea of social constructivism: social constructivism emphasizes the importance of the learner being actively involved in the learning process, unlike previous educational viewpoints where the responsibility rested with the instructor to teach and where the learner played a passive, receptive role. The second was an empirical study: Klahr and Nigam's (2004) "The Equivalence of Learning Paths in Early Science Instruction." Klahr and Nigam compared discovery learning with direct instruction and found direct instruction in elementary science classes was much more effective than discovery learning based on constructivism.

The first set was about a very popular issue and conflicts with each other, so it helped me understand how teachers handle contradictory information and clarify why they rejected one of the two artifacts if they did. Especially, I chose the Klahr and Nigam study because I guessed that its findings were not usual in education communities. I guessed that many teachers agreed with the research findings though they learned that discovery learning is more valuable than direct instruction at university courses. In this case, if I asked teachers to evaluate a study that showed constructivism was better, it was possible that they would be reluctant to say their thoughts frankly although they valued more direct instruction.

The second artifact was that "Teachers would be better not to do phonics any more but they have to apply entirely whole language approaches." This was what teachers advised each other in my practicum study. This issue of phonics and whole language was so popular and controversial that it helped teachers clarify their assumptions and positions. Since this set was

about two opposing educational ideas like discovery learning and direct instruction in the first set, these first two sets show how teachers handle and evaluate two opposing ideas in education field.

The third abstract was Bowles and Gintis's (1976) "Education, Inequality, and the Meritocracy." I chose this for two reasons. First, I aimed to provide teachers this study as one example of educational research because it was one of typical academic research. In addition, this was a macro analysis of the relation of society and school, so this might or might not be "relevant" to elementary teachers. Second, the authors' arguments were still insightful but controversial even now. These two features of this study allowed me to understand how teachers thought and used an academic study with a macro analysis.

The fourth artifact was Magdalene Lampert's (1985) "How Do Teachers Manage to Teach? Perspectives on Problems in Practice." In contrast to the Bowles and Gintis paper, Lampert's paper is a micro analysis of teaching that focused on two elementary teachers' dilemmas. Her research views teachers' work from a teacher's perspective rather than a researcher's perspective. Some researchers argued that particular research genres, such as case studies, ethnographies, and narratives are more relevant to teachers' epistemological forms rather than experimental research, conceptual analysis, etc (e.g., Bolster, 1983). If this is true, the teachers would evaluate differently Lampert's study from Bowles and Gintis's study. With respect to the differences of the Bowles and Gintis paper, Lampert's paper was useful in exploring how teachers evaluated and used research according to its genres. These two research papers allowed me to understand teachers' knowledge use in a different way from the first two sets.

The fifth set of the knowledge artifacts dealt with group learning. This set consisted of two specific prescriptions from teachers and from a website for teachers. The first piece was that

“Kindergarten students were too young to get benefit from pair work that is supposed to exchange ideas and comment each other in learning to write. They were too young to understand their job in the pair work, so tend not to give each other valuable feedback.” This piece came from a teacher’s real talk of my practicum study. I chose this one because it was teacher’s practical knowledge from teaching experience. This artifact was interesting because it was against a district professional program that recommended teachers to let kindergarteners do pair work in order to teach them how to write.

The second piece of the fifth set was about how to organize learning groups: “At the early elementary levels, teachers should not use ability grouping. Since ability groups produce social and cultural differentiation in schoolwork, it has not been successful in meeting individual needs.” This came from a website that offered advice about how to group students, but presumably the advice was supported by educational research findings. Since grouping was one of the most popular issues in teachers’ daily work life, and the two practical prescriptions were controversial, the fifth set allowed me to get insights into teachers’ positions and rationales.

The sixth artifact was two home-reading strategies of “The Take-Home Journal” and “A Writing Kit.” I chose this because it was specific prescriptions in contrast to the academic studies, the third and the fourth artifacts. I compare the teachers’ evaluations of these prescriptions and those of the descriptive studies. The last artifact was “Behavior notes” in which teachers checked off what students had done inappropriately and then the parent had to sign it and they had to bring it back. I chose this because it was again a specific prescription, and very popular strategy of student discipline.

This selection of artifacts was modified as a result of pilot testing. At first I planned to use several short vignettes of the usefulness of shared knowledge that came from teacher

interviews from previous research. For example, some vignettes were: “A course that I took was called Teaching and Learning Strategies and I thought the professor did a good job but I thought that half the material was utter bunk”; “Theories and research don’t seem to hit reality. I need practical solutions to everyday problems but most book knowledge doesn’t tell me actually what to do.” I expected such real talk would be effective in drawing out honest and deep responses from teacher participants. However, after piloting the vignettes, I found that the negative vignettes were not useful because they only drew out “defensive” responses: all the teachers in the pilot study tended to defend the value of research-based knowledge too much, although they did not have examples or cases of useful research-based knowledge. Therefore, instead of using the short vignettes from teachers’ real talks, I used knowledge artifacts for this study. Although I did not use the vignettes—especially negative critiques, I used several vignettes as survey items and as knowledge artifacts.

In addition, as a result of the pilot study, I eliminated one set of knowledge artifacts that consisted of a mathematics educational study, lesson plans, and worksheets: Jan Morkos and Susan Jo Russell’s (1995) “Children’s Concepts of Average and Representativeness,” and the lesson plans and the worksheets from Joey Mason and Erin Shiflett’s (2009) “Generating Meaning for Range, Type, Median, and Mean” in *Teaching Children Mathematics*, a magazine for teachers. I had chosen this set of research, lesson plans, and worksheets because they dealt with the same topic but had different forms and features. The former was research, but the latter was lesson plans with worksheets; the Morkos and Russell study was descriptive, but the lesson plans with worksheets were prescriptive. My intention was to investigate how the different types of knowledge in the three pieces affect teachers’ evaluation of their usefulness. However, the topic was very specific, so it seemed difficult to connect this artifact set and teachers’ current

teaching. In my pilot study, I found that the teachers who were not currently teaching the topic tended to provide somewhat general and superficial evaluations. Even a teacher, who just had taught the topic a few weeks ago did not provide substantial evaluations because she already taught the topic, so did not have much interest. This knowledge artifact might be most effective one for teachers who were just planning to teach the topic. Therefore, I eliminated this set from the knowledge artifacts in the final study.

For the three research papers as knowledge artifacts of the second interview–Klahr and Nigam’s (2004) study, Bowles and Gintis’ (1976) study, and Lampert’s (1985) study, I provided both the abstract of the study and the research paper to help teachers understand the studies: the teachers were required to read the abstracts, but reading the original research papers was optional. In my pilot study, I found that neither the strategy of providing only research papers nor the strategy of requiring the teachers to read both abstracts and original papers were appropriate: the former was not effective for teachers to understand research; in the latter strategy, teachers did not have enough time to read the original research papers. Therefore, in this study, I only required the teachers to read abstracts that I summarized original research, but I provided the original papers as optional readings.

The following table is the summary of the knowledge artifacts. Copies of all the knowledge artifacts can be found in Appendix C.

Table 1. Summary of the knowledge artifacts used in the second interview

1st set: Discovery learning vs. Direct instruction	Constructivism: Since learning was active and social process, meaningful learning occurs when students were actively involved in the learning process.
	David Klahr and Milena Nigam’s (2004) “The equivalence of learning paths in early science instruction”: Direct instruction in elementary science classes was much more effective than discovery learning based on constructivism.

Table 1 (cont'd).

2nd artifact: Whole language vs. phonics	Teachers would be better not to do phonics any more but they have to apply entirely whole language approaches.
3rd artifact: Samuel Bowles and Herbert Gintis's macro analysis	Samuel Bowles and Herbert Gintis's (1976) "Education, inequality, and the meritocracy": Schools reproduce social inequality, and the organization of the education system mirrors the way work was organized in Capitalist societies.
4th artifact: Magdalene Lampert's micro analysis	Magdalene Lampert's (1985) "How do teachers manage to teach? Perspectives on problems in practice": Most dilemmas of teaching requires coping rather than solving, so it would be more correct to view a teacher a dilemma manager and a broker of contradictory interests rather than a "rational" decision-maker who chooses one perfect solution.
5th set: Group learning	Kindergarten students were too young to get benefit from pair work that was supposed to exchange ideas and comment each other in learning to write. They were too young to understand their job in the pair work, so tend not to give each other valuable feedback. At the early elementary levels, teachers should not use ability grouping. Since ability groups produce social and cultural differentiation in schoolwork, it has not been successful in meeting individual needs.
6th artifact: Home-reading strategies	One technique of fostering home support in reading instruction is to create The Take-Home Journal—a plastic bag with a book and a notebook in it. There are these simple directions on the front. (e.g., <i>Your child has brought home the book, Flight. Read the book with your child and talk about it. Then use one page in the journal to write what you all thought about this book.</i>) The Take-Home Journal comes back the next day and then goes home to someone else. The teacher shares the family journal entries in class. Another technique is to send home a writing kit packed in a briefcase with paper, pencils, and crayons. The kit encourages kids to write a story or a book at home with their family members. These ideas—which encourage shared reading and real writing—are much preferable to sending home worksheets. When you ask families to discuss, read, and write with their children, you're asking them to reinforce your most important goal: to help students develop the habits of literacy.
7th artifact: Behavior notes	Use behavior notes! You check off what students have done inappropriately and then the parent has to sign it and they have to bring it back.

3.4. Participants

The main purpose of this study was to explore teachers' thoughts about the usefulness of shared knowledge and how and why teachers use, modify, or do not use it. I wanted a variety of teachers as participants to ensure rich and various data, but I limited the study to *lower elementary* school teachers. It was because school and grade levels might affect teachers' thoughts about the usefulness of shared knowledge and their knowledge use. For example, in the case of middle and high school teachers, different features of each subject matter may influence teachers' beliefs and thoughts about the usefulness of shared knowledge. In addition, since middle and high school teachers mostly teach one subject matter and share the same classrooms and students, they may have different experiences with regard to the usefulness of shared knowledge, especially to the usefulness of their colleagues' practical knowledge: when middle and high school teachers exchange ideas and opinions with other teachers who teach the same students, they may have different thoughts and beliefs from those of elementary school teachers. In the similar vein, I did not choose upper elementary teachers. Since some knowledge artifacts were about teaching lower elementary school students, grade levels might cause differences in the evaluations of the knowledge artifacts between lower elementary teachers and upper elementary teachers.

The participants in this study were fifteen lower elementary teachers. To recruit the participants, I sent emails to lower elementary teachers in local school districts to ask them to participate in this study. I wrote about the purposes of my study and the procedure of a survey and two interview sessions. Finally, fifteen teachers replied to me that they were willing to participate in this study. The teachers were working at seven elementary schools in three school districts. Table 2 presents the demographic characteristics of the participants. As the table

indicates, all were white, and all but one were females. Two out of fifteen teachers taught only English Language Learners, and one third of the teachers taught kindergarten. However, there was no distinctive difference between these two groups– ELL teachers and kindergarten teachers–and the other groups with respect to their responses in the survey and the two interview sessions. The average of the length of teaching was 15.8 years, and half the teachers had teaching experience from ten to nineteen years. Two thirds of the teachers had experience of doing research, mainly for their degree program requirements, and twelve out of fifteen teachers had a master’s degree.

Table 2. Demographic characteristics of the participants

Gender	Female	14	Years of Teaching	under 10	3
	Male	1		10-19	8
Race	White	15		20-29	3
	Multi	0		30+	1
	African American	0		mean	15.8
	Hispanic	0	Grade	K	6
	Asian	0		1	1
	Native American	0		2	2
Age	20-29	2		1&2 (multi-grade)	2
	30-39	5		3	2
	40-49	4		ELL	2
	50-59	2	S C H O O L	Lansing District FV	2
	60+	2		MH	3
Master degree	Yes	12		East Lansing District D	2
	No	3		RC	4
Research experience	Yes	10		P	1
	No	5		Okemos District H	1
				OM	2

3.5. Interview procedures

Before the first interview, I sent the participants a survey via email. In most cases, they finished the survey and returned it to me via email before the first interview session. Before interviewing the teachers, I read their survey responses and marked several responses for follow-up questions. This saved time and allowed me to create an outline of follow-up questions. After they returned the survey to me via email, I sent them my first interview questions. This gave teachers more time to think about the usefulness of shared knowledge and their episodes in which they used, modified, or did not use shared knowledge.

I interviewed teachers in their classrooms or in conference rooms in their school after or before school according to their convenience. All the first interviews began with a brief statement of the research purpose. Then I assured them that their identities would be protected, and explained the outline of the interview session. Before asking the questions for the first interview, I asked teachers follow-up questions about their survey responses. I asked them to elaborate any unusual responses, to provide me with their explanations, examples, or episodes. For example, when teachers responded that they had found irrelevant research, I asked if they had any examples of irrelevant research to their teaching.

The first interview took from thirty minutes to one hour. At the end of the first interview, I provided teachers with the knowledge artifacts and the original papers, and I explained what I would ask about them in the second interview. I made clear that they had to read the knowledge artifacts prior to the second interview, and that the original papers were optional. The second interview took from thirty to fifty minutes. During the second interview, teachers evaluated the knowledge artifacts with respect to whether or not they were agreeable and useful.

I discussed earlier that researchers need to check the meanings of terms, such as “research,” “useful,” and “meaningful.” When teachers evaluated shared knowledge as useful, I asked what they meant by useful. In addition to asking directly about the meanings of terms, I asked specific examples of “useful” shared knowledge and “research” in order to infer and clarify what they meant by the main terms of this study. In general, I probed the meanings of the main terms, rationales that teachers had for their opinions, whether they had specific examples and episodes, and how they implemented particular shared knowledge in order to know what they meant by the shared knowledge. For example, when teachers answered that they argued for discovery learning, direct instruction, or a balance of the two, I asked how they implemented the ideas in their lessons in order to reveal what they meant by the abstract terms. In most cases, teachers’ specific examples and episodes allowed me to clarify what teachers meant by abstract terms and to look at why they used, modified, or did not use shared knowledge.

The two interviews were usually completed within a three-week period for each teacher. It was because teachers needed time to read the knowledge artifacts after the first interview session. For two out of fifteen teachers, the second interview was delayed two months because their first interview sessions were conducted in early December, their schools had a winter break in December, and they did not have time for the second interview in the beginning of the spring semester.

3.6. Data analysis

From the survey and the two interviews, I acquired three groups of data: the first was teachers’ thoughts of the usefulness of shared knowledge in general; the second was a group of episodes in which teachers used, modified, or did not use shared knowledge; and the last was teachers’ evaluations of the knowledge artifacts I selected and provided. The first data group

consisted of the survey results and teachers' thoughts about the usefulness of shared knowledge as a general category from the first interview. The episodes that teachers nominated in the first interview went to the second data group. Almost all the data from the second interview went to the third group, teachers' evaluations of the knowledge artifacts. For the two interview data, I recorded all the interviews with an audio recorder and transcribed them. The transcripts averaged about 3,600 words per interview, eight pages in single-spaced type. In total, the data base of the interview transcripts has approximately 240 pages from the 30 interviews of the 15 teachers.

For the survey analysis, I counted the frequencies of the responses and made two different tables: a table of the teachers' background information, and a table of the teachers' thoughts about the usefulness of shared knowledge. Regarding the interview data, I used the N-Vivo software program to code the interview data. The program was very effective because I had to code again and again with newly elaborated codes. I partly used the Excel software program to see the big patterns and relationships of the second data group, the episodes of use, modification, or non-use. Below I describe more specifically the data analysis process according to each data group.

Regarding the first data group, teachers' thoughts and beliefs about the usefulness of shared knowledge, I read the transcripts several times and used codes, such as "all should/work," "useful although not using," "learning process" "meanings (of theory and research)," "picking one piece," and "experimental verification." Some codes came from the survey items because I asked follow-up questions on survey items and teachers provided more specific responses to them.

For example, the "all should/work" code came from the three survey items: "Teachers should follow all recommendations from educational theories or research findings because they

were based on scientific evidence”; “There exist some educational theories and research findings that all teachers should follow across all contexts”; and “There were practical guidelines of teaching strategies or classroom management that work across all contexts.” When teachers answered yes to one of these three survey items, I asked them follow-up questions to ask specific examples of research, theories, or practical guidelines that work across all contexts, or that all teachers should follow. For the examples of research, theories, or practical guidelines, I used the code, “all should/work.”

It was relatively easy to find codes according to the survey and interview questions. However, all the codes I used did not come from the survey or interview questions. I needed more specific codes. Therefore, first I made big categories according to the survey and interview questions. Then I read the interview transcripts, made notes about potential additional codes, read again the transcripts, and added, eliminated, combined, separated, and specified the codes. I repeated this process until I thought I had enough inclusive and specified codes for the data.

In addition, qualitative approaches use open-ended questions, so they very often attain additional data beyond what the research questions are concerned about. In this case, the codes came from themes in the teachers’ responses. However, I made a few codes not because they were repeatedly found in the teachers’ responses but because I thought that they were worth to report. For example, I had a code of “rejecting but using”: the case that a teacher did not like shared knowledge, but she used them. This code just had two episodes of one teacher, but I thought that this code was worth reporting because this could be another meaning of having open-mind, and it shows that this case exists.

The second data group consisted of teachers’ own episodes in which they used, modified, or did not use shared knowledge. First, I grouped all the episodes into three categories of use,

modification, and non-use. Then I made notes on why the teachers modified or did not use shared knowledge in the individual episodes of modification or non-use. At first, I made four categories for the reasons: teachers wanted to use shared knowledge but could not use it; they did not agree that it is not applicable; they did not agree that it is not effective; they did not agree that it is not valuable. Then I specified these four categories with respect to the codes from the previous studies, such as relevance, validity, students' characteristics, and teachers' teaching philosophies and styles.

After coding the episodes of modification and non-use according to the reasons, I found that the episodes of use actually had various types of using shared knowledge, and modification episodes represented different types of modification. Therefore, I tried to find similarities and differences in the ways how the teachers use or modify shared knowledge in the episodes. I used the codes of replication, specification, and extension just according to my data. In the case of modification, I also tried to identify the types of modification in the episodes. At first, I distinguished two types of modification: the first type was only adding or expanding, and the second was changing—the case of eliminating part of shared knowledge and use alternatives.

At first, I used the N-Vivo to code the second group data. I used codes, such as “non-use-not student relevant,” “non-use-reality constraints,” “non-use-teachers,” “modification-reality constraints,” and “modification-students.” Then, I added the knowledge source into the codes, so that I had more specified codes, such as “non-use-reality constraints-curriculum,” and “modification-students-colleague.” Finally, I found this way was not very effective because this system had too many codes and did not help me see the big patterns and compare the cases of use, modification, and non-use. My research adopted a qualitative approach, but I collected more than forty episodes for each category of use, modification, and non-use. Therefore, although the

sample size was not as big as quantitative research, it was not meaningless to identify and compare patterns of use, modification, and non-use in terms of sources, reasons, and so on.

For example, I wanted to know how many modification episodes were due to students' characteristics compared to the episodes of non-use due to the same reason. However, coding by N-vivo was not effective for answering this kind of questions. Therefore, I made an Excel table for all of the episodes: the table had columns of the teachers' ID, three categories of using—use, modification, and non-use—, reasons of modification or non-use, knowledge sources, and so on. I used a pivot table function of the Excel software to make tables that identified patterns and compared the data, and this way turned out to be very effective.

I revised codes several times in the Excel table of the episodes: For some codes, I put them together into more general ones; for another codes, I broke them up into more specific ones. At first, I made specific descriptions for individual episodes and then categorized the specific descriptions into more general ones in order to compare the episodes. For example, for the reasons of modification or non-use, first I made specific notes but later made them more simplified.

Occasionally, I specified and added codes in the columns. For example, at first I made only one code for the source of shared knowledge, but I realized that when the teachers modified particular shared knowledge, there were two kinds of sources: where the original shared knowledge came from and where they acquired modification ideas. For example, when a teacher modified instructional material from a district curriculum by following her colleagues' advice, the original knowledge's source was a "curriculum," but the second source was "colleagues" because she acquired modification ideas from her colleagues.

Comparatively, the third group data was easy to code. At first, I made big codes according to the name of the knowledge artifacts such as “Bowles and Gintis” and “Behavior notes.” Then, I coded whether teachers agreed with each knowledge artifact, and whether, why, and how they thought it is useful or not useful. For the reasons that teachers thought the knowledge artifacts were useful, codes came from the previous literature and from the data itself. For example, first I made two codes of how the teachers use shared knowledge: instrumental and conceptual. However, I found that all the responses could not be grouped into these two categories so made “generating their own practical knowledge,” “reminding,” and “justifying or confirming” codes according to the data.

Chapter 4: Teachers' perceptions about shared knowledge

In this chapter, I describe what images and concepts of educational theories and research teachers hold and what they thought about the usefulness of shared knowledge including research-based knowledge and explicit practical knowledge. First, I report the survey results that show what teachers generally thought and believed about the usefulness of shared knowledge. Then, I describe teachers' concepts and images of educational research and theories, and illustrate themes in the teachers' explanations of how they use shared knowledge. These findings came from teachers' responses to the survey and the survey follow-up questions in the first interview.

4.1. Survey results: the usefulness of shared knowledge

Before the first interview, I surveyed teachers to ask their thoughts and beliefs about the usefulness of shared knowledge as well as their background information. As I addressed earlier, the survey had mainly two groups of questions about the usefulness of shared knowledge. One group was to ask whether or not teachers had ever experienced that shared knowledge was not useful due to relevance, generalizability, reality constraints, students' characteristics, and teachers' teaching philosophies and styles. The other group consisted of "even if" questions that asked whether shared knowledge could be useful even if it lacks usefulness due to relevance, generalizability, reality constraints, students' characteristics, and teachers' teaching philosophies and styles. In addition, the survey had four general questions to check teachers' thoughts and beliefs about the generalizability of shared knowledge.

Table 3 presents the survey results of the teachers' thoughts and beliefs about the usefulness of shared knowledge. As table 3 indicates, almost all the teachers responded positively to the first group of questions. They answered that they had experienced particular

shared knowledge that was not relevant; it was unbalanced, narrow, or too ideal; it did not work for their students; and did not work due to reality constraints.

However, regarding the factor of teachers' philosophies and styles, teachers had somewhat different thoughts about the usefulness of other teachers' practical knowledge compared to the usefulness of research-based knowledge. 11 out of 15 teachers responded that they had found that educational theories and research did not fit their own teaching philosophies and styles. In contrast, all the teachers answered that they had found that other teachers' advice, teaching strategies, lesson plans, or worksheets did not fit their teaching philosophies and styles. All the teachers thought that other teachers' practical knowledge could not fit their own philosophies and styles, but all of them did not think that this would be the same for educational theories and research. Although the sample size is so small that I cannot say the difference is significant, this may indicate that teachers thought that research-based knowledge may have more generalizability than practical knowledge from other teachers with respect to teachers' philosophies and styles.

Regarding the second group of "even if" questions, the majority of teachers answered that shared knowledge was still useful even if it did not provide specific prescriptions, was not relevant to their contexts, was unbalanced, narrowed, or too ideal, did not work for their students, did not fit their teaching philosophies and styles, and did not work due to reality constraints. I describe and discuss what teachers meant by "useful" when they said that shared knowledge could still be useful despite the limiting factors in Chapter 5.

In addition, 11 out of 15 teachers did not agree that "there is nothing as practical as a good theory" mainly because they thought that, in addition to good theory, teachers needed practical knowledge, such as knowledge of how-to and of context specifics for practice. Among

the teachers who agreed with this, two teachers said that they agreed with this only if the theory was “really good” and had reliable scientific data. The other two teachers answered that they were not sure about this because it depended on the qualities of individual theories.

The majority of the teachers thought that there were theories, research, and practical guidelines that all teachers should follow or would work across all contexts: thirteen teachers agreed that “there exist some educational theories and research findings that all teachers should follow across all contexts,”; and twelve teachers said yes to the item, “there are practical guidelines of teaching strategies or classroom management that work across all contexts.” This is interesting because teachers almost always argued in the two interview sessions that there was no research, theories, or practical knowledge that works across all contexts especially when they evaluated the knowledge artifacts, and one of the most popular themes in their responses was “it depends” on context specifics: whether or not particular shared knowledge works depends on context specifics.

The inconsistency in teachers’ thoughts about the generalizability of shared knowledge may be due to differences in the features of particular shared knowledge. Regarding the two survey items, teachers’ examples of theories, research, and practical guidelines that all teachers should follow or would work across all contexts were very abstract, popular, taken-for-granted ideas, common sense information, or teachers’ ethical duties. For example, they nominated “child development theories,” “using different grouping,” “the format of a lesson,” “differentiating instruction,” “theories out there that kids that were loved and shown love and respect in a classroom, they do better in that environment,” and “keeping students interacting and discussing things with each other.” However, when teachers evaluated the generalizability of individual research findings, theories, or practical knowledge that were *not* relatively general and

taken-for-granted, they thought that whether or not particular knowledge works mostly depends on context specifics.

Table 3. Survey results

		Yes	No	Not sure	Total
1	As a teacher, I agree with that “there was nothing as practical as a good theory” in teaching.	2	11	2	15
2	Teachers should follow all recommendations from educational theories or research findings because they were based on “scientific” evidence.	1	14	0	15
3	There exist some educational theories and research findings that all teachers should follow across all contexts.	13	2	0	15
4	Even if educational theories and research do not provide specific prescriptions, it can still be useful for teachers.	13	2	0	15
5	Sometimes I have found that educational theories or research findings were not relevant to my teaching.	14	1	0	15
6	Even if educational theories or research findings were not relevant to my teaching, they could be useful for me.	13	1	1	15
7	Sometimes I have found that educational theories or research findings were unbalanced, narrowed, or too ideal.	15	0	0	15
8	Even if educational theories or research findings were unbalanced, narrowed, or too ideal, they could be useful for me.	13	2	0	15
9	Sometimes I have found that educational theories or research findings do not work for some kids or for my class because they were different.	13	2	0	15
10	Even if educational theories or research findings do not fit my class, they could be useful for me.	14	0	1	15
11	Sometimes I have found that recommendations from educational theories or research findings do not fit my teaching philosophy or style well.	11	3	1	15
12	Even if educational theories or research findings do not fit my teaching philosophy or style well, they could be useful for me.	14	0	1	15
13	Sometimes it was difficult to follow recommendations from educational theories or research findings because of reality-constraints.	15	0	0	15
14	Even if I cannot follow recommendations from educational theories or research findings because of reality-constraints, they could be useful for me.	15	0	0	15
15	There were practical guidelines of teaching strategies or classroom management that work across all contexts.	12	2	1	15
16	I always apply other teachers’ advice, teaching strategies, lesson plans, or worksheets without any modification or rejection.	0	15	0	15

Table 3 (cont'd).

17	Sometimes I have found that other teachers' advice, teaching strategies, lesson plans, or worksheets do not work for some kids or for my class because they were different.	14	0	1	15
18	Even if other teachers' advice, teaching strategies, lesson plans, or worksheets do not fit my class, they could be useful for me.	15	0	0	15
19	Sometimes I have found that other teachers' advice, teaching strategies, lesson plans, or worksheets do not fit my teaching philosophy or style well.	15	0	0	15
20	Even if other teachers' advice, teaching strategies, lesson plans, or worksheets do not fit my teaching philosophy or style well, they could be useful for me.	13	2	0	15
21	Sometimes it was difficult to follow other teachers' advice, teaching strategies, lesson plans, or worksheets because of reality-constraints.	14	1	0	15
22	Even if I cannot follow other teachers' advice, teaching strategies, lesson plans, or worksheets because of reality-constraints, they could be useful for me.	15	0	0	15

4.2. Teachers' images of educational theory and research

Before investigating what teachers mean by the usefulness of educational theories and research, I looked into what images teachers hold regarding educational theories and research. I asked teachers what could be examples of research and theories by the survey follow-up questions in the first interview. It is important to check teachers' images of educational theories and research for two reasons. First, when researchers ask teachers about the usefulness of educational theories and research, if teachers have different understandings of educational research and theory from those of researchers, the researchers would not interpret the teachers' responses correctly.

Second, the images of educational theories and research that teachers hold is important to whether or how they expect to use them (Eraut, 1994, p.59; Russell, 1988). For example, teachers' knowledge use would be different according to whether teachers view theories and

research as universal laws, validated guidelines, respectable opinions, or falsifiable stories. In this chapter, I describe the teachers' images of educational theories and research.

Educational theory and research as unfamiliar concepts or tools

When I asked teachers to provide examples of educational theories or research, they could rarely name particular ones. They often responded that it was very difficult to recall and name any theory or research because they graduated from universities such a long time ago. Even when they provided examples of educational research or theories, the examples tended to be general and very popular principles, such as “seven modalities of learning,” and “the five big ideas of reading.”

I found a similar thing when I collected teachers' episodes of use, modification, or non-use of shared knowledge in the first interview. There were *relatively* a small number of episodes about research findings or theories: one-third of episodes were about them. Two thirds of the episodes teachers nominated were prescriptions from their workshops, curricula, and colleagues rather than research findings and theories from journals and university courses. This indicates that educational theories and research were not very familiar concepts or tools that teachers often faced and used in their daily work. Rather, their images of educational theories and research were more like the knowledge that they learned in university courses.

However, it does not mean that teachers had never used educational theories and research in their practice. It would be more correct to say that they used theory-based or research-based principles, strategies, activities, and materials rather than applying *directly* particular research findings or theories to their classrooms. They often answered that although they did not have examples of particular research or theories, they had examples of “research-based” or “research-oriented” knowledge from workshops, district curricula programs, and books: they frequently

responded that “I don’t remember or pick and say particular research or theories, but I have plenty of examples of research-based or theory-based strategies, materials, or ideas.” For example, teachers often mentioned that they were using research-based or theory-based programs, such as *Response to Intervention Initiative*, *Lucy Calkins School Writing Program*, and *Everyday Mathematics*. This indicates that teachers apply educational theories and research to their practice by using “research-based” or “research-oriented” principles, strategies, activities, and materials rather than adopting educational theories and research findings themselves.

In addition, it is possible that teachers rarely nominated particular theories and research partly because they used them mainly in tacit ways: theories and research that they learned mainly in teacher preparation programs had already been incorporated deeply in their teaching philosophies and styles, so they could not even recognize even that they were actually using research and theories (Weiss, 1980). For example, in the first interview, when Robin explained how different her philosophies were from those of her colleagues, she addressed “educational chaos” as part of her philosophy. She could not name specific theories or research papers of “educational chaos,” but this was what she learned and read research papers in her preparation program, and she incorporated this theoretical idea in her teaching philosophy.

I don’t mind students talking and I don’t mind a little bit of the educational chaos ... [what do you mean by educational chaos?] That’s, I like to say that when the students were up and were to walk into the classroom and it doesn’t look like it’s organized, it doesn’t look like it’s structured, but the students all have a specific role and know what they’re doing and learning was taking place, so it’s educational ... it’s a little bit loud, but they’re learning, I’m okay with that. [Where did you get the idea?] That’s a lot from my MSU classes, ... a lot of the research has shown us that students were more engaged when they were given an active role in the learning process and weren’t passive learners who were just sitting there. ... [There was research supports the idea?] There was. I can’t name a specific study, but there’ve been several books that I’ve read that does support by research. [Robin]

Brain research as a popular image of research

A popular image of educational research that teachers hold was experimental research of teaching and learning. This is consistent with previous studies about teachers' concepts of educational research. For example, Zeuli (1991) found that some teachers did not regard conceptual or historical research as educational research; rather, they regarded only empirical research as "research." Throughout my interviews, I never heard teachers mention historical or conceptual studies as examples of educational research.

Interestingly, one third of them mentioned brain research as examples of research. However, the brain research findings that they mentioned were not that specific, rather they were like common-sense ideas or taken-for-granted knowledge. For example, as brain research, some teachers said that "movement helps children learn because the brain responds to certain stimuli that helps with learning," "repeating an activity helps learn," "left-brained kids do this better and right-brained kids do that better," and so on.

Teachers tended to view educational research as experimental research with empirical data. This image of research was one reason that they believed research was more useful than theories. When they evaluated the usefulness of theories and research, they frequently mentioned that theories were less reliable and valuable than research because theories were often not data driven: theories are just "their side of the story," "opinions," and "it's an idea, but it isn't data driven." They said that if a particular theory had experimental data, it would be more powerful to change their thoughts and practice. For example, Ellen said, "If they gave me a good fact, if they could prove to me that it's a better way I would, maybe I might change my teaching."

Educational theories and research as big pictures and backgrounds

Many teachers had images of theories and research as big pictures, backgrounds, and guidelines. This meant that the role of theories and research was to provide teachers big pictures, backgrounds, or guidelines, and the role of teachers was to specify them according to their contexts. Therefore, they thought that teachers needed additional skills and knowledge to apply theories and research to practice. They often said that though theories and research were given to teachers, there were still many decisions that they needed to make in order to use them.

Research is a good guideline but you also have to put some of your own knowledge and experience into those research findings. [Robin]

Information from the university, it's not specific. It's big picture and so you can look at that in theory and think yeah. Yeah, I can see where, in theory, that's great. And then when it comes to applying it to your own classroom, you need more specifics. You need more user friendly things to use right now in the classroom. [Eddie]

I think if you have a general blanket statement of a research, if you get the general idea of it then you can take that idea in and make the prescriptions yourself. Find out what will work for your group at that particular time. What may work for a small number of kids may not work for a small number of kids. So taking a general idea of the research, what someone else found worked and then find your own way to make it work for you. [Sam]

Due to the aspects of theories and research, several teachers criticized their usefulness. They argued that theories and research should provide more details and specifics to them in order to be used in practice. This is partly because in most cases teachers *already* knew enough about big pictures or guidelines that theories and research provided. Some teachers argued that very often what teachers needed were how-to strategies to specify and implement the big pictures or guidelines from theories or research. For example, Joan felt that *Respond to Intervention Initiative* was not that useful because it did not tell teachers what to do specifically.

I'm thinking specifically about the new *Respond to Intervention Initiative*. ... They want teachers to give interventions to students who were low, like in the top five

percent low. And we're all sitting around thinking, okay, what interventions do you want us to give them? And they're saying, the ones they need. And we're saying, what do they need? How do we find out what they need? ... I haven't yet figured that out. There's times I get frustrated. I say, "I want more details." [Joan]

The usefulness of theories and research as collective bodies

When teachers evaluated the usefulness of educational theories and research, several teachers evaluated the usefulness from the perspective of seeing theories and research as collective bodies rather than evaluating the usefulness of individual theories or studies. They said that educational theories and research as a collective body had influenced and improved practice. For example, Beth explained how the idea of whole language had been “evolving” and improving literacy teaching in classrooms. She addressed that whole language people had developed the idea by specifying the abstract ideas into strategies, activities, or materials. She thought the specific ones were helping teachers understand and implement the idea of whole language and finally improve their literacy lessons.

This perspective was similar to Weiss's (1979) enlightenment model of research use. She argued that social science research as a collective body improves and enlightens practice rather than a single study directly affecting it. This view on the usefulness of educational theories and research may influence how teachers use them for practice. For example, Jennifer argued that in order to utilize better educational theories or research, teachers needed to understand “a common thread in many studies” rather than focusing on individual research.

In sum, educational theories and research were not familiar concepts or tools that teachers often faced and used in their daily work. A popular image of educational research that they hold was experimental research, and they viewed the role of educational theories and research as big pictures, backgrounds, and guidelines for practice. Several teachers thought that theories or

studies as collective bodies had influenced and improved practice. Next, I describe teachers' knowledge use according to their explanations.

4.3. Teachers' explanations about their knowledge use

When I asked teachers about the usefulness of shared knowledge in the first interview, many explained how they used it in their daily work. I found four themes in their knowledge use: (a) teachers tended to collect shared knowledge as much as possible; (b) they thought that knowledge utilization took time and practice; (c) their verification of shared knowledge was experimental and personal; and (d) they often emphasized on having an open mind to accept and use external resources.

Collecting knowledge as much as possible

Huberman (1993) used an analogy of squirrels' habits to describe elementary teachers' ways of using information. He said that "like a squirrel, the elementary teacher gradually stores a chemistry kit here, a vocabulary game there, and a series of math drills elsewhere, and then picks and chooses bits from each." In the similar vein, I found that teachers had a tendency of collecting shared knowledge as much as possible and then adding it to their "tool belts" or "back pockets."

In the similar vein, many teachers argued that there was always at least *one useful piece* when they received shared knowledge from outside sources though they could not use or did not want to use it as a whole in its original form. They often mentioned, "You will always find out at least one piece useful."

I think when you find a good theory there's a way to apply it to, at least, a piece of your teaching, or a piece of your professional growth, or a piece. You might not take the whole thing, the whole piece of it, but just that little part that fits what you need. ... I think if it truly was researched and it truly has been practiced you can take something away. Usually when I go to a conference or something I say if I can take one thing home with me, ... then it's been a day well spent. [Beth]

I think that any research that we read, we can always pull something from it. I think that you can always find something useful, whether it's something that you use with just one child because that child needs a special adaptation. Or if it's something that you do in small groups, or if it's something that you do with the whole class, but maybe you'll just pick a little piece out. [Clara]

Even if teachers did not use immediately shared knowledge in an original form, they thought it as useful because of its potential use for somewhere and someday. Therefore, some teachers advised, “You can't just throw it all out because it doesn't work that one time for that one particular moment.” This indicates that teachers were not interested only in immediate use of shared knowledge. Rather, they also consider its potential value, so they tended to collect and store shared knowledge as much as possible.

For example, several teachers found particular shared knowledge was not relevant to their whole classes, but they used it for a particular group of students or a small number of students in their classrooms. For instance, Kathie thought some writing activities were too advanced for most of her students, so she used them only for her advanced students.

There were some activities that couldn't work for a lot of the kids. But some kids could do it. For example, a writing center where you have pictures. And the kids would look at a picture and come up with a creative story about the picture. ... But only the kids who already know how to write can do that. But you want to make sure you're challenging those kids so they weren't left behind and not able to make growth on the advanced in just as much as you're helping your lower kids. [Kathie]

Interestingly, I found that some teachers collected even shared knowledge that they did not agree with. They said that they collected and kept even “untrustworthy” knowledge in their “back pocket” because it possibly turns out true someday, and then they would change their original disagreements and use the ideas. For example, Ellen disagreed with the research finding that ADHD kids would learn better in a bland area without any decoration. However, she said

that it was still useful because it could be one *potential* explanation if her ADHD students would make problems in the future.

I guess to go back to the example of the way you decorate your room affects ADHD students. I don't truly believe that's true. But it's always in the back of my mind something that I think about. ... "This student was having trouble because it's the way my room was set up. Well, can I try to change something differently for that student?" So I always do think in the back of my mind, even if I don't agree with something I always think in the back of my mind that it could be proven true. ... It's always there to go back to it and maybe change my opinion. [Ellen]

Some researchers (e.g., Kagan, 1992) have argued that teachers filtered shared knowledge and did not use it when it turned out "untrustworthy" by their filters. This was true in the study, but I also saw that they collected and kept even "untrustworthy" shared knowledge in the back of their minds for potential future uses: they thought they could use it for potential explanations or options for actions later. The teachers filtered whether particular shared knowledge was relevant or trustworthy, but they did not "filter it out" because they thought it had potential use.

It takes time and practice: the process of internalization and incorporation

Eraut (1994) pointed out that significant new knowledge cannot be "used" until it is integrated into a person's overall teaching style. Many teachers often said that it took time and practice to "use" particular shared knowledge in terms of internalizing and incorporating into their teaching philosophies and styles. They thought that using shared knowledge was a kind of a learning process that required time and effort. For example, Julie said that "it takes three years to really feel very comfortable with a new way of doing something."

Some teachers said that in order to "use" new ideas, they needed to practice them, to go back and listen to the ideas again, to make another experiment, and then to repeat this process. Especially, regarding workshops or district programs, they said that although they learned new

ideas from a workshop, they often went back to the workshop and learned something new about the ideas. Therefore, several teachers mentioned that it was not worthless to attend workshops on the same ideas again and again because it helped them “reinforce the ideas,” form a “solid understanding,” and “learn more and understand more.”

Sometimes you go to them (workshops) and it’s just a lot of knowledge, and it’s not practical application. So, you’re pulling in all of this new knowledge that you haven’t had before. ... But you’re not learning how to apply it yet. You just have the knowledge. I think that they need to be allowed, though, time to process. Because sometimes you go to a conference and they pour all this information into you. When were you going to have time to practice it? And then eventually the application will come at a different time. [Joan]

The way I think about it was when I’m listening the first time through I’m listening with new ears and I don’t hear everything that the presenter was saying. And so the next time I think, okay now this was what I’ve been able to do in my classroom. Or you go back and you get started and you can’t implement it the way you thought. Gosh, this doesn’t look the way it really should. Then you go back and you hear the parts that you need to hear that time through. So I think sometimes with repeating it’s kind of better. [Beth]

The process shows how teachers internalize and incorporate new knowledge from external sources into their own practical knowledge. Some teachers developed their practical knowledge by incorporating new knowledge on the basis of their own teaching experience, philosophies, and previous practical knowledge. For example, Clara and Liz explained how they got familiar and comfortable new ideas by repeating the process of experimenting and then finally how they integrated them to their teaching. They first followed the prescriptions but incorporated them with modifications according to their contexts. Interestingly, it was not only teachers but also students who needed to be familiar with new ideas or strategies: both of them needed time and practice to “use” shared knowledge.

Lucy Calkins does a little mini-lesson with the kids. ... I’ve got it down to instead of reading her scripts now like I did the first time, I kind of put it in my own words and pull the important things that I think this group needs. And I do still go around and I work with the individual students like she said. And sometimes we come back

together at the end, sometimes we don't, depending on the amount of time we have. [Clara]

A lot of times I'll try it the first time the way they say. Because until you try it a lot of times, you don't know. ... I think, well, they (her students) have been introduced to it (a workshop activity) and it goes over it again and again. So I think don't worry if they don't have it yet. ... I think too that, maybe trying it in the beginning and my skills and their skills weren't at the level of mastery for it yet, but not to give up and try it again. Because I'll get better at it and you'll get better at it. [Liz]

Experimental verification

Lortie (1975) said "No one can give you a lesson plan and say 'go to it this way' because what works for one may be poor for another" (p.78). Most teachers said that it was only a teacher herself who could say whether or not particular shared knowledge would work for her classroom. Although particular shared knowledge was already proven valid through scientific methods or colleagues' experience, they did not think that the proof guaranteed it would also work for their contexts: the proof only gave weight to try the idea. Therefore, they thought that they had to make their own experiments to find out whether or not particular shared knowledge works in their classrooms. They often said, "You have to take ownership of it and know how it's going to work for you or it won't work" and "part of education was a little bit of experimenting to see what works."

I would try and see if it would work for me. And sometimes it did, and sometime it didn't. And whether it was because of the way I implemented them or it was because the needs of my students were different from theirs. You have to view that and evaluate it and then come back the next year and say this was what I tried. This was why it didn't work. What can I do now? And then you go from there. You keep modifying. You're constantly as a teacher modifying the way you teach every single year. [Joan]

Just from the experience that I've had just over the twelve years of teaching, which wasn't really that long of a time. But through it I think I've grown as a teacher in understanding and I think I'm pretty wide open to learning new things too. I'm open to trying new things. You give me an idea and I'll run with it. I'll take it and say, "I'll give it a shot. We'll try it and see how it goes." If it works, it works. If I like it, I like it. If I don't, maybe I'll try it again later. [Ellen]

Teachers believed that the usefulness of shared knowledge eventually depends on individual teachers. This belief made them avoid affirming whether or not particular shared knowledge was useful for “teachers” as a corps. What they can say was whether or not particular shared knowledge was useful for them, not for other teachers. They often responded “I do not accept this idea but if it works for another teacher, then I don’t have any problem with that.”

They’re obviously saying that the girls were not getting as much or the boys were not. There’s a problem there. But I wouldn’t disagree with it if it was working for that person. Whatever you can find that works for you and your kids were learning the best, that’s the best way. ... I think it just depends on the teacher and how it works for them. I’m not going to say nobody should do what they’re saying because that might really work for somebody else. And if it’s successful in your classroom, you should do whatever works for you and for your kids. [Ellen]

Teachers’ personal experimental verification of shared knowledge may come from their other belief of “it depends,” that is, whether or not shared knowledge works depends on context specifics including teachers’ philosophies, perspectives, purposes, and styles.

Emphasis on having open-mind

During the two interview sessions, teachers frequently emphasized on having open-mind. They often argued that teachers should keep open-minded not to “block down their own thoughts” and “be stuck in their ways” when they encountered shared knowledge from external sources. According to their responses, they meant by being “open-minded” was to try new ideas, not to use only their preferable principles and strategies, to use different ideas beyond district curricula, and to exchange and gain ideas from their colleagues having different philosophies or working at another districts.

Interestingly, there was one teacher who reported that she rejected particular knowledge but she later used it. She did not think two ideas—writing lesson goals on the board and the Stoplight management strategy—were appropriate at first, but tried them. She thought writing

lesson goals on the board were not applicable for her kindergarten level because kindergarteners could not read them. However, she tried the idea and found it beneficial: writing lesson goals allowed her to stay focused on them during lessons, and her students became interested in the goals that their teacher read aloud to them. Regarding another “inappropriate” idea, the Stoplight management strategy, she thought that it was not valuable because it did not seem to fit her teaching philosophy and style. However, she tried it and found that it worked well.

(At a workshop) they talked about writing on the board your goals for them in, like, reading. ... “Well, they can’t read it. I’m not going to try that.” But if I don’t try it, I don’t know. Maybe it’s something that’s very powerful that I haven’t even tried. So I did try it even though I thought, well the kids can’t read it. But I can read it to them. ... It helps me stay focused on what I’m doing in my lesson. ... The kids can’t maybe read them. But they know it’s something important. And they know it’s something that the teacher’s trying to communicate. [Liz]

There’s some behavior management type things I’ve tried that really weren’t my style. So it’s a behavior thing. It’s like a chart. I think we learned it from Michigan State. The students were green. And then if they do something that breaks a rule they get a warning. ... And then if they get more warnings you change their card from green, yellow, to orange. ... At first I said, “That’s just not my style. I didn’t like that they had warnings that they had to change their colors ... It seemed tough. ... But the parents like it and the kids like it. So even if I don’t really personally think it’s my style, it works. ... So I keep using it. [Liz]

I could not see this kind of cases in many teachers. However, the cases of Liz may provide one important meaning of being “open-minded,” which is to try knowledge from external sources even though you may not find it applicable or valuable.

Summary and discussion

In sum, educational theories and research were not familiar concepts or tools in the teachers’ daily work. They rarely applied theories and research findings directly to their classrooms, but they used “research-oriented” principles, strategies, activities, or materials, mainly from workshops, district curricula, and books that research findings or theories were

translated in teacher-friendly forms. Their main concern was instrumental use, but they did not always focused only on *immediate* use. Rather, they were likely to collect shared knowledge as much as possible for potential use.

The tendency of collecting shared knowledge may be one way to deal with the uncertainty of teaching. Teaching is inherently uncertain due to its lack of a “scientific” knowledge base and the complexity of work (e.g., Helsing, 2007; Lortie, 1975, Huberman, 1986). Teachers thought that since teaching was very uncertain with no easy or clear-cut answers, good teaching involved collecting as many teaching methods and strategies as possible. When they face unexpected situations, they pull out appropriate knowledge from their collections. If they have the larger bag of tricks, they are better able to deal with “uncertainty.” The tendency is also consistent their strong beliefs that “every context is idiosyncratic” and “there is no perfect knowledge that works across all contexts” which I heard very often in the interview.

Previous researchers have argued that teachers filtered shared knowledge and did not use it. It was true in my study, but I saw that they even collected knowledge that they did not think as relevant or trustworthy for potential use. In addition, I saw that they thought shared knowledge could be useful even if they were not able to use it instrumentally. Besides instrumental use, teachers recognized various ways of using shared knowledge. I describe and discuss the varied ways of using shared knowledge in the next chapter.

Chapter 5: Various ways of knowledge use

Knowledge use is a complicated process and has various meanings (e.g., Weiss, 1979; Rickinson, 2003). In order to explore what teachers mean by the usefulness of shared knowledge and how they use it, I collected three different kinds of data: teachers' thoughts and beliefs about the usefulness of shared knowledge in a general category; their own episodes in which they used, modified, or did not use shared knowledge; and their evaluations of the knowledge artifacts. In this chapter, I describe and discuss what teachers meant by "usefulness" of shared knowledge and how they used it by analyzing the three kinds of data.

5.1. Instrumental use

Teachers tend to criticize educational theories or research because they fail to provide specific, technical prescriptions for what to do in classrooms (e.g., Gore and Gitlin, 2004; Joram, 2007). They usually evaluate the usefulness of educational theories or research in terms of instrumental utilization. In this perspective, educational theories or research are regarded as a tool to solve practical problems: if we find out appropriate and plausible tools supported by research findings, we can solve many vexing problems and ultimately improve education practice.

I also found that teachers mostly meant the usefulness of shared knowledge by instrumental usefulness, and that they evaluated its usefulness primarily in instrumental ways. For example, when I asked them about the meanings of the usefulness of shared knowledge in a general category, they defined "useful" as "when I unlock my door and walk in the room, what I can use in my teaching," "you can apply it," and "ready to use."

When I asked teachers to nominate their own episodes in which they used, modified, or did not use shared knowledge, I collected 137 episodes. There were 50 episodes of using, 42

episodes of modifying, or 45 episodes of non-use of shared knowledge. More than half the episodes of use were about instrumental use, and all modification episodes could be regarded as instrumental use. In these episodes, I found that teachers used or modified shared knowledge as tools in order to yield better learning outcomes, to better motivate their students, to more efficiently organize classrooms, and so on.

For example, Lucy adopted a literacy center idea of making paper books to motivate her students, and Ellen used open ended discussion strategies instead of teacher-guided discussion, and found the new strategy more beneficial for students' learning and motivations.

[What did you use from the workshop?] Making books. Many gimmicks. Something new gets kids intrigued and interested in doing it. So maybe a different literacy center where kids are going to make a new book. Take a piece of paper and fold it in these different ways and they can make a book without having a staple. ... Doing it a different way gets them excited about doing it than the same old routine every time. [Lucy]

Like open ended discussions where the kids basically do a lot of the talking. And there's very little teacher guidance. They can kind of just discuss it. ... The discussion that I tend to have are much more teacher guided. And then when you want them to have an open ended discussion without them having any practice with that it's not an easy task to do. But I can see it (open ended discussions) being beneficial. ... More engaged. It stimulates thinking. [Ellen]

In addition, I found that instrumental use has various types. In the episodes of use, teachers copied and replicated shared knowledge, specified it, or extended it to different areas. In addition to the three types of instrumental use, the modification episodes also show that instrumental use has a variety of types. Though in this paper I categorized separately the episodes of use and those of modification, modification could be another type of using shared knowledge. In the episodes of modification, teachers added, expanded, reduced, and changed, and eliminated part and used alternatives. This indicates that instrumental use is not a mechanical application of shared knowledge: rather, in many cases, it requires teachers' reflection and

professional applications. I describe and discuss the various types of use and modification in Chapter 6.

In the second interview, when I asked teachers to evaluate the knowledge artifacts, their main concern was again instrumental use. They were eager to find ways of using them as problem-solving tools in their current classrooms. When they evaluated the artifacts, several teachers responded that they accepted the artifact, but it was not useful because it lacks information of what to do or how to do for their particular contexts. However, the majority of the teachers often said that the artifact could still be useful although they could not or would not use it instrumentally. In this case, the teachers meant “useful” in more various ways. In the following sections, I describe other varied meanings of “usefulness” and ways of using shared knowledge.

5.2. Conceptual use

A number of researchers have maintained that educational research is able to contribute to practice in conceptual ways: it influences practice by expanding, challenging, and changing practitioners’ perspectives (e.g., Weiss, 1980; Shavelson, 1988). For example, Shavelson (1988) argued that the contribution of research does not lie in providing immediate and direct applications but rather in gradual and indirect influence by constructing, challenging, or changing people’s perspectives.

One fifth of the episodes of use had to do with conceptual uses. In the episodes, shared knowledge helped teachers see their practice differently so expand or change their perspectives or understandings. For example, in Clara’s classrooms, center activities had meant that every student did the same thing in each center, but a book made Clara realize the need of differentiation within centers for higher-level students. In addition, Eddie said that a university course changed his understanding of diversity. He had regarded diversity only as racial or ethnic

diversity, but after taking the course, he learned that the concept of diversity includes individual differences in learning abilities and styles.

I did centers. But I kind of did the centers the same. Like every kid would do the same thing here, and then the next group would do it. They would all kind of do the same thing. This book focused more on let's assess the children first. And I think that it really did kind of open my eyes to not only focusing on the lower end kids who don't really know as much, but also giving those upper end kids a challenge. ... I think this made me realize more about those high kids. They need to be pushed too. ... that was kind of the 'aha!' I was like, oh. I should be pushing the higher kids too. [Clara]

In the course, they talked about dealing with diversity in the classroom. And I'm like, well that's not a problem. I don't, I don't have a problem dealing with diversity. I mean it's, I see everybody as the same and ... I was like well this was useless. I already know this. But I mean, later on, you learn that it's, it's been a problem with other people. And it's not just race, but it's, it's learning ability, it's learning style, it's, it's not just the diversity that we learned about as treating every person the same. ... So I mean that was more of like a, kind of a race and social class kind of thing, but it applies more now to individuals at, they wanted, they told us that everybody's the same, but now they tell us, everybody was their own individual and you accept them for that. [Eddie]

Previous researchers argued for conceptual use as the usefulness of educational theories or research, but I found that teachers' practical knowledge was also used conceptually. For example, Lucy said that her intern's teaching philosophy and practice changed her perspective of a teacher's responsibility.

Last year my intern, ... he had a philosophy of 'what was my responsibility, what do I have to teach.' And I said "your responsibility was to teach this state GLC. In the end this was your philosophy. This was your goal." ... One day the district saying "13 weeks was this." And he looked at it saying that might not be the best way for these kids. He put it (GLC) to a song - and he recorded music. ... So putting it to a song the kids got that GLC without going through 13 weeks of this same stuff. He was able to bring in fun games and activities. It helped me realize that I don't have to do all of these activities to get to here with certain things. [Lucy]

In the second interview, I saw that teachers conceptually used the knowledge artifacts. Especially, many teachers conceptually used the artifact of Bowles and Gintis. For instance, Ann explained how the artifact of Bowles and Gintis changed her understandings and thoughts. At

first, she thought that this study was not true because it did not seem to apply to her classrooms where she had worked for more than ten years. However, after she talked about this with her family, she realized that her experience could be limited, and accepted that it could be true in other districts' classrooms. Additionally, Clara and Liz said that the Bowles and Gintis study made them think about a bigger picture by connecting their teaching job to society.

I think it depends on the school district for this. But I do think it's valuable information. I think it helps us think about how we're teaching kids and what opportunities and activities and assignments we're giving them. And if it falls under, you know, we're just expecting them to follow rules and stuff like that, was it really enabling them to be problem solvers and thinking outside of the box and being more intrinsically motivated for education. So I thought it was a very interesting study and it made me think a lot about school districts and just opportunities for kids. [Ann]

But it did make connections to me because of where I teach and then where I live and looking at the differences. And I'm frustrated all the time with those differences when I see and go to school events just ten minutes away from here and what they can do. [Clara]

I think that we just get in our classroom and so focused on our curriculum that we kind of forget what the big picture was and where these kids were going to need to go educationally, what they need to learn to be successful.... I think as teachers we need to maybe, sometimes be a little more philosophical about society and education and more open minded. [Liz]

It seemed that conceptual influence and change in the episodes were so explicit and dramatic, so teachers to easily recall them in interview situations. However, when shared knowledge conceptually affects teachers' perspectives, it often happens that the process is so implicit and gradual that even a teacher herself does not recognize and nominate the influence. For example, in the first interview, Ann often said that she had learned the ideas and strategies of positive reinforcement in her teacher preparation program, and that she believed that positive reinforcement was very valuable and effective for classroom management. When she evaluated

the artifact of behavior notes, I found that positive reinforcement was part of her teaching philosophy and influenced the ways in which she used and modified behavior notes.

The following is part of her interview transcripts. The excerpts came from the different interview situations: the first excerpt came from the first interview session when I asked her if she had used knowledge from university courses, and the second one came from the second interview session when I asked her to evaluate the knowledge artifact of behavior notes. She did not seem to recognize that positive reinforcement from university courses influenced her way of using and modifying behavior notes. Her case would be an example that conceptual use is tacit.

So I think the graduate program at MSU, it was in special education. ... And I just think I learned so much in those classes that helped me help all kids to be successful. ... Like, a lot of positive reinforcement for kids that have behavior issues. So I'll do a plan with them and they get positively reinforced for good behavior instead of always focusing on the negative behaviors. So I use positive behavior plans a lot. [Ann]

I would do it (behavior plan) for both classes, my developmental kindergartners and my regular kindergartners. ... I do have some students—not all students—that were on behavior plans. ... I have four total between my both classes. And it just depends on the students. They look very different from each other. ... One has autism and ADHD, so the visual schedule helps him to really focus on those activities and know that he's expected to finish them and to stay on task. So it's really like reinforcing him. ... He can pick out a sticker, so it's more like a positive reinforcement reward chart. And then my other student has learning disabilities and that's kind of the same thing for him was the positive reward chart and that's to communicate. Because he attends another classroom in the afternoon so it's to communicate between teachers too, how his day went here. My third student, I don't send it home. It's just for me. Because at the beginning of the year she didn't do anything. She just stood at the back of the room. She wouldn't take off her coat, she wouldn't hang up her backpack, she wouldn't do anything. So I created that picture schedule for her to reinforce good behavior. So at the beginning of the year, I think the first month, she had no happy faces at all on her sheet. And then now she has all happy faces too. So it was just to reward her to interact and do the activities. ... And that was just more for me to keep track of her behavior and see if there were any things that were happening everyday that I could figure out what was bothering her. ... And then my last student, he sees an outside counselor and he has struggled for years before he even entered kindergarten with different things. So his mom asked that we have daily notes to communicate how his day went, so that's why I did one for him. They're not like a punishment system. It's just a

positive reinforcement for the behaviors and them sometimes just to communicate between adults about how the day went. [Ann]

In sum, teachers used shared knowledge conceptually although they nominated fewer episodes than those of instrumental use. Not only theoretical books, research, university courses but also conversations with their colleagues challenged teachers' perspectives. The conceptual change and influence in most episodes were somewhat dramatic, but a few episodes show that conceptual use could be implicit. This indicates that teachers might conceptually use shared knowledge more often than they nominated in the interview.

5.3. Combining both conceptual and instrumental uses

Teachers are mostly interested in instrumental use, but academics argue for research's contribution as conceptual influence. It is easy to think that conceptual use and instrumental use are separated: when teachers instrumentally use shared knowledge, they do not use it conceptually, and vice versa. However, I saw that teachers often used shared knowledge both conceptually and instrumentally especially when they were given both principles and strategies. In this case, principles that came from theories and research influenced teachers' perspectives and understandings, and then they applied specific strategies to their practice. The two kinds of knowledge encouraged and maximized each other's usefulness. Many teachers said that implementing strategies often helped them better understand principles. When they needed to modify strategies due to their context specifics, they went back to abstract principles and modified specific strategies according to the principles.

In the first interview, I found seven episodes where teachers used shared knowledge in both conceptual and instrumental ways: concepts and principles made the teachers see differently students' learning process and student discipline, and strategies helped them apply the concepts and principles to their classrooms. Five out of seven episodes were about shared knowledge from

workshops and district programs, and two others from books. This is partly because workshops, district programs, and books tend to provide teachers both big principles and specific strategies compared to other sources, such as research and teacher colleagues. For example, Julie explained how a phonics book changed her perspective of teaching phonics, and how she applied specific strategies in the same book to her lessons. Sarah talked about an “excellent” workshop on student discipline. It gave her new perspective of student discipline and specific strategies.

For instance, one book ... called *Phonographics*. It's research based. And the book was astounding. It made me rethink the way that I teach some things with reading. Especially teaching phonics. For instance, when they worked with children they found if they eliminated a lot of the jargon ... Short 'A', long 'A', open syllable, closed syllable, diphthongs, blends, consonants, vowels. It's just all this jargon. And kids end up hearing something called four different things. And especially for those kids who have memory and recall issues, they need just to get to the meat of it. ... It (this book) just takes away all that jargon that they don't need to know. So that was part of it was just learning that it's a sound picture and when they look at it they say the sound. (In usual teaching phonics) they called it "if that, then this" thinking. And it has to do with talking about phonics as rules. ... They showed how six year olds, seven year olds, their brains have not developed that kind of thinking, "if this, then that." ... To take all that jargon out of it you don't make it a rule, you just make it a pattern that they recognize with their eyes. [Julie]

I went to a really excellent workshop on behaviors and children with difficult behaviors. And rather than trying to impose something on the child or impose something on the classroom this whole approach was to check yourself as an educator and see what does this child need. ... To check your emotions and not to engage with the child and to realize they're acting out for a reason. ... [Did the workshop provide general principle or specific strategies?] Both. This particular book had really specific plans to follow in certain situations. But then the general idea was there as well. It would be, for instance, a child who would repeatedly refused a request or wasn't paying attention. Something as simple as make sure that your body's in proximity to the child as you're giving the lesson so that they're more focused on you. Things, such as that. [Sarah]

In addition, I found that teachers did not always prefer specific knowledge that would be more easily used instrumentally to abstract concepts or principles. They often said that they needed both abstract concepts or principles and specific strategies. Previous researchers have found that teachers thought specific prescriptions as very important and useful (e.g., Gore and

Gitlin, 2004; Huberman, 1983), but I found that many teachers thought that they needed theoretical ideas underlying specific strategies in order to better implement the specific ones. When teachers need to modify specific strategies, activities, or materials according to their “unique” contexts, if they do not know theoretical ideas as guidelines, the specifics would be just useless fragments. In this vein, several teachers said that they preferred comprehensive and systematic principles to specific strategies or materials. For example, Jennifer evaluated that particular specific activities and worksheets were not useful because they lacked big ideas.

Which part of the book impressed me, I think the idea that this book, this program, represented an opportunity for a very practical, yet comprehensive look ... I thought it was a more comprehensive piece because it included places where I might be able to not just teach what we call a “splinter skill,” just a very narrow piece. But rather, it involved many of the five big ideas of reading. ... So all of those areas were met with this. So that’s why I like this. It was quite systematic. ... I’m a person who likes to have a long range plan and within that plan I can adjust.
[Jennifer]

In sum, teachers often used shared knowledge both conceptually and instrumentally. Concepts or principles changed their understandings and perspectives, and then they applied specific strategies and activities to practice. It would be better to understand instrumental use and conceptual use as a continuum rather than two separated ways. Additionally, this indicates that providing both kinds of shared knowledge together would be a more effective way to help teachers utilize shared knowledge than just providing either abstract knowledge or a specific one.

5.4. “Use” as a source for teachers’ practical knowledge

Teachers used shared knowledge as a source to generate and develop their own practical knowledge. They produced their practical knowledge on the basis of shared knowledge from external sources. For example, Clara acquired the activity of writing students’ names on a board from a book, and evaluated this as too simple and not very valuable. Therefore, she generated her own activity based on the original activity in the book. The original activity had one purpose of

distinguishing the length of names, but her modified activity served multiple purposes to teach similarities of names, to recognize “dirt letters,” to learn a poem, and to help her students become familiar with each other’s names. She produced the activity by modifying the book knowledge and by using her colleague’s idea of “dirt letters.” Her process of creating the new activity is similar to that of creating a collage. She created the activity by using part of the book activity and part of her colleague’s ideas like people create a collage by pasting numerous materials from various stuffs.

The activity basically had them writing down each person’s name and shouting out if the letter was tall or short. I didn’t really see a whole lot of value in that. But I did see the value in using their names to help them learn. So what I did was I did write their names on the board like it said. But instead of just shouting out tall, short, tall, short, we looked at what were the similars in our names. Does it have the same first letters? ... Maybe the same letter at the end or, "Oh, I see three names that start with ‘A.’ ... I did introduce the tall, short like they had said. But then I also introduced my own—which I stole this from another teacher—dirt letters. Ones that go below the line. Like ‘g’ and ‘y.’ So we did tall, short, dirt letters. And I think that that helps them with their handwriting too. Because they need to know when they’re writing their name was it going to be all the way up? Was it going to go below the line? ... And then we do a little poem with that. It says, "Everybody has a name. A first name, a last name. People’s names were not the same. Tell me your name." And so we go around and we do that in the beginning of the year just to learn everybody’s names. [Clara]

Another example is various versions of behavior notes. I saw that many teachers developed and had their own versions of behavior notes with rationales. They produced the various versions of behavior notes according to their teaching philosophies, concerns, priorities, and students’ needs. For example, Ann tailored behavior notes according to her students’ individual needs. She used four different versions for each student. The four versions were different from each other in terms of the goals and procedures. While the basic idea of behavior notes was to correct students’ misbehaviors by communicating with their parents, Ann used behavior notes to track her student’s progress, to provide a visual schedule that helped the child

focus on his tasks, to provide positive rewards, and to communicate with his other teachers and parents.

Behavior notes, I do have some students—not all students ... I think I have four total between my both classes (my developmental kindergartners and my regular kindergartners). And it just depends on the students. They look very different from each other. Some have pictures and just the activity we did for the day. ... Two were special needs students. One has autism and ADHD, so the visual schedule helps him to really focus on those activities and know that he's expected to finish them and to stay on task. So it's really like reinforcing him when he does a great job 'cause he can see that he did well on all those activities. And most of the days he has all smiley faces. And then he can pick out a sticker, so it's more like a positive reinforcement reward chart. And then my other student has learning disabilities and that's kind of the same thing for him was the positive reward chart and that's to communicate. Because he attends another classroom in the afternoon so it's to communicate between teachers too, how his day went here. My third student, I don't send it home. It's just for me. Because at the beginning of the year she didn't do anything. She just stood at the back of the room. She wouldn't take off her coat, she wouldn't hang up her backpack. ... So I created that picture schedule for her to reinforce good behavior. So at the beginning of the year, I think the first month, she had no happy faces at all on her sheet. And then now she has all happy faces. So it was just to reward her to interact and do the activities. And so she's doing perfectly. And that was just more for me to keep track of her behavior and see if there were any things that were happening everyday that I could figure out what was bothering her. ... And then my last student, he sees an outside counselor and he has struggled for years before he even entered kindergarten with different things. So his mom asked that we have daily notes to communicate how his day went, so that's why I did one for him. They're not like a punishment system. It's just a positive reinforcement for the behaviors and then sometimes just to communicate between adults about how the day went. [Ann]

Teachers used shared knowledge as a source to produce or develop their own practical knowledge. Especially, when teachers made big modifications of original knowledge by changing or expanding its goals, the modified knowledge could be regarded as teachers' own practical knowledge. Or if we regard all modified knowledge as teachers' practical knowledge, all modification cases may be applied to this way of using shared knowledge.

5.5. “Use” for reflection

Teachers used shared knowledge to reflect on their thoughts and practice. As follow-up questions for “even if” items of the survey, I asked them why they agreed that shared knowledge could be useful for them even if it was not relevant, narrow, ideal, or did not fit their teaching styles and philosophies. They answered that it could be useful because “it helps you to refine your thinking and your understanding,” “clarify my thinking,” “I can learn about myself,” “realize the ways of my teaching,” “it makes me question it more,” and so on.

So even if I don’t agree with it, it still made me question and think about what I do and if I should maybe test myself ... But at least it made me think about it. Which I think we get so focused on here’s my math lesson, here’s my teacher guide for this. Here’s my teacher guide for that. Here’s how I’ve been running my room for years. And I think just hearing some ideas even if you don’t agree with them or you’re not sure the research was valid still makes you think about what you do and why. [Liz] I think that the more you can share (with your colleagues), even if you don’t agree with it, it can even kind of solidify for you why you think something else was better. I think if you never teach a bad lesson you don’t appreciate the good ones. And you kind of can learn from those mistakes. [Kathie]

Just as almost all people do not always recognize all their behaviors consciously in their ordinary lives, teachers also sometimes do not clearly recognize their practice. I saw that teachers used shared knowledge to recognize and reflect on their practice, their assumptions, and rationales. Teachers often said that “it made me think about what I do, how I do, and why I do it.” For example, after reading the knowledge artifact of ability grouping, Liz reflected on her ability grouping. She realized that she was using ability grouping and questioned herself if all her lowest reading groups were always Hispanic kids, and if they always stayed in the same groups. Clara said that the knowledge artifacts of constructivism and direct instruction made her think how and why she usually used the two approaches in her lessons.

It’s useful for me just because it makes me think about what I do. Because you might think, “I don’t use ability grouping. Wait, I do. I use it in reading. I don’t use it too much in math.” ... So it makes me stop and think. ... Stopping to think about

what kind of grouping if I do it by ability do I have? Were all my lowest reading groups always my Hispanic kids and they're never out of that group and they're always there? So I think it's good to question and look at what you're doing and say, "Wow. Maybe that's true." Or, "I should look into that more." So it's useful even if I don't agree with it because it makes me just think how much grouping do I do and maybe I should look at it a different way. [Liz]

I think that it just made me realize, made me think about what I do and how I do it. And it made me think, like, I don't really do a lot of standing up there direct instruction. I don't know. Maybe I do (direct instruction) more than I think I do. But I know that I include a lot of that discovery too. But it's a mix. And I think that's what works well. You can't just do one or the other. I think you have to mix them together. [Clara]

In sum, teachers used shared knowledge to recognize and reflect on their own practice, its underlying rationales, and assumptions. Although they could not use shared knowledge instrumentally, they thought it useful because of its use for reflection. This use for reflection is very important for teachers' professional development because it is the first step toward improving their practice to recognize and reflect on their practice and their rationales that they were not previously aware of.

5.6. "Use" as reminding

I found that teachers used shared knowledge as a reminder of other principles and strategies that they already knew but had forgotten. When teachers evaluated the knowledge artifacts, some often said that the knowledge artifacts were useful because the artifacts reminded them of related important ideas that they had learned but had forgotten. For example, regarding Klahr and Nigam's study that compared discovery learning and direct instruction, many teachers said that the study was useful because it reminded them of the importance of instructional guide: they said that teachers should make sure to provide students with clear guides and expectations before they let students explore materials and discover ideas. As another example, Sarah said that the Bowles and Gintis study reminded her of the need of being culturally aware in her classroom.

And right away I thought (before letting students explore materials) you need to make sure how to model how to use the materials, you need to make sure kids know what they're looking for. Do they have questions in their mind of what they're trying to answer? Do they know how to get themselves organized? If I remember correctly they were testing what would work better. Did they truly know what they were looking for? So that's how it was meaningful to me to remember those things. [Julie]

For me it's (the Bowles and Gintis study) reminder to be more culturally aware of my students. To not believe that they all have the same backgrounds and would understand the same ideas culturally based on a standard, middle class background. [Sarah]

Teachers have learned a great deal of knowledge from university courses and workshops, but they easily forget the knowledge unless they immediately and repeatedly apply it to their practice. One way to use shared knowledge is to remind teachers of other important ideas and principles that they had learned but had forgotten.

5.7. "Use" as confirmation and justification

Weiss (1979) noted that research was used to support practitioners' positions and decisions. In the similar vein, I saw that teachers used shared knowledge to confirm and justify their thoughts and practice. In the first interview, they said that shared knowledge can be useful because it can "solidify" and "justify" their thoughts and practice. When they evaluated the usefulness of the knowledge artifacts, several teachers used the artifacts to support and justify their current practice.

For example, several teachers mentioned that the artifact of Klahr and Nigam, comparing discovery learning and direct instruction, was useful because this study confirmed their previous thoughts that direct instruction was better than discovery learning. For example, Ellen thought that the artifact said "it is ok to give students more direct instruction." In addition, Eddie mentioned the Bowles and Gintis study was helpful because this study justified his behaviors of spending a disproportionate amount of time working with lower students.

I think it was very interesting with the findings. I would have thought they might have been a little more directed towards the constructivism. Like, they would have been higher scores. ... I think we try to avoid that so much. We want them to be openly learning. And I think with looking at some of these scores it said it's okay to give them more direct instruction. ... More guidance. So maybe I would definitely make sure that I'm giving enough guidance to my kids. And maybe even more than I felt comfortable with at first. That might be okay. [Ellen]

For me, I guess just (the Bowles and Gintis study is) helping to sort of justify why I spend a disproportionate amount of time working with the lower students. ... I think that to help rationalize to myself that this really was a good think because it's just unjust and unfair that if we don't spend time and resources trying to make sure we get everyone pulled up those kids don't have a shot. It's not fair for them. So I think that that's useful for me personally. If I start feeling bad because I feel like I'm not spending enough time pushing my highest students that can help me to say, "Okay, there's a reason why we were doing this." [Eddie]

When teachers evaluated the usefulness of the knowledge artifacts in the second interview, they very often said that the knowledge artifacts were useful because the artifacts provided them with “meaningful” implications that supported their beliefs, thoughts, or practice. However, occasionally the implications that confirmed and justified their thoughts and practice were subjective. Some implications did not seem deeply related to the original knowledge artifacts.

For example, after reading the Bowles and Gintis paper, one teacher said that it was useful because it said that a teacher should respect and focus on individual students' strengths. Another teacher drew the implication that “don't let students argue with you” from Rita's case in the Lampert study. In these two cases, the “implications” from the artifacts came from their teaching philosophies and concerns rather than the knowledge artifact themselves. They often interpreted shared knowledge through their thick lens and thought that it confirmed and justified their thoughts and practice.

5.8. Any knowledge is useful

When Kennedy (2000) investigated teachers' perceptions of research relevance, she found that teachers commented on minimal relevance of research: all knowledge is potentially relevant. In the similar vein, I saw that there was a position that "any knowledge is useful" among teachers when they evaluated the usefulness of shared knowledge. For example, they said that even if they did not agree or would not use particular knowledge, it was useful because "you've learned that you don't agree with it," and "at least I know this was something I don't think will work here." With this position, several teachers argued that "I think any research can be useful to teachers. It depends on the teachers and if they're trying to get something from it."

Summary and discussion

In sum, teachers used shared knowledge instrumentally, conceptually, in combined use of instrumental and conceptual ways, as a source to produce their practical knowledge, to reflect on, to confirm and justify their thoughts and practice, and as reminders. In addition, there was a position of "minimal use" that any knowledge was useful.

Interestingly, there was a different pattern in the teachers' responses according to the methods in the two interviews. While their meaning of usefulness was mainly instrumental usefulness in the first interview, they mentioned various ways of using shared knowledge in the second interview.

In the first interview, when I asked the teachers' general thoughts about the usefulness of shared knowledge, their meaning of "usefulness" was mainly instrumental one. They said that shared knowledge was useful when they were able to use it as a tool to solve classroom problems and improve their teaching; when they said that it was not useful, it usually meant that they could not use it instrumentally in their classrooms. In the same vein, when I asked them to nominate

episodes in which they used, modified, or did not use shared knowledge, most of the episodes were about instrumental use.

However, when teachers evaluated the usefulness of the knowledge artifacts in the second interview, they addressed other meanings of usefulness and explained various ways of using them. In addition, in the survey, the majority responded that they thought that shared knowledge could be useful though it was not instrumentally used. However, when I asked follow-up questions regarding the survey responses, they rarely addressed and specified how it could be useful beyond instrumental use. This shows that they recognized that shared knowledge was useful in other ways beyond instrumental use, but they could not specify the various ways of knowledge use until they actually evaluated and used particular knowledge artifacts in the second interview. Regarding the different interview strategies, I have four possible explanations of the teachers' different responses in the two interviews.

First, the different responses may represent the difference between teachers' *thoughts* about the usefulness of shared knowledge and their *actual uses* of shared knowledge. Argyris and Schön (1974) made a distinction between espoused theories of action and theories-in-use. According to them, espoused theories of action were those that people report as a basis for actions, but theories-in-use were the theories of action inferred from how people actually behave.

Teachers addressed mainly instrumental use when I asked generally about the usefulness of shared knowledge and their knowledge use, but when they actually evaluated and used particular knowledge artifacts, they demonstrated various ways of using shared knowledge. With respect to Schön and Argyris's distinction, the teachers nominated mostly instrumental use of shared knowledge in the level of espoused theory of action, but when they actually used it—when

they explained how they used or would use the artifacts—, they used it in more various ways in the level of theory-in-use.

The data came from interview, not from observation, so my data were what people said and not what people did. However, when the teachers evaluated the knowledge artifacts in the interview, they explained how they used and were using the artifacts for conceptual change, reflection, reminding, justification, and confirmation, like in the “think aloud” method. For example, they said “it made me think the most because ...,” and “it made me think how I am using ability grouping ...” They showed me how they used the artifacts in the various ways even in the interview. However, instrumental use was an exception: unlike other ways of knowledge use, in the interview, it was impossible to see if they instrumentally used or would use the artifacts.

According to this explanation of espoused theories of action and theories-in-use, teachers actually used shared knowledge in various ways although they mentioned mainly instrumental use in the level of espoused theory of action. This indicates that we need to reinterpret previous research findings that came from methods similar to my first interview, asking general and direct questions. For example, some researchers including Gore and Gitlin (2004), Joram (2007), and Gitlin et al (1999), used only the direct and general strategies, and found that teachers did not think that educational research was very useful for classrooms and tended to be concerned mainly about instrumental value. With respect to the findings from the second interview of my study, however, it may not be correct that teachers evaluate shared knowledge only in instrumental ways. My study indicates that teachers use shared knowledge in more various ways than they argued in the level of espoused theory of action.

Second, teachers' different responses may come from the differences in instrumental use and those of other ways of knowledge use. It might not be easy for teachers to recall and nominate their episodes of conceptual, reflective, confirmative, justifying, and reminding ways of knowledge use in interview situations. For example, as I described earlier, the process of conceptual use could be rather implicit and gradual, so it might be difficult for them to recall episodes of conceptual use. In addition, it was possible that when I asked for specific examples and episodes of their knowledge use, they might be likely to nominate instrumental use because those were the only ones that were clearly visible to an interviewer. In these cases, their nominated episodes could be biased toward instrumental use.

Third, the features of the knowledge artifact in the second interview could be one reason that caused teachers' different responses between in the first interview and in the second one. For the second interview, I chose various kinds of shared knowledge to collect a variety of responses. The knowledge artifacts I chose were not all prescriptive and relevant to the teachers' contexts, so it might not be easy for the teachers to instrumentally use all of the artifacts although the teachers' main concern was instrumental use. In fact, I found that the features of knowledge influenced the ways to use it. For example, teachers said conceptual use mainly for the Bowles and Gintis study, a descriptive analysis. In contrast, when they evaluated the artifact of home-reading strategies that were practical prescriptions, they said that they would instrumentally use it.

Fourth, the teachers' different responses might come from the particular terms that I used for the interview questions. When I interviewed teachers, I used the terms, "use," and "useful" because I was concerned with how the teachers interpreted and used the terms. However, if I asked different questions, such as "Has research ever influenced and changed your perspectives,

philosophies, strategies, and so on? Does research make you reflect, justify, or work as a reminder of something?,” they might nominate more episodes of various ways of knowledge use. Therefore, the first interview result that the teachers nominated mainly episodes of instrumental use indicates that they tended to interpret “use” and “useful” in mostly instrumental ways; it does not necessarily indicate that the teachers used shared knowledge only in instrumental ways.

In addition, the difference between “useful” and “using” might influence the teachers’ responses although teachers and I used the two terms intermittently. When we say “particular knowledge is useful,” it may be different from saying that “I am using particular knowledge.” When teachers evaluated the knowledge artifacts in the second interview, they sometimes said that “I would not use it, but it can be still useful.” This means that they would not use it instrumentally, but they thought it as useful in other ways, such as conceptual use, reflection, reminding, and confirmation or justification. This subtle difference might influence teachers’ responses. Especially, when I asked them to nominate the episodes of “using” and not “using” shared knowledge, they might regard my question as a question about instrumental use. However, even when I asked teachers “Did you find any *useful* knowledge from workshops, teacher colleagues, magazines, or research journals?,” they nominated examples of instrumental use. Additionally, in the first interview, when I asked them to define what they meant by “useful,” their meanings were mostly instrumental usefulness. There was a subtle difference between “useful” and “using,” but I do not think that it caused substantial differences in the teachers’ responses.

In addition, there were individual differences in what the term “useful” meant. For example, being different from the others, Sam meant “useful” only by instrumental usefulness. She said that the Bowles and Gintis study was very interesting, she agreed with the arguments,

and learned new things from it: she said “I hadn’t noticed the parallels before. I hadn’t thought of it in this way. And I do agree with it, the majority of it. I do look at our education system and wonder.” However, she finally evaluated that it was not useful because it did not provide anything that she was able to try in her classroom. She said, “A lot of this was thinking outside of what I do on a daily basis for what’s going on inside of my classroom.” She also evaluated constructivism artifacts as not useful because she thought there was no information relevant to her situation—it did not tell her how to change her district curriculum that was not designed as constructivist teaching. Sam did not say that it was useful when the knowledge artifact did not tell her what to do in her classroom. However, the “useless” knowledge artifacts changed her understanding and made her reflect on her practice as other teachers did.

Chapter 6: Illustrative episodes of responses to shared knowledge

In this chapter, I describe various types of instrumental use by analyzing teachers' episodes in which they used, modified, or did not use shared knowledge. I collected 137 episodes from fifteen teachers in the first interview. They nominated 50 episodes of using shared knowledge, 42 episodes of modifying it, and 45 episodes of not using it. The average number of episodes that one teacher nominated was nine episodes.

I need to make clear the meanings of knowledge use, modification, and non-use, three categories of teachers' episodes. First, into the category of "use," I classified teachers' episodes in which teachers used shared knowledge without adding, reducing, or changing its original ideas. There was sometimes a subtle difference between when teachers said that they were "using" shared knowledge and when they said that shared knowledge is "useful." Although teachers used the two terms "useful" and "using" as if they were interchangeable, this was not always the case when they evaluated particular knowledge as useful, they actually used it. For example, I saw a few episodes where teachers did not think particular knowledge as useful, but they used it in their classrooms. For example, Clara adopted pair work in her writing lessons though she did not think that pair work was useful for her kindergartners to learn how to write.

Second, it was not always clear to classify teachers' episodes into the category of "modification" because sometimes one modification episode could include all three cases of knowledge use, modification, and non-use. For example, I often saw the case in which a teacher rejected a particular material of a strategy, so she chose not to use the material, and then she used an alternative material of her colleagues. In this case, she *did not use* the original material, and *used* her colleagues' material as alternatives, but eventually *modified* the strategy. Since I defined one type of "modification" as eliminating part of knowledge and using alternatives, I

categorized this kind of episodes as “modification.” Teachers also nominated this kind of episodes as examples of modification in the interview.

Finally, regarding the category of non-use, it includes two kinds of episodes: the first is episodes in which teachers tried to use particular knowledge but did not find it useful, and so they did not use it anymore; and the second is episodes in which teachers evaluated it as not useful without trying it. In the second case, it is possible that if the teachers would actually try the particular knowledge, they might find it useful.

Before describing the types of knowledge use and modification, I illustrate a big picture of the episodes. First, teachers nominated episodes of knowledge use a lot more than I expected--they nominated 50 episodes of use, 42 episodes of modification, and 45 episodes of non-use. Since previous researchers found that teachers tended not to consider research-based knowledge to be useful and practical knowledge to be transferable, I expected that I would collect a lot more episodes of non-use than those of use or of modification. In addition, when we consider teachers’ modification to be another type of using shared knowledge, the number of the episodes of knowledge use was twice than the number of episodes of non-use.

This indicates that it may not be true that teachers tended not to think knowledge from external sources as useful. Although the numbers of episodes in each category do not necessarily represent the actual frequencies of teachers’ use, modification, or non-use, they may accept and use shared knowledge more often than in previous research findings. The survey results also supported this: in the survey, the majority of teachers responded that educational theories, research, or their colleagues’ ideas were useful.

I do not think that it was due to interview methods. During interviews, I used the same number of questions for each category of knowledge use, modification, and non-use. I did not try

to collect more episodes of knowledge use than those of modification or non-use; rather, since my main concern lay in why teachers do not use shared knowledge, I might unconsciously try to collect more episodes of non-use than those of use or modification. However, it is possible that teachers did not want to say about many episodes of non-use in the interview especially when they had no “appropriate” rationales for the case. Additionally, it is possible that teachers easily forget cases in which they did not use shared knowledge, particularly if there were no impressive or specific reasons for which they did not use it.

Second, I classified teachers’ episodes according to the sources to which teachers referred: research and theories, curricula and workshops, and teacher colleagues. However, the analysis of the sources does not intend to make generalizations about teachers’ knowledge use and its sources because, in the episodes, it is difficult to identify ultimate sources where particular knowledge came from. For example, it was possible that teachers said that they were adopting their colleagues’ ideas, but the knowledge originally came from research or theories. In the same vein, though I made a distinction between “research and theories” and “curricula and workshops,” knowledge from workshops and curricula was often based on research and theories.

Table 4 presents the relationship between knowledge use and sources. This table shows that research or theories were not easily modified; instead they were more frequently either used or not used. This was mainly because knowledge from research or theories was abstract one, concepts and principles, which was not easily modified. In contrast, since knowledge from workshops or curricula was usually presented in a teacher-friendly form, it was relatively easy to be used or modified. As previous research findings, in my study, teachers said that they preferred shared knowledge gotten from their colleagues to other sources. However, the table shows that it

does not necessarily mean that when teachers acquired knowledge from their colleagues, they tend to use it in their classrooms compared to knowledge from other sources.

Table 4. Knowledge use and sources

	Use	Modification	Non-use	Total
Research & theories	20	2	18	40
Workshops & Curricula	19	30	17	66
Colleagues	11	10	10	31
Total	50	42	45	137

In the following sections, I describe how teachers used and modified shared knowledge. They used shared knowledge by replicating, specifying, and extending it to different areas. They modified shared knowledge by adding other ideas to it, reducing it, and eliminating part of it and using alternatives. These types of use and modification came from teachers' episodes, nominated in the first interview.

6.1. Types of knowledge use

In this section, I describe three types of using shared knowledge in the teachers' episodes: replication, specification, and extension.

Replication

Teachers used shared knowledge by repeating it without any reorganization. More than half the episodes of instrumental use fell into replication. For example, teachers adopted the ideas of a "geographer hat," making a blank book with plain copy paper, sending a poetry folder home, organizing book lesson plans, or displaying students' art work in classrooms.

Mrs. Lansetta who I'm teaching with, she teaches kindergarten this year. And she does a poetry folder and sends it home. ... I had never sent them home like that so that they could read them to their parents. And it's just a good activity that practices writing and reading and just some things we were learning in class related

to the season or the month. ... I just thought it just reinforced everything we're doing in class. And it helped parents to reinforce it too. [Ann]

Something new gets kids intrigued and interested in doing it. So maybe a different literacy center where kids were going to make a new book. Take a piece of paper and fold it in these different ways and they can make a book without having a staple. ... Doing it a different way gets them excited about doing it than the same old routine every time. [Lucy]

In the episodes, all the replicated knowledge was specific prescriptions such as learning activities and materials. In addition, the replicated activities or materials came mainly from their colleagues. Since their colleagues had already tested them in similar contexts, teachers might feel less need to modify them than knowledge from other sources.

Specification

When teachers used abstract ideas from workshops, university courses, books, and research findings, they often specified them according to context specifics. One third of the episodes of instrumental use had to do with specification. When teachers specified shared knowledge, it was all abstract one such as abstract concepts and principles. For example, Ann used the idea of interactive writing that she learned at university courses. She specified the idea with a topic of Thanksgiving. Additionally, Lucy said that she adopted research that said "having a close community in the classroom makes students feel safer and more willing to work together." Her specification of the abstract research finding was the point system as a management strategy, in which students in the class could work together to earn points.

We're writing about Thanksgiving was our topic. Everybody gives me a sentence about Thanksgiving. And then we take all the ideas and try to put it together to make a story together. ... So that's interactive writing I learned about in my graduate program. And it's very helpful for kids that just have a hard time with writing. ... You're writing together and you're helping each other to edit and to add ideas and details and that kinds of things. [Ann]

Like my point system, where we're working collaboratively as a team, that's, research shows that having a close community in the classroom makes students feel more safe and they're more willing to work together and I think that that's a way

that I can use the research that somebody's done for me. ... I applied it in my own way by using a point system to create a better community. [Lucy]

The episodes of specifications indicate that abstract knowledge such as concepts and principles can be useful and be instrumentally used by specifications. In addition, when teachers specify abstract knowledge, a main issue would be how well they specify original ideas without “distorting” their essential parts. Since teachers’ prior knowledge, skills, and beliefs influence how to specify and use abstract ideas, sometimes specified strategies or activities may not be directly related to original abstract ideas.

Extension

Some teachers extended shared knowledge to different areas from its origin. For example, Jennifer adopted the concept of phonemic awareness in learning to read for other literacy lessons. Lucy used some movie making technologies when she showed pictures to her students in lessons. I found just two extension episodes. This may be because it is not easy to use shared knowledge across different areas.

Well, I think if you understand what some of these pieces were, like what was phonemic awareness, then you can use that in many different places, not just when you're teaching reading. So, if you can help children if they're not really hearing the sounds and words, ... you can pick up vocabulary words. ... “These were our vocabulary words for the day. Let's stretch them out.” ... So I think that if you were aware of the basic principles of the research, you can be creative about putting them in additional pieces even if you're not working with a program. [Jennifer]

In sum, there were three types of using shared knowledge: replication, specification, and extension. More than half the episodes of instrumental use had to do with replication. This indicates that when teachers use shared knowledge, they often replicate it, and the knowledge is likely to be specific one. Regarding the types of replication and specification, the features of knowledge influence the way teachers use it: specific prescriptions are easily replicable; and abstract knowledge can be used by specification.

6.2. Types of knowledge modification

Teachers nominated 42 episodes of modification. In the episodes, they added other ideas, expanded or reduced shared knowledge. In addition, they often changed it: they eliminated its part and used alternatives, changed structures or sequences, and made tiny adjustments. In the modification episodes, the knowledge came from workshops, research, theories, and teacher colleagues, but in more than half the episodes it came from workshops and curricula. Additionally, in four fifths of the modification episodes, teachers got the modification ideas from their own teaching experiences, philosophies, and styles.

Addition or reduction

Some teachers modified shared knowledge by adding other ideas, expanding, or reducing it. More specifically, they often added other activities, such as hands-on activities or more effective materials, to strategies that they obtained. They expanded or reduced activities to motivate students, to meet students' needs, or to compensate for their particular realities. One fifth of modification episodes were this type of modification.

Some teachers modified shared knowledge because of their perspectives on good learning and teaching. In this case, they thought that their modified ideas were more *valuable* than the original ones. For example, Julie modified zoology lessons by adding reading and writing activities because she believed that the first and second graders needed to spend more time on reading and writing than on other subject matters. Additionally, Kathie expanded the activity of “a big sharing day”: instead of a big sharing day of writing once in a while, she had a “sharing activity” every week because she thought that her weekly sharing activity helped her students to be more motivated.

First graders need to spend more time reading and writing than they do with geography or zoology. Sometimes what I did was to add more writing to it, or more

reading to it. For instance, sorting pictures of living and non-living objects. I modified it by also adding the word card to it. So they were thinking about what's something that's living, what's something that's non-living. But they're also doing reading by putting the word cards with it. [Julie]

With the Lucy Calkins writing program, she doesn't allow for much sharing time on a daily basis. It's more if you work on something for many, many days and then you have one big sharing day. But I found that if my students had a chance to share once a week even, they were more excited. And they worked a little harder because they knew they were going to get to share it with the class and show it to the kids. [Kathie]

Occasionally, teachers made modifications because of their circumstances. For example, Sarah, working at a Montessori public school, said that she added "math facts" to her math lessons. Math facts were not part of Montessori math curriculum but she thought that the Montessori math did not directly cover the tests and that math facts helped students prepare for Michigan state standardized tests.

Here in Montessori ... what we found that we needed to do because the standardized tests were all paper and pencil we needed to help the children become stronger on their math facts. Their memorization of the math facts so that they could answer the problems more quickly. So that's a component that we've put into all homework for the class. They practice the math facts at home and then once a week we give them a test of fifty math facts that they were to complete within five minutes. [Sarah]

There was one episode of reduction in modification episodes. Julie thought that the activity of writing suffixes had so much recording work to get her students bored, so she gave students word choices and write suffixes less than in the original activities.

Sometimes a lot of the language activities involve a lot of recording of their work. And sometimes I think that gets tedious for kids. ... For instance, suffix work ... they're practicing adding 'ed' to the end of words. Like 'clap' becomes 'clapped.' ... They have cards that they match to add the suffix. And then when they record it, instead of recording all fifteen of them, they can pick half. So that's a modification that I've made. ... And they like that control. [Julie]

I saw just one episode of reduction. This may be because when teachers reduce or eliminate part of original ideas, they tend to use alternatives for the eliminated part rather than

just reducing or eliminating them. This kind of episodes fell into a different category: “changes.” In addition, when teachers “eliminate” the whole piece of shared knowledge—they do not use it, the episode fell into the category of non-use.

When teachers modified shared knowledge by adding other ideas, expanding, or reducing original ones, usually their modifications did not dilute the goals or essential parts of the original knowledge. In this case, the degree of modification was not likely to be huge in general. However, I saw that several teachers made big modifications by adding other ideas to original ones. They used the original ideas just as a basis and finally developed and produced new ideas on the basis. For example, Clara got an idea of writing students’ names on a board from a book, but thought that it was too simple and not very valuable. Thereafter, she developed and created her own activity based on the original one in order to make it more valuable and to serve multiple goals. The original activity had one purpose—distinguishing the length of names, but her modified one served multiple goals to teach the similarity of names, to recognize “dirt letters,” such as ‘j’ and ‘y’, that goes below the line, to learn a poem, and to help her students become familiar with each other’s names.

Changes

Teachers changed shared knowledge by eliminating its part and then using alternatives. Some teachers modified teaching strategies by changing their sequences and structures. For example, Sue and Eddie modified teaching strategies because they did not think the original strategies were valuable or effective. Sue used a strategy of hands-on activities instead of a direct instruction strategy in order to better teach the concepts of area and perimeter. Additionally, Eddie changed the strategy of teaching the concepts of insulators and conductors by reversing its

sequence because he did not think that the strategy of addressing definitions first and then making students do the experiments was valuable.

This happened the other day—one teacher taught and the concept was insulators and conductors, and that teacher chose to introduce the definition of insulators and conductors in the beginning, and then give them the experiment. And the students kind of saw, well I already know what an insulator and conductor was, ... so why am I going to experiment and investigate when I already have the answer? So I, the second time around, I flipped it and said, “Let’s do the experiment. Let’s think about some of these things.” And then I gave them the answer. ... And that’s the things they were questioning and wrestling with in their head, and then after, we talked about well, here’s why. ... And the students, I think, responded better with the inquiry part being first, and then an answer being explained after. They were more engaged. [Eddie]

So in the book it said to teach about area and perimeter. There was a very direct lesson to give the definition and to have the children practice on the sheet. But to have them actually make something that they could see had area and perimeter, I think it engaged them more. So there was a framework of the lesson, teach area and perimeter, but this is more of a hands-on activity where they could see the difference. ... So what I did is I got these out, I had these pre-cut, and had them look at the manipulatives and make shapes to show the difference between area and perimeter. [Sue]

Some teachers modified strategies, activities, or materials by changing their contents. In all the episodes where teachers changed contents, the modification was due to student relevance. They often changed contents according to their students’ grades or other features. For example, Jennifer, an ELL teacher, said that she usually made words and sentences easier according to the level of her ELL students when she applied native English users’ materials and activities into her ELL classrooms. In addition, since Kathie thought that the “ball and ramps” of a science curriculum were too difficult for her kindergarteners, she changed the whole contents, keeping the concepts. She used “body movements” instead of “ball and ramps” in order to teach the concepts of force and motion.

Some of the things that used to be taught in first grade were now being taught in kindergarten. One example would be force and motion which was a high level concept ... And at the first grade level they were doing things with ball and ramps.

And I was thinking with my kindergartners how were they going to be able to do that? How were they going to understand that? And what I realized was at the kindergarten level we don't have to be that advanced with the force and motion. ... We can talk about motion as movement, how we move our bodies. How we push and pull things. ... So I was able to change the focus, although we still use the same vocabulary. [Kathie]

Some teachers modified learning activities by changing their procedures. They often changed group activities to whole group activities because they did not think the group activities would work well regarding their students' grade levels and learning abilities. For example, Sam taught math problem solving activities in a whole group instead of using pair work for the problems because of her students' academic levels. In addition, instead of spreading them out and letting them write anywhere in the classroom as the district program suggested, Clara had her students work at their tables with their partners. She changed the procedures because she thought that her students were too young to stay motivated and to focus on their writing work when they were allowed to write anywhere in the classroom.

I guess one would be in math for higher level thinking skills and questions. ... And the kids were given problems to work together in pairs with. For this lower level, sometimes I've found that we do them as a whole group and that works better. ... So instead of always pairing them up like what I would do if I was teaching older kids, I sometimes choose to do whole group or let them work individually and then discuss whole group. [Sam]

Some teachers changed materials. One fourth of the episodes of modification had to do with changing materials. When teachers changed materials, this was mostly due to effectiveness: they did not think the materials were effective, so they used alternative ones. For example, Joan used fraction strips instead of fraction slide rulers from her curriculum because she thought slide rulers were not useful in understanding the concept of fractions.

There was a lesson on using the fraction slide ruler. I took that out. I thought it was confusing, I didn't think it was going to help the kids, so I took it out. And instead, I took fraction strips that make a whole. ... [Where did you get the idea?] I remember doing that in elementary school, taking strips of paper and well I knew

that denominator, if the denominator was four, there had to be four equal pieces and if the numerator was three, I had to color in three of them. So I remember doing that from my own schooling. [Joan]

Summary and discussion

In sum, teachers used shared knowledge as tools to solve problems and improve their practice by replicating, specifying, and extending it to different areas, and modified it by adding, expanding, reducing, and changing it. These types of use and modification indicate that instrumental use is very complex and complicated.

When teachers used shared knowledge instrumentally, they did not regard it as rigid universal rules. Instead, they regarded shared knowledge as flexible tools that require modifications according to context specifics. In addition, teachers do not only “consume” shared knowledge but also generate it (e.g., Clandinin, 1985). Modification, particularly, could be an instance where teachers develop and generate their own practical knowledge on the basis of shared knowledge from outside sources, their teaching experience, and their teaching philosophies.

Chapter 7: Reasons for non-use and modification

The third research question of this study is why teachers modify or do not use shared knowledge. In this chapter, I described reasons for non-use and for modification by analyzing teachers' episodes. This study's data came from interview, so all the reasons here were based on what the teachers perceived and told me in the episodes that they nominated. It is possible that there was a gap between their perceptions and realities. For example, when teachers' episodes were about reality constraints, it is possible that there were not actually reality constraints as obstacles to using particular knowledge in the contexts. My data only shows why and how teachers perceived by analyzing their episodes of knowledge use, non-use, or modification.

Before addressing the reasons, I need to clarify the meanings of non-use. When teachers did not use shared knowledge, this has two different cases of non-use. First, teachers *wanted* to use particular shared knowledge but could not use it for some reasons, such as reality constraints or student relevance. Second, they did *not want* to use shared knowledge because it did not fit their perspectives and teaching styles, or they did not think it as valuable, effective, or valid. In this study, both cases fell into the category of non-use. The distinction shows that teachers' non-use episodes were not always about teachers' rejection—only the latter case was about teachers' rejection.

Regarding the two cases of non-use, I classified the episodes into two groups. The first group had the episodes in which teachers *wanted* to use particular shared knowledge but were not able to use whole or part of it. In this case, they thought shared knowledge not “applicable” because of “reality constraints,” “context relevance,” or “student relevance.” The second group had episodes that the teachers did not *even want* to use particular shared knowledge because they did not think it valuable, effective, or valid. In addition, there were a few episodes that had more

than one reasons. For example, one episode had to do with student relevance and teachers' philosophy. In this case, I classified them into the category of a more influential reason.

I found the reasons why teachers did not use shared knowledge were the same reasons for modification: they did not use and modify shared knowledge when they thought that it lacked relevance, did not look valuable, effective, or valid. In the following sections, I describe first why the teachers did not use particular shared knowledge and then how they modified it for each reason.

7.1. Relevance

Some researchers addressed various meanings of relevance between research and teaching (e.g., Kennedy, 1997): the extent to which research addresses teachers' concerns or questions; or how much research represents ordinary classrooms; or how well it matches teachers' epistemological frames. In the first interview, I found that when teachers addressed relevance with respect to the usefulness of theories and research, what they meant by relevance was mainly context relevance or student relevance. During the two interview sessions, I never heard the teachers mention having different concerns or epistemological frames from those of researchers. This may be partly because it was difficult for them to recognize and explain this version of relevance. Alternatively, it is also possible that the relevance issues are mingled together in realities. For example, when particular research lacks context relevance, it is because the researcher has different concerns from the teachers' and thus chooses an irrelevant context in which to do the research. In this section, I describe and discuss three kinds of relevance here: context relevance, reality constraints, and student relevance.

Context relevance

Context relevance may be a bigger concept that includes the case of reality constraints. When we say context relevance, it means findings from one context can be applied to another context. There could be two different context relevance cases regarding the teachers' episodes: relevance between ideal contexts and ordinary contexts; relevance between two different ordinary contexts. The former kind of context relevance is about "reality constraints" that I describe next. In the reality constraints episodes, teachers could not use shared knowledge because it lacked relevance to their "imperfect" contexts. In this study, "context relevance" refers to relevance between two different ordinary contexts.

Teachers thought the relevance between research contexts and their classroom contexts was very important to the usefulness of research findings. When they explained the usefulness of educational research in a general category, they often mentioned research that was conducted in a certain range of setting may not work in a different setting, so research findings that "have been tested at least throughout the United States" not in other countries were worth looking at and trying in their classrooms.

I found only three episodes for this kind of context relevance: two episodes of non-use and one episode of modification. For example, Liz said that a new writing program was not relevant to her and her colleagues because the program was on the previous unit that they had already taught, and they were ahead by a whole unit. She said "We didn't feel like we learned anything that we didn't already know." The other episode of non-use was that Montessori language arts were not relevant to the U.S. schools because Montessori was Italian, and especially Montessori strategies of teaching Italian language was not applicable to teaching English. In the one case of modification episode, Beth modified homework plans because they

came from a different school district: the school district had a different school calendar and a different set of sight words from those of her school district. She modified the homework plans according to her school district's calendar and sight word set.

The same friend gave me some website resources. ... We (Beth and her colleagues at the same school) had to make a few modifications to it because it didn't fit. ... I don't know what school district she's from. But it's based on their school district's calendar. So there would be a day off school or maybe different sight words that are introduced. So we just changed it to fit the Lansing School District calendar and sight words. But the basic homework part is the same. [Beth]

Reality constraints

In the teachers' episodes, I found that teachers modified or did not use shared knowledge when they thought there were reality constraints as obstacles to using it.

Episodes of non-use

Teachers nominated episodes in which they felt they were not able to use shared knowledge because they did not think it was applicable to their classroom realities. One fifth of non-use episodes had to do with reality constraints. In these episodes, they said that the shared knowledge was too ideal for ordinary classrooms or inapplicable to their particular circumstances. They often mentioned that they could not use shared knowledge because they did not have enough time or funding, were working under the pressure of standardized tests, had to cover demanding and rigid curricula, and so on.

For example, Sarah, said that she sometimes could not follow Montessori principles because they did not fit ordinary classroom realities. Montessori recommended that students work at their pace and for as long as they want to, but students at ordinary schools often stop their work and move to other subject lessons, such as gym and art. Ann wanted to use the

Response to Intervention program, but she could not use it because her school could not afford to buy it.

When teachers made decisions not to use shared knowledge due to reality constraints, the decisions came from deliberations in which they weighed pros and cons of implementing it. For example, when Sam evaluated constructivism ideas, she said that she could not use them in her science lessons although she thought them as valuable. As reasons for not using the ideas, she addressed that her science curriculum was not designed for constructivist teaching, that her students were too young so needed to build knowledge for constructivist learning, and that they would be disadvantaged next year if she did not follow her curriculum.

I know that a lot of our curriculum wasn't designed for this (constructivism) approach. ... At this level, at the second grade level I said that science, it's more really just intro and exposure. ... Our science was really quite introductory. ... And they have to have that foundation and that prior knowledge to be able to build on it. ... I have to present it with the structure that the program provides because the kids have seen it previously and were going to see it again. So as a teacher do I think that's the best way to present the concept? No, I don't. But I realize I would be shortcoming my kids if I didn't use that model because of what they have been taught in first grade and what they will be expected to use in third grade and beyond. [Sam]

When teachers said that shared knowledge was not realistic, and therefore it was useless, they occasionally meant that it was almost impossible to apply it *exactly* the same ways that they learned. For example, two teachers said that ideas of pre-test and post-test and lesson planning that they learned at their universities were not realistic, so were not useful for them. However, if they did not accept the ideas as something that should be followed exactly without modifications, they might evaluate differently the usefulness of the two ideas. In other words, if they focused on key points or essential parts of doing the pre-test and post-test, and writing lesson plans, and regarded them as flexible tools that they can modify according to their realities, the ideas of pre-test and post-test and writing lesson plans could be useful even for their realities.

They would always say, “Before every lesson, or every new unit of study, so a pre-test and a post-test and adjust your teaching with that.” Well we’re given a certain set curriculum and there were times that that, that was a wonderful thing to do and it works in many situations, but in some of our curriculum, not flexible, it just doesn’t work. [Robin]

I guess in the, in MSU, we’ve learned how to write lesson plans for everything and write these six page lesson plans and I’ve learned that’s just not reasonable and as a teacher, you have to be a lot more flexible and on the go and not everything can be planned out as perfectly as we have been taught to do at MSU ... As a teacher, to plan a whole year, you can’t create a six page lesson for every single lesson you teach when you’re teaching five lessons per day. So you have to know your stuff and, and think about it before and you do have to plan, but you can’t create six page lessons ten times a day for the whole year. [Eddie]

This indicates that when teachers acquire particular shared knowledge, it would be helpful if they also learn which part of it is essential by seeing its various modification cases. More fundamentally, teachers need to recognize limitations and potentials of social science and to know various ways of using it. If teachers appreciate these, some of “too ideal” ideas can be used even for ordinary classrooms with reality constraints. In fact, I saw a number of episodes in which some teachers used shared knowledge by modifying it according to their reality constraints. Next, I describe the modification episodes due to reality constraints.

Episodes of modification

While one fifth of the episodes of non-use were about reality constraints, reality constraints were the least-frequent reason for modification—one tenth of modification episodes were about reality constraints. This could indicate that when teachers face reality constraints, the knowledge was very difficult to be used with modifications. However, several teachers nominated episodes in which they made modifications due to reality constraints: they often picked and used part of a particular idea because they could not use the whole idea. For example, Kathie used part of the *Handwriting without Tears* program that her school could not afford to buy, Clara used alternative books for a program because she could not find the original books in

the list, and Eddie picked and used part of a package of shared knowledge for differentiation because it would take too much time to use all activities of the package.

There was a program that came through called Handwriting without Tears. And this was a writing program to help students with how to control their fine motor, how to make letters on a page. ... It's a very nice program. However, our school didn't have the money to purchase it. So what I did was I found which parts of the program worked for my kids. The music was very helpful. The body movements were very helpful. Those were things I could still do with them even though we didn't buy the program. [Kathie]

With that program first of all I would not ever be able to do the whole thing with all my kids. It would take too long. So I pulled the pieces out that were important to me. The letter recognition, I have to do with everybody. The hearing and recording sounds I only do with kids that I'm concerned with. The concepts of print I only do with the kids I'm concerned with. [Eddie]

Student relevance

Most of the teachers' relevance episodes were about student relevance. When they thought shared knowledge was not relevant to them, this usually meant that the particular knowledge was not relevant to their students as a class. When they said "it depends on," it usually meant that the usefulness of shared knowledge depends on students' characteristics rather than it depends on teachers' characteristics, other circumstances, or attributes of the shared knowledge itself.

Episodes of non-use

In the first interview, when teachers talked about the usefulness of research in general, main themes in their responses were relevance issues. They often evaluated that particular knowledge would work only for a class having "twenty kids who were perfectly well behaved," for "upper levels" of students, or in "inner city schools." Student relevance was the most common reason in their episodes of non-use of shared knowledge: two fifths of non-use episodes were about student relevance.

Student relevance includes characteristics of “perfect” students and other characteristics of students, such as students’ grade levels, learning styles and abilities, behavior issues, family backgrounds, and so on. “Perfect students” could be part of reality constraints, but I discuss “perfect students” here because the qualities of perfect students were also part of students’ characteristics, and occasionally the distinction between them was not clear in the episodes.

Some teachers said that particular ideas were not useful when they assumed “perfect students” who were already motivated, were able to do self-regulated learning, had no behavior problems, and had supportive parents. However, in the realities, their students were often not motivated, not well-disciplined, lacked basic skills and attitudes, or did not have parents’ supports enough. For example, when they evaluated the usefulness of “home-reading strategies” in the second interview, the majority of their responses were that it was a very good idea, but these activities would not work for their students because they were not able to do it independently with responsibility and their parents were not supportive enough.

Some teachers found particular knowledge was not relevant because it was not applicable to their students regarding grade levels, learning styles and abilities, behavior problems, family backgrounds, and so on. For example, Jennifer found strategies of using *the best children’s books* not useful for her ELL students because she thought the books too difficult for them. In addition, Lucy found many ideas from a writing conference not useful because they were not applicable for her first grade students.

What was the best children’s books of the year. Strategies to use them effectively. ... Some of the strategies would require more language than my students had. Even though they might say this was a book that works well with third or fourth graders I would find that it did not work with my students because they did not have enough language for that particular book. [Jennifer]

I know the last conference I went to I was very disappointed. It said for first and second grade teachers. But it was for very advanced kids. And the lady that was

teaching it was a third grade teacher. She had a very hard time teaching down to first grade. So a lot of the ideas were not applicable for a first grader. So if I ever go to second grade and I have high kids or third grade and teach in those grades, then those ideas would be useful. [Lucy]

In addition, there were several episodes where teachers found shared knowledge useless because they thought that it was not relevant at all. For example, one teacher said that many language arts classes that she took at her university were on adult level, so they were totally useless for her elementary classes. She said “they weren’t relatable to the children and their learning, so I can’t even remember them.”

Episodes of modification

Student relevance was the second most common reason in the episodes of modification: one third of the modification episodes was about student relevance. Though teachers found that particular knowledge did not fit their students, they modified it according to their students’ characteristics including grade levels, learning styles and abilities, behavior problems, and family backgrounds. In all but one episodes of modification about students’ grades or learning abilities, teachers reduced the intellectual demand of the ideas: they often made easier contents and used whole class lessons instead of group activities. For example, Lucy used a whole group editing instead of peer editing because she thought peer editing was too difficult for her first graders. Often teachers changed activities according to students’ needs. For example, Kathie altered reading activities to meet her students’ needs.

The idea that came from one of the workshops was peer editing and having the kids switch their writing books. ... So this friend would grade yours and you would grade this friend’s and you would look for their mistakes. And we don’t do that because it’s very hard at first grade for a first grader to do. ... So we do that as a class. And we’ll put it under the ELMO machine. And we’ll have kids look out. So on this piece we’ll say, “What was a good thing that’s being done? What’s something that they could improve on?” So instead of having a peer do that, I changed it. The kids were still doing it, but we’re doing it as a class. [Lucy]

They're making excellent progress on the alphabetic principal, they're mapping sounds beautifully. ... Not making the kind of progress in oral reading fluency yet that I would like to see. So I'm already looking at switching the piece of oral reading fluency ... now I'm looking at another piece to switch out about a six or seven minute piece of this in the half hour that I'm doing and moving the kids into here. I can focus on what they need more. I'm going to delete a piece from this one and push into this one. [Kathie]

7.2. Teachers' philosophies and styles

In this section, I describe the cases of non-use or modification that were based on compatibility with teachers' own values. I found that teachers often did not think shared knowledge was valuable when it did not fit their' own teaching philosophies and styles—their beliefs and assumptions about the purposes of education. I grouped teaching philosophies and styles together because both were teachers' factors, and because it was not always clear whether it was a value-judgment or just a personal preference. Especially, for their colleagues' ideas and advice, teachers had a tendency to avoid judging them though they thought the ideas not valuable. They often said, just “It's not my style” even in value-judgments.

Episodes of non-use

Teachers' philosophies and teaching styles were the second most common reason in the teachers' episodes of non-use: one third of non-use episodes were about teaching philosophies and styles. For example, Julie did not use “math facts” because she did not agree with the idea that first graders should have a facts test every week. In addition, Robin rejected her colleague's approach of teaching social studies because she did not agree with his ideas that that if teachers do not anything, students become more independent.

Two of the teachers do math facts tests every Friday. I don't do that. I focus more on teaching the strategies. If children were working on addition, we focus on developing really good and quick strategies for figuring out. For instance, ... If you have nine plus three, you can say nine, ten eleven twelve. Or learning your doubles, or making a ten. Knowing that something was a double plus one. Like seven plus

eight looks like seven plus seven, but it's one more. [Why do you not use math facts?] I guess, I didn't agree with that especially first graders should have a facts test every week. I wanted to focus more on the strategies rather than just assessing what they're doing every time. [Julie]

I came to him and said, "What are you doing for social studies?" ... He just gives all his students assignments in a big packet that he copies at the beginning of the year. ... He gave me one of the packets and he said, "Your kids become so independent because you don't even answer their questions. ... I knew I didn't want to teach like that, ever. I totally disagree. I don't think you should be not engaged with your students or helping them or teaching them something and they just learn from themselves. That's not my philosophy. [Robin]

I saw relatively a few episodes where teachers did not want to use shared knowledge because it did not fit their personal teaching style and preference. For example, Ellen did not use puppets of the lesson scripts just because she did not like them. She said "I don't do well with the puppet. I don't like the puppet."

Episodes of modification

Teachers often modified shared knowledge to make it more valuable according to their own philosophies or teaching styles. This was the second common reason of modification episodes: one third of modifying episodes was to make shared knowledge better fit their own values and teaching philosophies. For example, Robin modified a strategy of social studies textbook by adding hands-on activities and using worksheets for homework. It was because she did not think the strategy of the textbook valuable: she did not think that it would motivate students and foster students' learning.

The social studies textbook outlines what you're supposed to do each day and a lot of it was very old school, I would say. Reading the textbook, giving them a worksheet, reading the textbook, giving them a worksheet so I don't like that repetitiveness in the classroom. I think the students need to be engaged more and a more active part of the learning process so I've modified it where maybe I give them the worksheet for homework, but in class we're going to do a activity to make it more applicable to lives. I find that's a much way, a better way of doing things if the students were more engaged and it's more hands-on. [Robin]

Sam could not use constructivist activities for her science lessons because of perceived reality constraints as I described earlier, but she modified her math curriculum and used constructivist activities as additional practice. This was because she believed that constructivist teaching was more valuable in mathematics.

I do math activities that are problem solving activities. And that's one of the few areas that I do use my own materials. And it's not part of our East Lansing curriculum. It's actually taken from the summer school program ... They're given the problem and I step back, and they work through it. And then we do a whole group discussion and they have to agree on an answer. I don't give them the answer. So that was where they were constructing knowledge. ... More valuable for the kids, yeah. Because they're constructing that knowledge. ... I use a lot of the stuff that I did (in summer school program). The ideas, the structure. ... The, it's all designed for middle school. I have adapted that down to second grade. ... So I do simplify it a little and break it down. [Sam]

7.3. Knowledge qualities

In the earlier section, I described that when teachers did not want to use shared knowledge because of their own philosophies, perspectives, and teaching styles, they thought shared knowledge not valuable or not preferable. However, there was another case where they did not want to use shared knowledge. Teachers found shared knowledge useless when it was not effective or not valid. In this case, teachers made the evaluations about the usefulness of shared knowledge due to its qualities rather than due to context specifics or teachers' philosophies and styles. In this section, I describe and discuss two qualities of shared knowledge: effectiveness and validity.

Effectiveness

In the teachers' episodes, I found episodes of non-use or modification when they did not think shared knowledge was or would be effective: they did not think it served or would serve its goals well.

Episodes of non-use

Among the episodes of non-use, I found just two episodes in which teachers did not think it effective. In one episode, Jennifer found that a “tennis balls” game was just too fun and did not yield learning, so she did not use it, in the other, Joan thought that a “red star” strategy would not motivate students in lessons, so she did not use it. In this case, they did not think the activity and strategy appropriate to attain expected outcomes that the educational ideas were supposed to yield.

One that didn't work for me that I thought was interesting, they had a tennis ball. And they had you say a sentence, throw the tennis ball and had the tennis ball be a period in this sentence. Now, it started like a good idea. I tried that one. Oh, no. It was too fun to throw balls. ... So we ended up holding up stop signs. [Jennifer]

It was a one day conference and she had a PowerPoint. And she had a red star at the top. And every time a person would see a red star that person could shout out, "red star". ... So every other slide somebody's screaming, "Red star." It took time. We're frustrated because we're trying to concentrate on what was being taught. ... And it was just like, maybe it could work in my classroom. I don't know. I'm not sure if I want them to be motivated by a red star. [Joan]

Episodes of modification

While there were a few episodes of non-use of shared knowledge due to effectiveness issues, effectiveness was the second most common reason of modification episodes. One fourth of the modification episodes were about effectiveness. Teachers often modified shared knowledge to make it more effective. In this case, they did not change its goals or rationales. For example, Lucy changed materials when she adapted Calkins writing program: she used journals instead of papers that were recommended in the writing program. She did not think papers as effective because students often lost them, so they could not use the papers having teachers' comments to improve their writing. In addition, Clara modified evaluation charts to be more efficient to read.

Pieces that I don't do, I do let my kids use journals, notebooks that we turn the pages. Because the papers they have lost. They don't get put in their work. Going back to revise, if the paper was crinkled or folded or old they don't want to work on that. So having something in a journal that's kept together already was much easier. ... I use it in their journal so I can see right here what they can work on. And then the next day when they write they look at that page from the day before and say, "Oh, I need to remember spaces. My teacher talked to me about spaces." So they turn the page and it's fresh in their mind that they're working on spaces. [Lucy]

Our first grade teacher came up with a way to—because we have to score all their writing—and so our first grade teacher came up with a way to, like a chart that she uses to write down their scores. ... So I thought, "That's a good idea to have that in front of me." But I thought the table was a too hard to read. So I changed it a little bit and color coded some things and made it a little bit easier for me to read. So I liked the idea, but what was working for her wasn't really working for me. So I just kind of changed it a little bit so that I could read it easier and it made more sense to me. [Clara]

When teachers modified shared knowledge to make it more efficient, it was mostly specific ideas such as activities and materials rather than concepts or principles. For effectiveness, teachers often changed procedures and materials of activities. In this case, they accepted particular ideas' goals and rationales but just altered their details.

Validity

Validity is a reason to not use shared knowledge, but there were few validity episodes. This may be because validity evaluation applies mainly to descriptive or explanative statements: whether or not the statements are trustworthy. However, when teachers nominated episodes of non-use or modification, it was likely to be prescriptive knowledge rather than descriptive or explanative one. When they explained why they either modify or did not use prescriptive knowledge in their episodes, their evaluations were mainly about whether it was valuable or effective. Therefore, I rarely saw teachers' validity evaluations in their episodes, but there was one episode of Ellen, who did not use one ADHD theoretical principle because she did not think it as valid, based on her experience.

I think there's a lot of theories of things that tell me if I'm not on the right track, for example, for kids with ADHD. It works to take everything out of your room and have it very bland. And don't hang stuff up because those kids focus on those kinds of things. ... kids learn better in a small area that's very, doesn't have color because they don't get distracted. And I don't believe in that theory. I think kids can learn in any environment given what you give to stimulate them or how you figure out how to work with them. ... My room was really colorful and I hang up bright things. But I don't think a kid in my class wasn't going to learn as well as a kid in another class because there's stuff on the walls. [Ellen]

Validity was not a major reason in teachers' episodes of non-use or modification. In the second interview, however, teachers evaluated several knowledge artifacts regarding validity—whether it sounded trustworthy or persuasive. For example, when they evaluated the Klahr and Nigam study, several teachers doubted its validity because they did not think that the discovery group of the study represented “true” discovery learning or the measurements were reliable. In addition, some teachers doubted the validity of the Bowles and Gintis study because they had substantial personal experiences that were against the authors' explanations about the relations between education and society. In Chapter 8, I address the teachers' validity evaluations when I describe and discuss their evaluations about the knowledge artifacts.

Summary and discussion

Previous literatures have suggested that teachers tend not to think research-based knowledge useful and not to use it when (a) it is descriptive or explanative rather than prescriptive; (b) it lacks relevance; (c) it fails to represent classroom realities; (d) it lacks validity (e.g., Kennedy, 1997; Tom, 1985). I also found that teachers modified or did not use shared knowledge because of (b) and (c) as main reasons in their episodes. There were a few cases of (a) and (d) in the episodes, but I heard they mentioned (a) briefly in the first interview and I saw (d) in the teachers' evaluations of the knowledge artifacts.

In addition to the reasons of the previous literatures, I saw that teachers either modify or did not use shared knowledge because it did not fit their teaching philosophies, perspectives, goals, or styles. In addition, in my findings, effectiveness was one of major reasons of modification or non-use. The differences between previous literatures and my findings may be because my analysis includes other kinds of knowledge from colleague teachers and workshop as well as research-based knowledge while the literatures were only about research-based knowledge, and because my study my analysis includes modification cases. Regarding “effectiveness,” it was a much bigger reason in modification episodes than in those of non-uses as Table 5 shows.

My analysis shows that teachers modified or did not use shared knowledge when they thought that it was not relevant to their contexts or students, there were reality constraints, it did not fit their teaching philosophies or styles, it was not effective, or it were not valid. These different reasons for non-use or for modification were not equally common, so I describe and discuss patterns in the reasons for modification and non-use. Since my sample size was not very large, and the data came from interview—they represent teachers’ perceptions, the patterns may not be generalized and represent realities.

In Table 5, I compare the frequency of these different reasons. Table 5 represents teachers’ thinking as they themselves lay it out. When they did not use shared knowledge, their reasons in order of frequency were students’ characteristics, teachers’ philosophies and styles, reality constraints, and effectiveness. When they modified shared knowledge, the reasons, in order, were effectiveness, students’ characteristics, teachers’ philosophies and styles, and reality constraints. Student relevance, and teachers’ philosophies and styles were major reasons for both the episodes of non-use and modification.

Notice that teachers' responses to ideas that they believe not effective are distributed differently. For effectiveness issues, teachers were far more likely to try to modify shared knowledge than they were to not use it at all. This indicates that when shared knowledge lacks effectiveness, teachers tend to modify and use it rather than not to use it. On the other side, ideas that teachers perceived to be limited due to reality constraints episodes were least often modified, whereas one third of the episodes of non-use were about reality constraints. This indicates that when teachers obtain shared knowledge that they cannot use due to reality constraints, it was very difficult to modify and use it, so in most cases they choose not to use it.

Context specifics were much more influential factors than knowledge qualities when teachers decide whether or not they use particular knowledge. Teachers modified or did not use shared knowledge due to the reasons: context relevance, reality constraints, student relevance, teachers' philosophies or styles, effectiveness, or validity. The first three reasons are all about context factors. The last two reasons are knowledge qualities. More than four fifths of the episodes of modification or non-use were about the first three reasons. This indicates that context factors were much more determinant factors than knowledge qualities. In addition, this supports that teachers' strong belief of "it depends"—whether or not shared knowledge is useful depends on context specifics—is reasonable. Reversely, it was possible that teachers' strong belief of "it depends" might partly influence their decisions to modify or not to use shared knowledge due to context specifics.

Table 5. Reasons for non-use and modification

	Reality constraints	Context relevance	Student relevance	Teachers' philosophies and styles	Effectiveness	Total
Non-use	11	2	17	12	2	44
Modification	5	1	13	12	11	42
Total	16	3	30	25	13	86

Table 6 presents the relationship between the sources and the reasons. I classified the shared knowledge sources into three categories: research and theories; curricula and workshops; and teacher colleagues. I separated out “curricula and workshops,” because these were widely cited by teachers, but it was difficult to be certain whether the knowledge that curricular and workshops provided teachers came from research or from teaching experience, or from some combination of the two.

Table 6 shows that research-based knowledge such as theories and research was more vulnerable to non-use than to modification. In contrast, shared knowledge from curricula or workshops was more likely to yield modification than non-use. This may be because research-based knowledge tended to be more abstract knowledge, such as concepts and principles, so it is difficult to modify them. In contrast, shared knowledge from workshops and curricula was likely to include specific knowledge, such as activities and materials, so it was relatively easy to modify them.

When theories and research were modified or not used, the two most common reasons were reality constraints and student relevance. In contrast, shared knowledge from curricula or workshops were modified or not used, the two most common reasons were student relevance and teachers’ philosophies and styles. This may be because shared knowledge from curricula or workshops were presented in more teacher-friendly forms although they were based on theories and research, so reality constraints were already considered when they were translated as curricula and workshop knowledge.

Perhaps the most surprising finding was that shared knowledge from teacher colleagues was most frequently rejected because it did not fit teachers’ philosophies and styles. When teachers did not think shared knowledge as valuable to use, it came from more often teacher

colleagues than workshops, curricula, or research-based knowledge. They often did not use their colleagues' ideas because they had different perspectives on good teaching and learning and teaching styles from their colleagues. This is consistent with the survey result: all the teachers thought that other teachers' practical knowledge could not fit their own philosophies and styles, but all of them did not think that this would be the same for educational theories and research. Teachers thought that theories and research may have more generalizability than shared knowledge from other teachers with respect to teachers' philosophies and styles.

Table 6. Sources and reasons for non-use and modification

	Reality Constraints	Context Relevance	Student relevance	Teachers' philosophies and styles	Effectiveness	Total
Theory/Research	6	1	10	2	0	19
Non-use	6	1	9	2	0	17
Modification	0	0	1	1	0	2
Curri/Workshop	9	1	13	13	11	47
Non-use	4	1	6	4	2	17
Modification	5	0	7	9	9	30
Colleagues	0	1	8	9	2	20
Non-use	0	0	3	7	0	10
Modification	0	1	5	2	2	10
Total	16	3	30	25	13	86

This chapter shows that the processes where teachers use, modify, or do not use shared knowledge is dynamic and complicated. In the processes, teachers consider various factors, such as reality constraints, context relevance, student relevance, their philosophies and styles, effectiveness, and validity.

Up to now, I described reasons for non-use or for modification by analyzing teachers' episodes. I did not deal with reasons of using shared knowledge in this study. I did not ask why teachers *used* particular shared knowledge when they nominated episodes of knowledge use. I thought that it might be difficult for people to provide reasons why they used shared

knowledge—many responses could be superficial, such as “it sounds right” and ‘it is a good idea.’”

In addition, the question why teachers use shared knowledge would be fruitful especially when they choose one idea over another idea. This is similar to the question why teachers modify shared knowledge—why they do not use original ideas but use alternatives by modifications. In this vein, the reasons of non-use or modification could be reasons why teachers *use* shared knowledge. For example, student relevance was one main reason for non-use or modification, so this may indicate that teachers are likely to use shared knowledge when it is relevant to their students’ characteristics. However, it is possible that the reasons of non-use or modification are not sufficient conditions but necessary conditions for using shared knowledge.

Chapter 8: Teachers' evaluation of the knowledge artifacts

In the second interview, I asked these same teachers to evaluate the usefulness of the knowledge artifacts. While their main concern was instrumental use in the first interview, when they evaluated the artifacts, they addressed various ways of knowledge use. As I described in Chapter 5, they said that the knowledge artifacts were useful in improving their practice and solve specific problems in classrooms, to expand and change their perspectives on teaching and learning, to use as a source to produce their practical knowledge, to reflect on their practice, to confirm and justify their practice, and as a reminder of other principles. In this chapter, I describe how teachers evaluated the knowledge artifacts and discuss what factors influenced their evaluations.

8.1. Constructivism and Direct instruction

I asked teachers to evaluate a summary of constructivism and Klahr and Nigam's (2004) study, "The equivalence of learning paths in early science instruction" that compares discovery learning with direct instruction. The first one summarized social constructivism, but the empirical study's main finding was that direct instruction yielded better outcomes than discovery learning in both short and long terms. Since the topic of discovery learning and direct instruction was very popular and ordinary in teacher communities, and the two pieces provided teachers with contradictory information, the artifacts were effective to identify and specify teachers' positions and evaluations.

All the teachers agreed to the constructivism summary. However, this does not necessarily mean that they valued constructivist teaching approaches more than direct instruction that was based on different perspectives on learning and teaching. When they compared direct instruction with discovery learning—they regarded constructivist teaching as discovery learning—,

only three teachers said that they valued more discovery learning. Six teachers thought that directed instruction was better and more effective, and the others did not make clear their preferences—most of the fifteen teachers argued for a balance or a mix of the two ideas of direct instruction and discovery learning. This indicates that it is one thing to accept an idea as valuable and plausible, and it is another to choose and implement it among other alternatives. Alternatively, all the teachers said that they accepted constructivism, but it was possible that, even when they did not actually accept constructivism ideas, they were reluctant to say so in the interview because constructivism had been spread wide as “unquestionable” truth in education communities.

Teachers’ previous thoughts and beliefs influenced their evaluations and the ways in which they used the artifacts. For example, with their strong beliefs that “there is no perfect strategy that works across all contexts,” “one way is not always better than the other,” and “students learn differently,” almost all the teachers responded that both discovery learning and direct instruction methods were valuable, and that each method had its place in teaching. They said that which method was better depends on context specifics, such as students’ ages, abilities, or learning styles, subjects, topics, the sequence of lesson, and so on.

I also believe that it goes back to my original philosophy that teaching children requires a balance of philosophies. I believe that direct teaching is important ... And when they are conducting their own experiments, which I believe is important. ... Which brings me back to, once again, a balance in teaching. [Sue]

It is helpful because it proves that if you do just one or the other without a balance of the two you’re not going to have positive results. So I guess it sort of confirms my thought that you do need a balance of both. [Robin]

Especially, this position of a “balance” or a “mix” between discovery learning and direct instruction was related to their view on educational theories that came mainly from their teaching experience. When they evaluated two opposing theories and ideas, many of them addressed that

educational trends were a “swinging pendulum,” “cyclical,” or a “wave.” For example, Beth and Joan said that they saw that the two opposing method ideas were like, and a current trend is the two ideas’ “happy marriage.”

Education was cyclical. It goes around and around. And it goes away for awhile and then things come back. Like, cooperative learning went away for awhile and now it’s coming back again. So you’re just kind of on this swinging pendulum all the time. ... So really after many years of teaching you realize that just because the pendulum has swung way over here doesn’t mean this method over here wasn’t valid. [Joan]

What I was saying earlier about Michigan State’s Child Development Laboratory was very much an exploration, learning center. There was a curriculum and the teacher sort of acts as facilitator and provides learning opportunities. And then throughout the room there were opportunities for kids to discover things on their own. But now since we were a Reading First school we’ve really been expected to do more explicit instruction and more direct instruction. And so there’s sort of a happy marriage, I guess, in most classrooms now where people were doing some direct instruction and then also providing that discovery time. [Beth]

Some teachers thought that Klahr and Nigam’s research findings indicated that “we need different types because students were different,” or “which brings me to again a balance.” They tended to interpret this study results as validating and confirming their previous beliefs though the study findings actually said that direct instruction was better than discovery learning.

All the teachers accepted that the both methods were valuable, but nine of them said their preferences. Six teachers valued more and preferred direct instruction, and three thought discovery learning more valuable and preferable. The two groups of the teachers had different focused when they compared the usefulness of the two approaches. While the teachers who preferred direct instruction addressed student relevance, effectiveness, or reality constraints as reasons for their preference, the other three teachers said that discovery learning was more valuable due to their perspectives on good learning and teaching.

The six teachers who preferred directed instruction explained that direct instruction usually worked for *many* students in their classrooms. In addition, they said that their students were too young for discovery learning, or discovery learning was neither practical nor realistic. They easily accepted the Klahr and Nigam's findings and used them to confirm or justify their previous thoughts and practice. For example, Ellen interpreted that this study was saying that it was okay to give them more guidance.

I think we try to avoid that (direct instruction) so much. We want them to be openly learning. I think with looking at some of these scores it said it's okay to give them more direct instruction. It's okay to tell them exactly what you want them to learn. ... So maybe I would definitely make sure that I'm giving enough guidance to my kids. And maybe even more than I felt comfortable with at first. That might be okay. [Ellen]

It sounded like it (the Klahr and Nigam study) would have validity. You realize that discovery learning can be extremely random. And I don't think as educators we can approach something that was that random. Some children will discover and some will not. ... And so it's not really terribly realistic to set up a situation where all children were going to discover. Sometimes they don't even know what they have discovered. ... You can let kindergartners play in the sand for a certain length of time, but they're not going to discover the properties of sand without hours and years of time. And I don't have that, quite frankly. So I think yeah, in a perfect world. But it wasn't. So it's not terribly realistic to set up discovery situations all the time. And it's extremely time consuming. [Jennifer]

This information (the Klahr and Nigam study) it validates what I've been taught as a Montessorian and what I use every day that initial presentation of the material of the work, it's very important. It's key to build a strong foundation from which children can go and explore on their own. I felt validation. [Sarah]

The teachers who argued for a balance or valued more direct instruction tended to use the study to confirm their beliefs of a balance or justify their preferences of direct instruction. However, several teachers among them said that this study was useful because it made them to think about their practice. For example, Clara said that this was useful because it made her think about how she adopted direct instruction and discovery learning in her classrooms.

I think that it just made me realize, made me think about what I do and how I do it. And it made me think, like, I don't really do a lot of standing up there direct instruction. I don't know. Maybe I do more than I think I do. But I know that I include a lot of that discovery too. But it's a mix. And I think that's what works well. [Clara]

Among the teachers who addressed their preferences, there were three teachers who valued more discovery learning. While the teachers who argued for a "balance" or preferred direct instruction used the study findings to confirm and justify their thoughts and practice, the three teachers who valued more discovery learning doubted the validity of the Klahr and Nigam study. When they evaluated the Klahr and Nigam's study, all the three teachers pointed out that the "discovery" group in the study did not have instructional guidance, and argued that "true" discovery learning included more instructional guidance.

In addition, they suggested potential factors that "distorted" the research findings: they wondered if there were considerable differences in instructors or students in the two methods groups, or if the tests were reliable and valid enough. Besides these advocates of "discovery learning," there were two other teachers who mentioned the same points though they did not value more and preferred discovery learning.

According to this and the data that they had you would think that this would definitely be a better approach. But I don't agree with that. It does show the results of students with direct instruction and students with basically no instruction. But I don't consider inquiry and discover to have no instruction. [Liz]

I was surprised. But my question was, how did they assess this activity? ... if they were given the same rigid assessment then obviously they wouldn't do as well because they weren't provided with the support to do well on that. So I kind of disagreed with their conclusion, but I had a question about how they were assessed. Because if it was a rubric that would make quite a bit of difference I thought than (these research results). [Robin]

I think it's still useful because it makes me think about the research and think about how they did it. ... I think I question it just because of my own experiences saying I know this doesn't match my own understanding of inquiry and how people learn

and what I've experienced. So I challenge it in my mind and look for a reason why it doesn't match in my mind. ... "Should I look more into this and see how I would continue with the research or follow up on the research later at another time?" ... So it makes me question it more. [Liz]

This indicates that teachers' understanding of discovery learning might influence their evaluation of Klahr and Nigam's study. They did not have the same meanings of discovery learning. Ten teachers thought that discovery learning did not include instructional guidance and directions like in the discovery learning group of the Klahr and Nigam study, but five thought that discovery learning also includes instructional guidance in a way different from direct instruction.

The five teachers evaluated that the discovery learning instruction of the study was not "true" discovery learning, so doubted the validity of the study. They argued that the study findings did not prove that direct instruction was more effective than discovery learning. However, all the teachers who doubted the validity of the study with the "different" definition of discovery learning did not think that discovery learning was more valuable or preferable in their classrooms. Two of the five said that they preferred a balanced approach or direct instruction.

In addition to the issue of whether or not discovery learning includes instructional guidance, there was another issue in their different understandings of discovery learning. For several teachers, discovery activities often mean "practice" with hands-on activities. They said that they also needed discovery learning because "children do need those hands-on experiences." For example, after they learned the parts of a flower, Ann's students did an activity of labeling a flower's part as a "discovery learning" activity. However, strictly speaking, discovery learning does not mean only hands-on activities or practice. Discovery learning was a very popular concept and a practical issue that the teachers often faced in their ordinary work, but several teachers' understandings did not seem correct.

We use centers, small groups once a week to do more of the small groups discovery kind of things. So we do have it, but it's a smaller portion of our day. And it's usually based on direct instruction we've already taught. So we've talked about flowers this week in kindergarten and the parts of a flower. So one of the centers today was that the students label the flower. They label the root, the leaves, the stem, and the flower. So that was kind of on their own doing something. But they've already received direct instruction for it. [Ann]

In addition, all the teachers argued for the balance between direct instruction and discovery learning, but their meanings of the balance were not the same. When the teachers said that they balanced and mixed the two methods, most of them meant that they used both methods for one lesson or one chunk of lessons. However, for several teachers, the balance or mix of the two methods meant that they used direct instruction for some subject matters and discovery learning for other subject matters. For example, several teachers said that they made the balance by using discovery learning especially for math and science lessons and using direct instruction for reading and writing lessons. This indicates that when teachers accept and use particular shared knowledge, their implements could be very different according to their understandings of the knowledge.

As I expected, the Klahr and Nigam study findings were not usual for these teachers. When they evaluated the study, the first responses were to be surprised with the findings for half the teachers. Seven teachers explicitly said that they were surprised at the research findings though I did not ask them about it. Interestingly, five of the seven teachers who said that they were surprised had already thought that direct instruction worked better than discovery learning usually. Though they already knew this from their teaching experience, it might not be popular experience for them to read research saying that direct instruction was better than discovery learning. In contrast, two teachers who preferred direct instruction and one teacher who argued for a balance said that they were not surprised at the findings and added "I knew it."

This was the most interesting of the set. I was familiar with the constructivism. I think that with the research that was done that they found that the direct instruction actually worked better on this particular one. I was a little surprised. However it just reiterates for me that you need different types of instruction. Direct instruction, I think, worked for many years for many kids. [Kathie]

Klahr and Nigam's findings were unexpected for many of the teachers, but this study did not change the teachers' previous thoughts and beliefs. It is difficult for one study to change teachers' previous thoughts and beliefs like one information rarely change people's thoughts, especially when the thoughts and beliefs came from their own experiences (Weiss, 1995). The teachers did not think that one study was sufficient by itself to influence their thoughts and beliefs. Several teachers said that they needed more studies with better research designs or differently designed studies: studies comparing three instruction models including a balanced one, or studies testing "true" discovery learning. The teachers who required more experiments were not all the teachers who preferred constructivism. Regardless of their preferences, the teachers thought that it was not easy to say that direct instruction is more effective than discovery learning.

There's not enough. There's not enough proof to me to say that I could throw away the other. Even if there were, it would have to be pretty, pretty, convincing evidence to throw away a way that some children learn. You just can't throw it all away. You've got to use all of those tools. [Joan]

I know that was just one study with the balls and the ramps. ... And I wonder if it was partially due to the difference in teachers and also a difference in how the students were randomly... I mean, if it's random, it's random. So you don't know. It could have been one way or the other. ... I would want to see more experiments done that way and see whether the constructivist or the direct instruction benefited students. Or a mix of the both. [Beth]

In sum, the teachers evaluated the artifacts mainly regarding validity, and their previous thoughts, beliefs, and understandings influenced their evaluations.

8.2. Whole language and Phonics

In addition to the artifacts of constructivism and direct instruction, I used another two opposing educational ideas. I asked teachers to evaluate the claim that “teachers would be better not to do phonics any more but they have to apply entirely the whole language approaches in reading instruction.” Since this was controversial and popular, it was useful to reveal teachers’ thoughts and beliefs.

All but two teachers disagreed with the statement. The majority of them focused on a balance of the two different ideas, just like they responded to the issue of constructivism and direct instruction. Their beliefs in a balance and a mix of two opposing educational ideas were very strong. As I discussed earlier, this beliefs came from their perceptions of educational ideas as “swinging pendulum” and their beliefs of “every child learns differently so teachers need all strategies.” These beliefs came partly from their teaching experiences.

Which brings me back to, once again, a balance in teaching. Because when I first started my undergrad work the philosophy was the whole language. And in my portfolio, which I actually have here, I put in my literacy philosophy that I believe that there needs to be a balance. That you can’t just do the whole language. I think that there needs to be some direct instruction with phonics as well as vocabulary.
[Sue]

I think that we need a balance of both. And that’s how I teach my students and that’s how I work with my own children too. I think they need to be exposed to that whole language and read to and look at full words and learn words and things. But they also need to learn the phonics piece. They need to learn the sound. They need to learn that letters have sounds and they need to learn that sometimes it’s tricky. There’s a silent ‘k’ sometimes. So I think that it needs to be a balance in order for it to all work. [Clara]

The majority of the teachers disagreed with the statement, but two teachers agreed with it. This difference came from their different views about which way was more effective and valuable way to learn to read. The majority disagreed with it because a balance would be more effective and better meet individual students’ needs, but the two teachers agreed with it because

they thought the whole language approaches as more valuable and effective—they were “whole language” people. For example, Liz said that the whole language approaches would be more effective and valuable way to learn to read because “teaching things in isolation may not necessarily carry over to application.”

Doing phonics was practicing sounds maybe in isolation or something. Sounding out just letters or something that were just isolated from words. A story when with the whole language approach you would be maybe using it in your reading group, applying it towards just letters and words and words and text. ... I’m basically kind of agreeing with that (the whole language approach). ... It’s also I think sort of a philosophy that teaching things in isolation compared to teaching things in context. To me I feel teaching things in isolation may not necessarily carry over to application. So to teach, they may know the sound of the letter ‘b’, but they still don’t apply it when they’re reading. [Liz]

I support whole language approach. I don’t think that readers should be given these books that say c-a-t, cat. Real readers don’t do this. ... If we teach children these isolated phonics things they will not be able to apply it to reading and writing or speaking like we want them to be able to do, which was the whole reason we started a whole language approach. Because everything needs to be integrated together. ... I just think it’s so sad that all of a sudden now we’re switching back to, "See Spot run. Run, run, run." It’s boring and it’s not real books. Children need to be taught how to read in an authentic way. [Robin]

Within the teachers who disagreed, I saw that they had slightly different foci: some focused on a balance between the whole language and phonics; others focused on individual students’ different needs. The teachers who focused on the balance argued that a class as a whole needs both approaches to learn better how to read. In this case, their disagreements were influenced by their previous beliefs in a balance of on opposite educational ideas *in general*. In contrast, other teachers who focused on the different needs of individual students often said that *particular* students in their classrooms needed phonics lessons. Their disagreements were related to student relevance issues. They said that they should consider and meet the differences of individual students, especially students with lower achievement. They often emphasized that some of their students who were “performing very low” especially needed phonics learning. That

was why they thought that teachers need the both strategies. For example, Sam said that their students did not have home support, so they needed phonics teaching.

I said no to this argument right away. And I think the main reason was because we don't have the home support. Some students come to us with absolutely nothing. ... We have kindergartners coming in that can read. But we also have kindergartners coming in that don't know their letters. Can't recognize all of the letters yet, let alone know letter sounds. So I think you completely have to build up on that. [Sam] I think some kids pick things up easier and they'll pick it up quickly with the whole language piece. However, some kids need that direct instruction. They need it. And [Kathie]

The majority of the teachers argued for the balance between whole language and phonics, but their rationales were somewhat different. This indicates that though teachers reach the same evaluation of shared knowledge, it does not necessarily mean that they have the same rationales.

In sum, the different perspectives on “which is more effective way to teach reading” influenced their evaluations of the artifact. Even when they made the same evaluations, their foci and rationales were different. In addition, this artifact shows again the strength and pervasiveness of teachers' beliefs in a balance or a mix when they evaluate opposing educational ideas.

8.3. Bowles and Gintis's study

The third artifact was Samuel Bowles and Herbert Gintis's (1976) “Education, inequality, and the meritocracy.” As academic research, this was largely descriptive and interpretive study, explaining the relationship between society and education from a macro perspective. In addition, it did not provide teachers with any specific prescriptions. Teachers have been known to criticize the usefulness of academic research mainly because it does not provide them with specific prescriptions as I reviewed in the second chapter. This artifact allowed me to explore teachers' evaluations of a descriptive and explanative study without prescriptions.

Teachers evaluated this artifact mainly according to its validity. Six teachers said that Bowles and Gintis's paper was “mainly” true, and two teachers mentioned that it was partly true

in “other” places: they said that “It does not happen in my classroom, this school, or at least this district but it could happen in other higher grades or other districts.” Four teachers responded that it was not true: they said that since there were many powerful factors or variables to determine a person’s educational and social success, it was not reasonable just to “blame education.” The other teachers responded they did not know whether it was trustworthy.

In addition, there was a difference in the kinds of evidence according to teachers’ agreements or disagreements with the Bowles and Gintis artifact. The teachers who disagreed suggested mainly concrete evidence from their personal and teaching experiences. They explained how education helped them personally get out of poverty that their parents had experienced, or described their own schools’ good standardized test scores and the success of their graduates despite low social economic backgrounds. However, the teachers who said the arguments were generally true mentioned more abstract concepts or broad phenomena, such as “labeling,” “cultural factors,” the gaps of standardized test scores among different races and economic classes, and other related studies.

I disagree with that. I think for the majority of children, especially poverty level children, that the way out of that is through education. And even for me. I came from Benton Harbor Michigan. ... It’s a very poor area. I have teenaged parents. My grandma helped raise me. I very easily could have fallen into being an unwed mother myself, not moving on to college, not going on to school. But for me school was the place I was able to be successful. And so that let me get out of that situation and be a successful citizen today. So for me, school helped. [Kathie]
I’ve read quite a few articles that suggest that ... there’s a high correlation between certain things like your socioeconomic status and your vocabulary. The hypothesis was that people in higher socioeconomic status were more educated, therefore they use a wider variety of words and more rare language. So their kids were exposed to more. So when their kids were in school they perform better in school. ... Likewise, kids from impoverished families don’t hear as many words so they have a smaller vocabulary. So they don’t perform as well in reading and literacy. And so they don’t do as well in school. ... I’ve read articles and studies that support that. The educational system does contribute. [Eddie]

Compared to other knowledge artifacts in this study, the Bowles and Gintis paper has very theoretical and abstract ideas and a very “macro” perspective. However, six teachers explicitly said that this artifact was “very interesting,” and all but one answered that this study was useful. They thought it was interesting because this artifact gave them new perspectives and made them think about “big ideas,” such as “the hierarchy of education being a microcosm of capitalist societies,” “capitalism versus communism,” “the structure and property, relations,” and so on.

For example, Ann said that this made her think the most compared with the other knowledge artifacts. She explained how her thoughts changed. At first, she thought that the Bowles and Gintis artifact was not true because it did not seem to explain her own classroom. However, she later talked about this with her family, and then realized that her experience could be limited, and accepted it could be true in some districts.

That one is the one that made me think most. ... I was frustrated because I read the study and it was completed in 1976. ... “Perhaps in 1976 but not necessarily true today.” And, “It depends on the school.” Then I was talking to my family about it. And my husband says, “Lisa, you teach in a wonderful school district. One of the best school districts in Michigan and even the United States.” “You’re only thinking of yourself as a comparison to this.” Which is true. And then I stepped back and I said, “You’re right.” I mean, I’m thinking of my classroom, I’m thinking of our school and everything we do for kids. So when I compared this study to our school district I thought it’s not necessarily true. But my husband pointed out, compare it to Detroit schools. ... When I sat back and thought of it, Detroit schools are in very much impoverished areas and kids are not as well educated as the kids in Okemos, in a more affluent district. So this is very true today, I thought, after we had that discussion. [Ann]

The reasons why teachers felt this artifact interesting were similar to the reasons why they thought it as useful. They said that this artifact was useful because it changed their previous thoughts, made them reflect on their practice, made them view their job and society in a big picture, made them think about the role of education in society, made them ask further questions,

and reminded them of other important principles, such as cultural capital and social-economic class awareness in teaching. Interestingly, whether or not teachers agreed with the study had nothing to do with their perceptions of whether and how this Bowles and Gintis artifact was interesting and useful.

I think that we just get in our classroom and so focused on our curriculum that we kind of forget what the big picture was and where these kids were going to need to go educationally, what they need to learn to be successful. ... I think as teachers we need to maybe, sometimes be a little more philosophical about society and education and more open minded. [Liz]

I think it helps us think about how we're teaching kids and what opportunities and activities and assignments we're giving them. And if it falls under, you know, we're just expecting them to follow rules and stuff like that, was it really enabling them to be problem solvers and thinking outside of the box and being more intrinsically motivated for education. [Ann]

We need to be aware of these things. So even as we follow our curriculum that we do question like, what am I doing if I have this group that I'm already labeling as kids who need interventions and were already behind and they're only five. [Liz]

While most of the teachers said that the artifact was useful, one teacher did not think it useful. Sam said that she agreed with the main points and learned from the study. However, she did not think it useful because she could not find any prescriptions or implications for her class. This was because she evaluated the usefulness of shared knowledge only by instrumental value. She used the term "useful" very strictly and narrowly in instrumental ways. In contrast, the other teachers recognized other ways in which shared knowledge was useful. For example, they said that it was useful because it changed their perspectives and made them think about things that they did not know or think before.

I hadn't noticed the parallels before. I hadn't thought of it in this way. And I do agree with it, the majority of it. I do look at our education system and wonder. I don't really know (if it was useful and helpful). I couldn't really find ways that I thought it was useful to me. Like I say, a lot of this was thinking outside of what I do on a daily basis for what's going on inside of my classroom. [Sam]

Although the Bowles and Gintis study did not directly provide teachers with recommendations as to what to do, teachers tended to seek practical implications of the study. Even for this study, their main concern was “what to do” and “how to do” in their classrooms. For example, two teachers drew implications that teachers should try to ensure that inequality did not happen and should empower children. Occasionally, several implications that the teachers drew from the artifact seemed not to be directly related to it. Rather, they just reflected the teachers’ own philosophies and concerns. For example, Sue drew an implication that teachers should encourage students’ strengths and respect them regardless of their capacities. In this case, this artifact functioned to confirm their previous philosophies and concerns.

I think that it speaks to the importance of telling children to concentrate on their strengths ... So by keeping this in mind, that people look at people according to their test scores and their IQs, which all teachers know they do, it’s just makes it more important to give those kids that firm message that what they do and who they were was just as or more important than their individual scores on tests. [Sue]

In sum, teachers mainly evaluated this artifact regarding its validity—whether this sounded trustworthy based on their experiences and prior knowledge. I found that this artifact was very theoretical, looked not relevant, and did not provide prescriptions, but the teachers thought it very interesting and useful. They used it to challenge their perspectives and rethink their practice. Some teachers drew prescriptive implications from this artifact.

8.4. Lampert’s study

While the Bowles and Gintis artifact is a macro study, Lampert’s (1985) study is at a micro level with two elementary teachers’ dilemmas. This Lampert study used the two elementary teachers’ cases and took teachers’ different perspectives about teachers’ roles from those of academic’s perspectives in the study. A number of researchers argued that particular research genres, such as case studies, ethnographies, and narratives are more relevant to teachers’

epistemological forms rather than experimental research, conceptual analysis, etc (e.g., Bolster, 1983). If this is true, the features of Lampert's study would influence the teachers' evaluations.

Teachers thought both Bowles and Gintis's macro analysis and Lampert's micro analysis useful but in different ways. They thought the macro analysis useful because it helped them expand their understandings and think about the relation between their practice and social inequality. Regarding the Lampert's micro analysis, they said that it was useful because the two teachers' dilemmas helped them refine their thoughts and reflect on their own practice.

Teachers did not think that the Lampert study was more useful. Rather, while the Bowles and Gintis artifact challenged their perspectives and stimulated them intellectually, teachers thought that there was no new information in the Lampert study. This was because the Lampert study's the main points and the dilemmas were already very familiar for teachers, and the two teachers' "solutions" in the dilemmas were not very insightful for them. For example, Beth said that this study would be much more useful for "new" teachers because they lack experiences of handling this kind of dilemmas. Therefore, they reported the Lampert study useful just to refine and confirm what they would do in the dilemmas. This supports that contents matter more than research genres when teachers evaluate the usefulness of shared knowledge (Kennedy, 2000).

Regarding the research findings of Lampert, all the teachers agreed that "teachers often cope with problems rather than solving them," "there was more than one best answer in teaching," and "there cannot be one perfect solution in teaching," but several teachers suggested various roles and duties of teachers in addition to or instead of a teacher's role of a dilemma manager that Lampert described in the study.

Because so many problems come up through the day. Many of them have nothing to do with teaching. ... You can't always solve the problem. Let's see. "Sometimes choosing one value was not the best way to manage dilemmas because there cannot be one perfect solution." Yeah. I would agree that a lot of times we're coping

because things come up where you don't have time to really think it through. You've just got to make a quick decision. [Julie]

The ideas of teachers wasn't always necessarily correct. I think that within the day we were doing so many things with kids that sometimes we're parenting kids. Sometimes we're teaching them manners, sometimes we're feeding them. Truly. If they don't bring their snack we're giving them food. So I think our role was so multidimensional now that I think it's hard to label it as this or that sometimes. ... There's so many things we do in our day I could see how the way we're production managers. ... I just think it's complex. [Ann]

Many of the teachers said that teachers sometimes had to cope with dilemmas rather than solving them because it was almost impossible for them to "solve" all problems in the classrooms. However, they often argued that teachers should make effort to solve dilemmas rather than just coping with them.

I think it's okay to cope and handle things. But it's also important to try and solve. It's okay to cope but you've got to try to make time for solving too. And I know I do a lot of coping in my room. But like I said, I always try to get to that solving part. [Lucy]

She (Lampert) argued teachers dilemmas often require coping rather than solving. I would say sometimes yes, that's true. And I think a lot of it depends on the supports available within your school, and the supports available outside of school being the parent. ... I would say there were times when a kid was acting out and I do what I have to do just to cope with it to get through that lesson. Because I'm not going to let the one stop from twenty something others. [Sam]

Teachers were much more interested in the two teachers' dilemmas than the research findings and conclusions when they evaluated the artifact of Lampert's research. This may be because they were more interested in "what to do" and "how to do" in the similar situations to the two teachers' dilemmas in the study. When they evaluated the Lampert artifact, they spent much time on diagnosing why the dilemmas happened, evaluating the two teachers' "solutions," suggesting their alternative resolutions, and explaining their similar experiences. Regarding Lampert's dilemma, many of them diagnosed that the teacher's seating policy caused the dilemma, saying that "if I get a bunch of boys together they'll start goofing around throwing

stuff. If I get a bunch of girls together they'll talk, and talk, and talk," "some of those boys it's probably like they're being goofy because they're sitting by their friend," and "she hadn't set up a proper classroom community."

Eleven teachers disagreed with Lampert's way of coping with the dilemma mainly because they did not think it as effective or because it did not fit their philosophies. They diagnosed the reasons the dilemma happened, evaluated Lampert's "solution," and then concluded that the Lampert's seating policy was neither valuable nor efficient. Many of them pointed the ineffectiveness of the seating policy, and four teachers disagreed with it due to their different philosophies. They argued that students needed to learn to work together, and one teacher mentioned students should have opportunities to choose where they sit in order to develop their ownership.

Many of the teachers suggested their own ways to solve the dilemma. Major alternative solution that they suggested was to mix students, but several teachers provided different strategies and tips in addition to mixing students. For example, they suggested to make the arrangement an "L," and to use tables instead of tables. Several teachers thought that since boys had more energy, teachers should figure out ways to channel boys' energy and settle them down, such as taking a break and doing some movement activities.

I don't see any reason that the boys are all in one spot and the girls are all in one spot. I wouldn't let them do that. I would mix it up. Especially if the boys had been messing around. I would spread them out. ... I didn't think she made the best choice. ... Because even with my kids, even at this young age if I get a bunch of boys together they'll start goofing around throwing stuff. If I get a bunch of girls together they'll talk, and talk, and talk. So it's good to mix them up. [Ellen]

I didn't understand why she didn't mix them. But in our work lives when we go out in the work force, we have to work with men, and men have to work with women. I always tell my students "there's going to be a time in your life when you have to work with someone that you don't necessarily have the same ideas as they do." ... "So in kindergarten you're going to work with everyone in our class at some point

of the year. ... And I want to see you talking to each other and helping each other.” ... I try to teach that to them. [Ann]

Three teachers did not disagree with Lampert’s solution: they just said “I don’t know,” or “it (Lampert’s way) is fine.” One teacher responded “I don’t know” because she was not sure if there are differences in learning between boys and girls. The other two teachers said that if they were in her position, they would deal with the dilemma differently. Although the three teachers did not say that “I disagree with her,” but they did not support Lampert’s seating policy and “solutions.” In fact, I saw that the teachers very often said “I don’t know” or “I don’t understand” when they did not agree with other teachers’ practice. They tended not to evaluate and criticize other teachers’ practice. This was partly because the teachers thought that whether or not a particular strategy work depended on context specifics including individual teachers’ features.

While teachers addressed effectiveness and their different perspectives and philosophies during the evaluation of the Lampert dilemma, when they evaluated Rita’s dilemma, this evaluation was mostly about whether or not Rita’s “solution” matched their perspectives and philosophies. Six teachers agreed with Rita’s way of coping with the dilemma. They said “It was not always black and white,” “Each kid learns differently and they’re going to tell you what they understand in a different way,” “There were places and times you can allow students to say this was what they think about something,” and so on.

Seven teachers responded that they would differently solve it if they were in the same situation. They explained how and why they would deal with the dilemmas and suggested their alternatives with rationales. These alternative ways were deeply related to their perspectives, philosophies, or styles. For example, Ellen disagreed with Rita’s way to coping with the dilemma. She argued that Rita should have clarified what was a fact in the situation because “it was a fact” of science field. Almost all the teachers have their rationales for their agreements and

disagreements based on their teaching experiences but one teacher mentioned her experience as a mother.

With this one, number two, with Rita I completely agree with what she was doing. And that she talked with both of them and the class and let them know that they were both right. Because kids learn different ways and they're able to express what they know in different ways. Each kid learns differently and they're going to tell you what they understand in a different way. [Lucy]

I would just say there's more than one answer to some questions. I tell them that even with math from the first week of school. ... (If I were Rita,) I would say tell me more. It's not necessarily wrong. It's just not as complete. Because they're talking about the water cycle and the answer book says that it comes from the cloud. ... I would say that I need more information. So I don't know where that fits in to this philosophy, but that's what I would do. [Sue]

With something like this, the water cycle, there's a right answer. If it were something like a belief or an opinion, that'd be a different story. But this was a fact. So I think you basically needed to tell the kid what the right answer is. ... When you're dealing with this kind of stuff—4th grade—you're dealing with stuff that kids are going to remember a long time and they're going to need to know. So you need to tell them. [Ellen]

In sum, the features of the Lampert study did not make it more useful for the teachers. They evaluated its validity mainly according to their teaching experiences, and when they evaluated the two teachers' "solutions" of their dilemmas, their perspectives and philosophies, and effectiveness influenced their evaluations.

8.5. Group learning

In this section, I describe teachers' evaluations of the two practical principles about group learning: "Kindergarten students were too young to get benefit from pair work that was supposed to exchange ideas and comment each other in learning to write. They were too young to understand their job in the pair work, so tend not to give each other valuable feedback"; and "At the early elementary levels, teachers should not use ability grouping. Since ability groups

produce social and cultural differentiation in schoolwork, it has not been successful in meeting individual needs.”

The first quote represents the statements that teachers might say to one another. This artifact came from a teacher’ real talk of my practicum study. I chose this one because it was teacher’ practical knowledge from teaching experience that contradicted a district professional program. This statement includes both descriptions and prescriptions, so teachers were able to evaluate this regarding its validity, reality constraints, relevance, effectiveness, and so on. Especially, half the teachers participating in this study were kindergarten teachers, so it was able to compare kindergarten teachers’ evaluations and those of other non kindergarten teachers—more exactly, teachers who had taught kindergarten and teachers who had no experience of teaching kindergarteners.

The second artifact was also a specific controversial prescription, came from a website for teachers. This had a form of practical advice but presumably originated in academic research findings. Ability grouping was an ordinary strategy for teachers, but it was controversial, so this statement was effective in gaining teachers’ various responses, their own principles, rules, and rationales in their evaluations.

Kindergarteners’ pair work

I asked teachers to evaluate the statement that “Kindergarten students were too young to get benefit from pair work that was supposed to exchange ideas and comment each other in learning to write. They were too young to understand their job in the pair work, so tend not to give each other valuable feedback.” This includes two comments, one description and the other prescription.

Teachers evaluated the validity of this artifact mainly from their teaching experiences. All the teachers but two disagreed with this. Among the teachers who disagreed, five teachers said that kindergarteners still acquired benefits from pair work, two teachers mentioned its practical benefits for teachers, and another two teachers said that it was worth for students to begin to practice. In contrast, two out of the fifteen teachers agreed with the statement: they did not think that pair work and small group work were beneficial for kindergarteners to learn to write.

We do this (pair work) and they're learning some very important vocabulary as they do that. I will hear them use the words I've used in the whole group. For example, I'll do a story and we'll talk about "Was it an exciting story or was it kind of boring?" "Did I give enough details?" "How could I make it better?" And I will hear them. Some of them will read their story. "This was me. This was my mom." And the other person will say, "You need to add more details." Or they'll say, "What were you and your mom doing?" They were helpful. They can do this. [Kathie]

This one I agree with because I've experienced this with teaching kindergarten. Some kindergartners can do this, many cannot. ... The idea of changing it and making it better was very abstract to them. So I think that step needs to come later. ... They don't know how to give valuable feedback. And I think it's because they don't have the big picture. ... We have in our mind what effective writing it. They're not there yet. [Julie]

Teachers differently evaluated this artifact mainly because they had different perceptions on the same phenomenon: some thought that pair work and small group *actually* worked well in kindergarten writing lessons, but others did not think so. Despite their similar experience of teaching kindergarteners, the teachers did not have the same perception on the same phenomenon.

This artifact may be about student relevance: pair work or small group work in learning to write was relevant to kindergarteners. Some thought that the group work was relevant, but others did not think them relevant to kindergarteners. When teachers decide whether or not particular shared knowledge is relevant to students, it could be a subjective decision.

Teachers' purposes and expectations influenced their evaluations. For example, Clara agreed with the artifact because she did not think that the pair work outcomes were "really beneficial to their learning."—she was not against the idea of pair work in general. She thought pair work as useful for kindergarten math lessons. However, some teachers including Liz and Kathie thought that pair work was useful for kindergartners although they also accepted that pair work was not very beneficial for kindergartners. It was because they had different purposes and expectations from those of Clara. Clara's purpose was to develop her kindergartners' writing abilities by using pair work and small group work. However, Liz's purpose was to give opportunities for her kindergartners to encounter and practice pair work and small group work in writing lessons, and Kathie's purpose was to develop their social abilities. Their different purposes and expectations of the same activities made differences in their evaluations.

I really do feel like it's not that beneficial. They don't really understand constructive criticism at this point. They don't really understand even how they can fully complement someone on things or tell them how to be better. ... [but, are your students doing pair work or small group for writing?] Small groups like table work when they're sitting. ... They might be discussing their ideas. Like, "I'm going to write about this." Or "I'm going to write about this today." But as far as discussing their actual writing and how they can make it better I think they're too young to do that. ... they don't really help each other. [Clara]

I don't accept this because I teach kindergarten and I think they might be too young to do it real successfully. But that they're not too young to begin learning how to do it and have the experience. ... (They) at least learn maybe to work with a partner without fighting with them or something. Just get an idea that it's not too young to just get that idea. And then first grade or next year they'll build on it. ... I don't really agree because I don't feel they have to have mastery to do it. They just need to get an experience so that next year when the teacher says, "Have you ever worked with a partner?" "Yes, I have." So it's not brand new. [Liz]

Teachers agreed or disagreed with the artifact mainly based on their teaching experience. Their rationales were based on mostly their experiences of using pair work in kindergarten classrooms. Most of the teachers who thought that pair work was beneficial explained their

successful experiences of using it. Their concern was actually not whether or not pair work was relevant to kindergarteners. Rather, their concern was about how to make workable pair work in even kindergarten classrooms. They addressed and suggested conditions and circumstances that made pair work activities more productive in kindergarten classrooms.

I am using it. It was good for my kids and me. ... I think they help each other all the time. I think it helps me. ... I don't have time to listen to every kid and have them tell me what they're going to write about. So it's kind of beneficial for me. And they're telling someone. ... So I think it's helpful for them and for me. [Ellen]

It's just typically a question, such as, "what things do you like to do with your family?" ... And so one little boy was talking with the little girl next to him. And she didn't understand. She couldn't tell any answers to the question. And he started saying, "In my family we like to go to the store. And we like to go to the movies." And she said, "We like to go to the movies too." So she started having a conversation based on something the other child said. So I feel like, yes, they do benefit from that. ... When you said to her, "Tell what you like to do with your family" she didn't understand what to do. But when he talked to her she did. [Beth]

Teaching experience in kindergarten influenced teachers' evaluations. Among fifteen teachers, three teachers had no experience of teaching kindergarteners. One of them, Sam said that she did not know about this principle because she had no experience of teaching though I did not ask about her teaching experience. However, two other teachers who did not have any experience of teaching kindergarteners expressed their opinions with rationales. While other teachers' main rationales came from teaching experiences, the two teachers' rationales from their general inference and experience.

I said I'm not familiar with K. I don't think I can speak to that. I taught middle school so I can reflect more up than I can down. This was the lowest I've been and truthfully I didn't ever picture myself being at this level. I did most of my work in upper el. and middle school rooms. So I didn't feel I could comment on that one. [Sam]

So I disagree completely that kindergartners were too young to benefit from group work. That's the age where you learn to work with others. And even babies, infants, can interact with one another. And it says they need to give feedback. Well feedback even with someone who was non-verbal going "waah," that's feedback.

... Or a smile was feedback ... So I think that children at any age can benefit from peer interaction. [Robin]

In sum, teachers made different evaluations according to their perceptions and purposes. Teaching experience was an importance ground of knowledge evaluations, but similar experiences did not always lead to the same evaluations.

Ability Grouping

The other artifact of group learning was that “At the early elementary levels, teachers should not use ability grouping. Since ability groups produce social and cultural differentiation in schoolwork, it has not been successful in meeting individual needs.” Teachers evaluated ability grouping with regard to its effectiveness and their perspectives on good teaching and learning. As I mentioned, it had a form of practical advice, but it originated from academic research findings.

Eight teachers said that they did not accept this statement because they thought that ability grouping “has a place at times,” “it would be successful in meeting individual needs,” and “they were too young to notice ability grouping.” These responses came from their strong beliefs and thoughts about “it depends” and “all different strategies are valuable because it works for some students.” The teachers who accepted ability grouping very often added conditions that teachers should consider when they adopt ability groups. For example, they said “those groups were stagnant and they stay that way all year long, that’s not good,” “I don’t think it should be your only way to group students though,” and “I don’t think groups should be fixed.”

I disagree with this as well because ... If you put kids in a high, medium, low group and those group and those groups were stagnant and they stay that way all year long, that’s not good. ... (However, sometimes it could be helpful, for example) You have four kids who were just not understanding how to leave a space between their words. And you work with them on that. ... Then they can come out of that group and they can move up to their next step of learning. So there were times that

I think ability grouping was helpful. ... They don't stay in the same group for a very long period of time. So that's why I disagree with this. [Kathie]

I think you have to be careful that you're not doing all ability grouping. ... It's important because kids grow and change. And you can group kids in different ways depending on what you're working on. ... I don't think groups should be fixed. ... And it's important to use many different types of grouping so that they don't feel like they're always working with the same kids or feel isolated because they're always in the same group. ... I don't think you can meet individual needs without ability grouping. You have to be very careful how you do it and how you communicate what you're doing. [Julie]

Three teachers agreed with the statement. They agreed that "At the early elementary levels, teachers should not use ability grouping. Since ability groups produce social and cultural differentiation in schoolwork, it has not been successful in meeting individual needs." They disagreed with ability grouping with different reasons: some did not think it as effective, and the others did not think it as valuable. While one teacher did not think that the ability grouping was efficient because it was "not beneficial for both higher and lower students," two other teachers were against ability grouping because they thought that it was not "fair" and generated differentiations. The disagreements with ability grouping came from teachers' philosophies and main concerns.

I do agree with. I feel like ability grouping for practice work was not beneficial to students because higher achievers were never challenged with just being with higher achievers. ... And then lower achieving students won't ever grow because they don't have any model to look to. [Beth]

I don't like ability grouping. I don't like it because of exactly what it says. It makes some kids feel like they were dumb and sets them up for failure even at a really young age. So I agree with this that we should not group kids by ability. [Lucy]

That was something that I've heard and read a lot of research about. And mostly what I've been hearing was instead of pulling by ability groups pull by strategy groups. So, for example, when I meet with children for reading instead of taking all the lowest level children or all the highest level children I pull children who need assistance with a certain strategy. [Robin]

This artifact was presented as a prescription, but some teachers used this to clarify their thoughts and to reflect on their practice. For example, Liz said that this made her realize that she was actually using ability grouping in her classrooms, made her question if her ability groups were producing social and cultural differentiation, and helped her see ability grouping from a different perspective.

It's useful for me just because it makes me think about what I do. Because you think, "Do I use ability grouping? Yeah I do." Because you might think, "I don't use ability grouping. Wait, I do. I use it in reading. I don't use it too much in math." But you think, "I do use it." So it makes me stop and think. And I think anytime you stop and think about what you're doing is good. Stopping to think about what kind of grouping if I do it by ability do I have? Are all my lowest reading groups always my Hispanic kids and they're never out of that group and they're always there? So I think it's good to question and look at what you're doing and say, "Wow. Maybe that's true." Or, "I should look into that more." So it's useful even if I don't agree with it, because it makes me just think how much grouping do I do and maybe I should look at it a different way. [Liz]

I didn't accept his argument fully. It's useful as a reference. I can hold it up to what I know and reflect on it on my own experience. Measure my own knowledge against it. ... This is useful as something for me to reflect on. ... Maybe I would structure it differently and I would find benefit from it. [Sarah]

Teachers' disagreements and agreements came from mainly their teaching experiences and experience as mothers, but four teachers mentioned theories, research, or magazines to support their opinions. They mentioned research or theoretical ideas to defend their positions, but their positions were not the same: two teachers used research and theories to defend ability grouping while the other use research to support their disagreements with ability grouping.

For example, Sam argued for ability grouping because theories and research showed it worth that "students need to be constructing it with someone that was at a similar level as them." Sue also mentioned a piece of professional magazines that argued "if you put all of the strong learners in one team and all of the weaker learners in another team, that the weaker learners will do better because they were used to depending on the strong learners in their team." In contrast,

Robin said that “that was something that I’ve heard and read a lot of research,” so she was against ability grouping.

In sum, teachers evaluated ability grouping regarding its effectiveness and their perspectives on good teaching and learning. Teachers tended to use prescriptive knowledge instrumentally, but sometimes they conceptually used prescriptive knowledge and used it for reflection.

8.6. Home-reading strategies

This artifact offered two strategies to foster home support in reading and writing. “Take-Home Journal” strategy is to send home a plastic bag with a book and a notebook in it; and “a Writing Kit” strategy is to send home a writing kit packed in a briefcase with papers, pencils, and crayons. Since this artifact provided teachers with specific prescriptions that were different from academic research and theories, it allowed me to understand how teachers evaluate and use two different kind of shared knowledge.

All the fifteen teachers evaluated this artifact regarding reality constraints, effectiveness, and student relevance mainly because this offered specific prescriptions. Half the teachers responded that the home-reading strategies were “wonderful” and “great,” and would love to use them in their classrooms. However, other half said that the general idea was very good, but they doubted that they were realistic and applicable in their classrooms. Several teachers did not think the strategies were effective. They said that the strategies would not be the best ways or realistic ones for students who really needed support in reading because these students usually did not have knowledge and attitudes to do the home-reading activities independently, and their parents tended not to be supportive. In addition, some teachers said that they did not have enough time to

do this because they were already doing many other activities, such as home works and behavior plans.

I liked this idea a lot about sending home a book for them to read together and then write about together. I thought that was a wonderful idea. And if you have families who will take care of it and make sure the student brings it back and will actually sit down and read with them, that could be very successful. [Kathie]

I'm not sure these two ways were the best ways to foster it because the student might not ever do it. And the first one was a take home journal. Great idea. Only you'd have to have a way to insure that it's done. ... The other one might be too open ended. I feel like for some of our parents they wouldn't really know what to do with a kit sent home unless it was explicit for them.... I think if kids were invested in it and parents were invested in it, it will work well. But those were the students that were already successful. Those were the kids that already do well because someone was making sure everything was being done that's supposed to be done. [Beth]

When teachers evaluated the home-reading strategies, they tried to envision enacting the strategies in their own classrooms. They tested them by enacting them mentally regarding their reality constraints and student relevance. When they read the artifact, very often their first response was how many students in their classrooms would return the bag or the kit. Half the teachers provided an estimated rate of how many students in their classrooms would return back the kits though I did not ask about this. For example, Kathie said "I probably get about 75% that will return things but about 25% of the kids, I'll never see it again" and Sue said "probably six of them never came back." Regarding this artifact, teachers' first concern was whether it would work for their own classes: whether their students were able to return back the bag or the kit, and their parents would help them.

I don't think that they will be very successful here because when I've done them in the past. ... We have about a forty percent free and reduced lunch population here. And even though you don't like to group people into a category according to their social/economic status a lot of times those were the children who don't have their backpack at all. They don't bring their planner. They don't complete their homework. They don't return things that they're supposed to. And it's rarely their

fault because their home was so disorganized. And the expectations may be there, but the support was not. [Sue]

I feel like for some of our parents they wouldn't really know what to do with a kit sent home unless it was explicit for them. We have parents that have questions on kindergarten homework. And it's not difficult homework. It's simple little practice. Maybe printing a letter a few times and then reading a book ten minutes a night. That's at the kindergarten level. And they still have questions about it. They still can't figure it out and we've been doing it for three months. [Beth]

Though the majority of the teachers worried about low rate of return and the lack of parents' support, nearly half of them said that they would love to use the strategies despite the reality constraints. However, interestingly, a school district's features did not seem to be determinant factors when the teachers decided whether or not they would use the home-reading strategies. Two teachers who worked at a relatively poor school district, Lansing, expected a low rate of returning the kits and lack of parents' supports but responded that they would love to use the strategies. However, two other teachers who worked at a relatively wealthy school district—East Lansing and Okemos—responded that they were not able to use the strategies due to their “negative” circumstances. Since I did not observe the teachers' practice, it was not certain that they would *actually* use them. However, this indicates that teachers' similar diagnoses of the situation do not necessarily bring the same decisions of whether they use particular ideas.

Teachers said that the home-reading strategies were useful in mostly instrumental ways. This was partly because these strategies were very specific prescriptions that teachers directly use instrumentally. Teachers added and specified conditions and circumstances to make the home-reading activities more workable and successful with respect to their contexts. Since their main concern was the lack of parents' supports and low rate of returning the kits, many of the teachers suggested several ideas that make better the home-reading activities work. For example, some explained tips of making supportive relationships with parents, of giving students one

opportunity every month instead of a weekly opportunity, of adding worksheets, and of fostering a “love” for reading books.

Interestingly, some teachers used this artifact to develop and generate their practical knowledge of home-reading activities. They very often said that this artifact provided them with new strategies and tips to devise and develop their previous home activities that they had used. For example, Katie said that it would be nice to add “a discussion piece” of the artifact into the home reading activities that she had used.

In sum, the teachers evaluated the artifact of home-reading strategies mostly instrumentally. When they evaluated the strategies, they tried to envision enacting them in their own classrooms. All of them evaluated this artifact regarding reality constraints, effectiveness, and student relevance. This was mainly because this artifact was specific prescriptions. Interestingly, some teachers used this to revise and develop their previous strategies that were part of their practical knowledge.

8.7. Behavior notes

The last artifact was “behavior notes,” a popular strategy for student discipline: teachers check off what students had done inappropriately and send it home to their parents. Since this artifact provided specific prescriptions like the home-reading strategies, teachers tended to evaluate this with respect to its instrumental usefulness.

This artifact shows that teachers differently adopted specific prescriptions according to their perspectives and purposes. Thirteen out of the fifteen teachers were already using behavior notes, and I found that there were lots of varieties in their ways of using behavior notes. Many of the teachers developed their own versions of behavior notes with rationales. The varieties of behavior notes reflected the teachers’ different philosophies, concerns, and priorities.

For example, Beth, a kindergarten teacher, thought that main purposes of behavior notes were to communicate with parents and foster students' responsibility, so she sent the behavior notes to all parents everyday—behavior notes were more than writing misbehaviors. Ann, another kindergarten teacher, used behavior notes just for a few students and had different purposes and methods according to the students' individual needs. She used behavior notes to track her student's progress, to provide a visual schedule to help the child focus on his tasks, and to provide positive rewards and to communicate with his another teacher and parents.

We send home a note everyday just to communicate how the child's day went. Because kindergartners when you ask them, "How was your day?" "It was good." "What'd you do?" "I played." They don't ever tell anything else. The student takes something home and brings it back daily. So the main purpose of that was responsibility. [Beth]

Some teachers made the same modification of behavior notes but with different rationales. For example, Beth, a kindergarten teacher, was sending behavior notes to everyone everyday mainly because she thought that main purposes of behavior notes lay in communication and responsibility. Lucy, a first grade teacher, was also sending behavior notes to everyone every day. However, her main purpose was to prevent students from hiding the behavior notes at home.

I do this for everyone, everyday. Not just the kids who were misbehaving. Because if a parent knows that their child was going to get it every day then they're going to look for it. And if they're looking for it they're going to see if their child misbehaved. But if it's only when the kid was naughty or when the teacher wrote a note home, the parent might not know that there was a note there. The child might try to hide it. [Lucy]

In addition, Kathie and Sue added their own strategies to make behavior notes more effective and more valuable according to their philosophies and perspectives. Kathie explained that she wrote down just what the kid answered to her questions, such as what and why the kid did and what he would do. Sue said that she always tried to send three positive notes to students' home before sending a negative note: her policy was to send home two positive things about

each child until the beginning of the third week and to try to get three in before anything bad can happen.

The majority of the teachers developed and used their own versions of behavior notes, but two teachers responded that they did not agree with the idea of behavior because they did not think it as valuable or effective for student discipline—they evaluated this with respect to their philosophies and student relevance. One of them said that she did not want to use behavior notes because her own way of student discipline was much better—making phone calls and sending emails for both negative and positive behaviors of students, and the other said that she did not think that behavior notes would not work in her classroom due to lack of home support.

In sum, teachers evaluated behavior notes mainly with respect to effectiveness and student relevance. This artifact shows that there was a variety of the purposes and methods in using behavior notes according to teachers' teaching philosophies, purposes, student relevance, and effectiveness. Their various versions of behavior notes also indicate that teachers develop and produce their practical knowledge by modifying shared knowledge from outside sources. They often take only a basic idea from external sources and then tailor it according to their own philosophies, purposes, concerns, teaching styles, students' characteristics, and other context specifics.

Summary and discussion

When teachers evaluated the knowledge artifacts, their previous thoughts, beliefs, understandings, perspectives on good learning and teaching, and priorities influenced their evaluations. For example, regarding the artifact of “ability grouping,” some teachers who put first individual students' needs and effectiveness tended to argue for ability grouping. In contrast,

some teachers who were first concerned about “differentiations” were likely to be against ability grouping.

Additionally, teachers’ general beliefs about shared knowledge influenced their evaluations of the particular artifacts. Very often I saw that the beliefs such as “a balance of opposing ideas,” “shared knowledge is like a swinging pendulum,” “whether or not shared knowledge works depends on context specifics,” and “every student learns differently,” were strong assumptions in their evaluations. These assumptions were consistent to their tendencies to collect shared knowledge as much as possible in order to make larger their “bags of tricks.”

Teachers’ prior thoughts and beliefs influenced the ways of using the artifacts. For example, when teachers evaluated the Klahr and Nigam study, some teachers who already believed that direct instruction used this study to confirm their previous thoughts, some teachers who valued more discovery learning used it to rethink and clarify their conceptions of discovery learning.

Teachers evaluated the knowledge artifacts with regard to validity, reality constraints, student relevance, and effectiveness like in the episodes analyses of Chapter 7. However, the features of the artifacts influenced which factors were mainly considered in the evaluation. When they evaluated research artifacts, such as the Klahr and Nigam study and the Bowles and Gintis study, validity was a major factor in their evaluations, but when they evaluated specific prescriptions, such as home-reading strategies and grouping, main evaluation factors were “effectiveness” and “student relevance.” This indicates that effectiveness and student relevance may be best applicable for evaluations about instrumental uses of specific prescriptions.

Teachers used the artifacts to expand and change their perspectives, reflect on, justify, or confirm their practice, remind of other principles, and develop and generate their own practical

knowledge. The features of the artifacts influenced the ways of using them. Teachers tended to use descriptive research conceptually and use specific prescriptions instrumentally. For example, teachers used the Bowles and Gintis study mainly to expand and change their perspectives while they used “home-reading strategies” mainly instrumentally. However, the features of shared knowledge do not always determine the ways of using them. For example, some drew specific prescriptions from the Bowles and Gintis study, some used specific ways of grouping to expand and challenge their perspectives.

In addition, the teachers’ evaluations about the artifacts of home-reading strategies and behavior notes show that teachers develop and produce their practical knowledge by tailoring and modifying shared knowledge from outside sources. They often take only a basic idea from external shared knowledge and then tailor it according to their own philosophies, purposes, concerns, teaching styles, students’ characteristics, and other context specifics.

Chapter 9: Conclusion

In this chapter, I summarize and discuss my research findings, and address the limitation and implications of this study. My first research question asked how teachers think about the usefulness of educational theories, research, their colleagues' practical knowledge, and other important sources such as professional development programs and district programs. Previous researchers found that teachers did not think educational theories and research were useful and that their main concern was instrumental use (e.g., Gore and Gitlin, 2004; Hargreaves, 1996; Huberman, 1983; Joram, 2007).

I also saw that teachers' main concern was instrumental use, and when they said that they were using shared knowledge, it usually meant instrumental use. However, I found that they used shared knowledge and evaluated its usefulness in various ways. In addition to instrumental use, they used shared knowledge to expand and change their perspectives on teaching and learning, used it as a source to develop and produce their own practical knowledge, used it to reflect on their practice, to confirm and justify their practice, and used it as a reminder of other principles that they learned before but forgot. The features of shared knowledge influenced the ways of using it. Teachers tended to use descriptive research conceptually and tended to use specific prescriptions instrumentally. In addition, teachers' prior thoughts and beliefs influenced the ways of using shared knowledge.

Like previous researchers, I found that educational theories and research were not familiar tools in teachers' daily work. However, I saw that teachers used "research-oriented" principles, strategies, activities, and materials mainly from workshops, professional development programs, and district curricula. In addition, when I asked teachers to nominate their episodes of knowledge use, they nominated as many episodes of knowledge use as those of non-use. If I

consider teachers' modification to be another type of using shared knowledge, the episodes of knowledge use were nearly twice as many as those of non-use. This indicates that teachers use shared knowledge much more than previous researchers thought.

In addition, I found that instrumental use has various types: teachers instrumentally used shared knowledge by replicating, specifying, extending, adding, reducing, or changing it. It shows that teachers did not regard shared knowledge as "laws," or "rules" that should be mechanically followed. Rather, they considered shared knowledge flexible tools that require modifications according to context specifics and that can be taken apart and put together in different ways.

My second research question asked why teachers modify or do not use shared knowledge. I found that teachers either modify or did not use it because of reality constraints, context relevance, student relevance, teachers' philosophies and styles, effectiveness, and validity. Student relevance, and teachers' philosophies and styles were major reasons for both the episodes of non-use and modification. The usefulness of shared knowledge is not an intrinsic feature in the knowledge itself but is determined mainly by outer factors, such as contexts, students, and teachers. This is consistent with teachers' strong beliefs in "it depends on."

I saw patterns in the reasons for non-use or modification. Teachers were far more likely to try to modify shared knowledge they thought might not be effective than they were to not use it at all. When teachers obtain shared knowledge that they cannot use due to reality constraints, it was very difficult to modify and use it, so in most cases they choose not to use it. Regarding the sources, research-based knowledge was more vulnerable to non-use than to modification. In contrast, shared knowledge from curricula or workshops was more likely to yield modification than non-use. When theories and research were modified or not used, the two most common

reasons were reality constraints and student relevance. In contrast, shared knowledge from curricula or workshops were modified or not used, the two most common reasons were student relevance and teachers' philosophies and styles. When teachers did not think shared knowledge was valuable due to their teaching philosophies, it came from more often teacher colleagues than workshops, curricula, research, or theories.

In addition, I saw that teachers had a tendency to collect shared knowledge as much as possible for potential use regardless of its relevance, validity, effectiveness, and so on. This tendency is one way to deal with the uncertainty of teaching: since teaching was very uncertain with no easy or clear-cut answers, good teaching involved collecting as many teaching methods and strategies as possible. When teachers face unexpected situations, they pull out appropriate knowledge from their collections. If they have the larger bag of tricks, they are better able to deal with "uncertainty."

This study has a limitation. Since the data came only from interviews not from observations, some findings may not reflect realities: they were just teachers' perceptions. For example, it is possible that there were no reality obstacles even though a teacher addressed reality constraints for not using particular research. In addition, the research findings may not apply to different teachers regarding grade levels, districts, careers, academic backgrounds, research experience, and so on. All the teachers participating in this study were lower elementary teachers, and they worked at three different school districts in Michigan. Many of them were middle career, with master's degrees and self-reported experience with research. These features might influence their thoughts of the usefulness of shared knowledge and evaluations of the knowledge artifacts.

The results of this study have several implications for teacher education. First, if teachers recognize various ways of using shared knowledge beyond instrumental use, they might be able to make better use of educational theories, research, their colleagues' practical knowledge, and other important sources such as professional development programs and district programs. If teacher educators provided teachers with both abstract principles and specific prescriptions and showed them examples of modifications according to context specifics, teachers would understand the relationship between shared knowledge and their "unique" contexts.

In this study, I found that teachers used shared knowledge in various ways and that they regarded it as flexible tools. Their responses to shared knowledge have an implication for the role of a professional knowledge base for teaching. As social science, the knowledge base for teaching would be different from a medical knowledge base. A knowledge base for teaching is a resource pool for flexible uses rather an accumulation of laws or rules that can be mechanically followed.

The results of this study have several implications for future research. A useful next step would be to study what factors help teachers use shared knowledge more often and more effectively. Even if all the factors such as relevance, teachers' philosophies or styles, and knowledge qualities were satisfied, it would be possible that teachers would not use shared knowledge. Conversely, it is possible that teachers could use shared knowledge even if it lacks relevance, effectiveness, or validity, or does not fit their philosophies or styles. In fact, this study showed many episodes of modification where teachers modified and then used shared knowledge despite reality constraints, lacking relevance, effectiveness, or validity, or not matching teachers' philosophies or styles.

Another useful direction would be to investigate teachers' knowledge use *as a whole* phenomenon. My data came from individual episodes and short-term evaluations of the knowledge artifacts. It reveals cross-sections of teachers' knowledge use. As I mentioned earlier, teachers' knowledge use would be a complicated phenomenon in which all the cases of using, modifying, and non-use knowledge are mingled together. In addition, as many teachers addressed in this study, it takes teachers years to internalize a particular idea. During their careers, teachers develop their professionalism by using and modifying shared knowledge from various sources. In order to better understand teachers' knowledge use as a whole, we need to investigate the phenomena from a perspective of teacher development.

APPENDICES

Appendix A: Survey

Background

1. What is your gender? Female / Male
2. What is your ethnic background?
3. White / Multi-racial / African American / Hispanic / Asian / Native American / Other:
4. What is your age? 20-29 / 30-39 / 40-49 / 50-59 / 60+
5. Do you have a master's degree? Yes / No
 - a. If not, are you planning to go to graduate school? Yes / No
6. Have you ever done educational research (including teacher research)? Yes / No
 - a. If yes, what was that about?
_____.
7. How many years have you taught each of the following grade bands in schools? Please, include this year.
 K _____yr(s) 1 _____yr(s) 2 _____yr(s) 3 _____yr(s)
 4 _____yr(s) 5 _____yr(s) 6 _____yr(s)
8. How many years of teaching experience do you have? _____yrs
9. What grade level do you currently teach? _____.
10. How many students are in your classroom? # of students _____.

General thoughts of shared knowledge

Below is a sample set of teachers' views of teaching knowledge. Within each column, indicate your agreement with the evaluation judgment by writing "Y" (yes), "N"(no), or "?"(I don't know/I'm not sure).

Table 7. Survey

		"Y," "N," or "?"
1	As a teacher, I agree with that "there is nothing so <i>practical</i> as a <i>good theory</i> " in teaching.	
2	Teachers should follow all recommendations from educational theories or research findings because they are based on "scientific" evidence.	
3	There exist some educational theories and research findings that all teachers should follow across all contexts.	
4	Even if educational theories and research do not provide specific prescriptions, it can still be useful for teachers.	
5	Sometimes I have found that educational theories or research findings are not relevant to my teaching.	
6	Even if educational theories or research findings are not relevant to my teaching , they could be useful for me.	
7	Sometimes I have found that educational theories or research findings are unbalanced, narrowed, or too ideal .	
8	Even if educational theories or research findings are unbalanced, narrowed, or too ideal , they could be useful for me.	

Table 7 (cont'd).

9	Sometimes I have found that educational theories or research findings do not work for some kids or for my class because they are different.	
10	Even if educational theories or research findings do not fit my class , they could be useful for me.	
11	Sometimes I have found that recommendations from educational theories or research findings do not fit my teaching philosophy or style well .	
12	Even if educational theories or research findings do not fit my teaching philosophy or style well , they could be useful for me.	
13	Sometimes it is difficult to follow recommendations from educational theories or research findings because of reality-constraints .	
14	Even if I cannot follow recommendations from educational theories or research findings because of reality-constraints , they could be useful for me.	
15	There are practical guidelines of teaching strategies or classroom management that work across all contexts.	
16	I always apply other teachers' advice, teaching strategies, lesson plans, or worksheets without any modification or rejection .	
17	Sometimes I have found that other teachers' advice, teaching strategies, lesson plans, or worksheets do not work for some kids or for my class because they are different.	
18	Even if other teachers' advice, teaching strategies, lesson plans, or worksheets do not fit my class , they could be useful for me.	
19	Sometimes I have found that other teachers' advice, teaching strategies, lesson plans, or worksheets do not fit my teaching philosophy or style well .	
20	Even if other teachers' advice, teaching strategies, lesson plans, or worksheets do not fit my teaching philosophy or style well , they could be useful for me.	
21	Sometimes it is difficult to follow other teachers' advice, teaching strategies, lesson plans, or worksheets because of reality-constraints .	
22	Even if I cannot follow other teachers' advice, teaching strategies, lesson plans, or worksheets because of reality-constraints , they could be useful for me.	

Appendix B: Interview protocol

The first interview

1. Could you give me some examples of educational theories and research?
2. Do you think educational theories and research are useful for your teaching?
 - 2.1 (If you think they are useful,) in what ways are they useful? Do you consciously use educational theories and research for your teaching? Which educational theories and research do you use for your teaching?
 - 2.2. (If you do not think they are very useful,) why do you think not? Could you give me some examples of less useful theories/research? What would make educational theories and research more useful?
3. Do you think educational theories and research influence your teaching? If so, how? If not, why?
4. Have you ever tried to use ideas that you learned in college courses? Could you give me some examples?
5. Could you tell me about your experience with professional developmental programs or workshops? Could you tell me about that?
6. Have you ever tried to use the ideas that you learned there? Could you give me some examples?
7. Have you ever modified—added /deleted/changed something in the ideas? Could you give me some examples?
8. If you have found that some information from professional developmental programs or workshops was not useful, what was missing part of the information? What would make it more helpful?
9. Do you usually exchange ideas with your colleagues? How often? Who do you usually talk to?
10. Do you think that conversations with them are useful? If so, in what ways?
 - 10.1. Could you give me some examples of useful ideas from your colleagues?
 - 10.2. Do you always follow EXACTLY the ideas from the colleagues? Have you ever modified—deleted, added, changed something in it? Why did you modify it? Could you give me some examples?
10. Even if you can't apply their advice, is it possible that the conversations are useful? (if yes) How?

Table 8. The follow-up questions of the survey

1	As a teacher, I agree with that “there is nothing so <i>practical</i> as a <i>good theory</i> ” in <i>teaching</i> .
	<i>Why do you (not) agree? What do you mean by “practical”?</i>
2	Teachers should follow all recommendations from educational theories or research findings because they are based on “scientific” evidence.
	<i>(If yes,) Why? What do you mean by “scientific” evidence? (If no), in which cases do teachers not need to follow them?</i>

Table 8 (cont'd).

3	There exist some educational theories and research findings that all teachers should follow across all contexts.
	<i>(If yes), what educational theories and research findings do you think all teachers should follow?</i> <i>(If no), why? Do you have some examples of educational theories and research findings?</i>
4	Even if educational theories and research do not provide specific prescriptions, it can still be useful for teachers.
	<i>(If so,) in what ways can it be useful?</i> <i>(If not,) some people say research or theories sometimes change their thoughts. What do you think about that? Have you ever experienced that?</i>
5,6	Sometimes I have found that educational theories or research findings are not relevant to my teaching.
	<i>What do you mean by relevance? Could you tell me some examples?</i> <i>If you think they could be useful although they are not relevant, how?</i>
7,8	Sometimes I have found that educational theories or research findings are unbalanced, narrowed, or too ideal.
	<i>What do you mean by unbalanced, narrowed, or too ideal? Could you tell me some examples?</i> <i>If you think they could be useful although they are unbalanced, narrowed, or too ideal, how?</i>
9, 10	Sometimes I have found that educational theories or research findings do not work for some kids or for my class because they are different.
	<i>Could you tell me some examples? If you think they could be useful although they do not work for some kids or for your class, how?</i>
11, 12	Sometimes I have found that recommendations from educational theories or research findings do not fit my teaching philosophy or style well.
	<i>Could you tell me some examples? Each teacher has her own philosophies and styles. But do you think that there exist “no-exception” theories or research despite of various philosophies and styles of teachers? If you think they could be useful although they do not fit your teaching philosophy or style, how?</i>
13, 14	Sometimes it is difficult to follow recommendations from educational theories or research findings because of reality-constraints.
	<i>Could you tell me some examples? If you cannot follow them because of reality-constraints but you think they could be useful, how?</i>
15	There are practical guidelines of teaching strategies or classroom management that work across all contexts.
	<i>(If yes), what practical guidelines?</i> <i>(If no), why?</i>
16	I always apply other teachers’ advice, teaching strategies, lesson plans, or worksheets without any modification or rejection.
	<i>If you always do so, why?</i> <i>(If not) Have you ever modified or rejected them? If so, could you tell me some examples?</i>

Table 8 (cont'd).

17, 18	Sometimes I have found that other teachers' advice, teaching strategies, lesson plans, or worksheets do not work for some kids or for my class because they are different.
	<i>Could you tell me some examples? If you think they could be useful although they do not work for some kids or for your class, how?</i>
19, 20	Sometimes I have found that other teachers' advice, teaching strategies, lesson plans, or worksheets do not fit my teaching philosophy or style well.
	<i>Could you tell me some examples? If you think they could be useful although they do not fit your teaching philosophy or style, how?</i>
21, 22	Sometimes it is difficult to follow other teachers' advice, teaching strategies, lesson plans, or worksheets because of reality-constraints .
	<i>Could you tell me some examples? If you cannot follow them because of reality-constraints but you think they could be useful, how?</i>

The second interview

1. Do you agree with the ideas? (with all of them?) Why? Or why not?
2. Do you think it is useful (not useful) for your teaching? If so, in what ways? If not, why?
 - 2.1. Would you try in your classroom? If so, how? If not, why?
 - 2.2. Have you already used it in your classroom? How?
3. Do you get any implication from the ideas? Or why can you not get implication?
4. Does the information give you any ideas about specific changes you should make in your practice? What are they?

Appendix C: Knowledge artifacts

1st artifact set

Constructivism theory

Since learning is an active and social process, meaningful learning occurs when students are actively involved in the learning process. Constructivism emphasizes the importance of the learner being actively involved in the learning process, unlike previous educational viewpoints where the responsibility rested with the instructor to teach and where the learner played a passive, receptive role. In constructivism, the instructor's role is a facilitator who helps the learner to get to his or her own understanding of the content. Especially, a widely accepted claim in the science- and mathematics-education community is the constructivist idea that discovery learning, as opposed to direct instruction, is the best way to get deep and lasting understanding of scientific phenomena and procedures, particularly for young children. Advocates of discovery learning argue that the premise of constructivism implies that the knowledge students construct on their own, for example, is more valuable than the knowledge modeled for them; told to them; or shown, demonstrated, or explained to them by a teacher. Moreover, they argue that children who acquire knowledge on their own are more likely to apply and extend that knowledge than those who receive direct instruction.

David Klahr and Milena Nigam. (2004). The equivalence of learning paths in early science instruction: Effects of direct instruction and discovery learning. Psychological Science, 15(10), 661-667.

- Research question

Is direct instruction more effective than discovery learning in teaching children CVS (the control-of-variable strategy)?

- Background

Since advocates of discovery learning have argued that the main advantage of discovery learning is long-term benefits on how children ultimately transfer their learning, the researchers tested if discovery learning had more long term benefits than direct instruction by comparing the effects of one direct instruction lesson to those of another discovery learning lesson.

- Participants

Participants were 112 third- and fourth-grade children in four different elementary schools. They were randomly assigned to either the direct-instruction condition or the discovery learning condition.

- Lesson topic

The topic is CVS (a control-of-variables strategy): How different variables—the steepness of each wooden ramp (high or low), the surface of the ramps (rough and smooth), the length of the downhill run (long or short), and the type of balls (a rubber ball or a golf ball)—affected the distance that balls rolled after leaving the downhill ramp. The students in both classes learned how to determine the effects of steepness and run length by controlling other variables, such as the surface of the ramps, the length of the downhill run, and the type of balls.

- Lesson

In both conditions, the lesson began by explaining the ramp apparatus. Then researchers assessed students' baseline competence in order to measure their improvement after each lesson. To assess their baseline competence, they were asked to set up four experiments: two to

determine the effect of steepness and two to determine the effect of run length on how far a ball rolls.

The direct instruction condition: students observed that the experimenter designed several experiments to determine the effects of steepness and run length. Then, the instructor provided good and bad examples of CVS, explained what the differences were between them, and told the students how and why CVS worked.

The discovery learning condition: students continued to design their own experiment there were no examples and no explanations—no teacher intervention beyond the suggestion of a learning objective.

- 1st assessment (right after each lesson)

This evaluation aims to compare an immediate effectiveness of direct instruction and discovery learning. Students in both conditions were asked to design four additional experiments using the materials including ramps and balls: two to determine the effects of a factor that had been investigated earlier (run length: long and short) and two to determine the effect of a factor that had not been investigated earlier (surface: smooth and rough).

*A CVS "master" was defined as a child who designed at least three experiments (out of four experiments).

- 1st Assessment results

77% of the direct-instruction children became masters. 69 % of the lowest initial CVS scores in the direct-instruction became masters. 23% of the discovery children became masters. 15% of the lowest initial CVS scores in the discovery condition became masters.

- 2nd assessment (One week later the lessons)

This evaluation aimed to compare long-term benefits of the different types of instruction: “Does discovery learning have more long-term benefits than direct instruction?”

The researchers asked all children to evaluate two science-fair posters generated by sixth graders from another school: one poster explored the effect of the number of holes in a Ping-Pong ball on how far the ball traveled when launched from a catapult, and the other poster compared the short-term memory of boys and girls for a set of common objects. They conducted a structured interview with specific probes asking the child to critique the posters. The score was based on the total number of valid critiques.

- 2nd Assessment results

The many children in direct instruction performed as well as those few children who discovered the method on their own when they were asked to make broader, richer scientific judgments. Masters outperformed non-masters regardless of the learning paths.

- Conclusions

Direct instruction was clearly superior to discovery learning in facilitating children’s acquisition of CVS. Discovery learning is not superior to direct instruction in the long term benefits

2nd artifact

Teachers would be better not to do phonics any more but they have to apply entirely the Whole Language approaches in reading instruction.

3rd artifact

Bowls, S. & Gintis, H. (1976). "Education, inequality, and the meritocracy." In Bowles and Gintis, *Schooling in Capitalist America: Educational Reform and the Contradictions of Economic Life* (pp. 102-124). NY: Academic press.

- Objective

To uncover the role of schools in justifying and reproducing inequality in capitalist societies

- Method

A macro analysis of social reproduction theory using statistical data on IQs and economic status in the 1970s. A macro analysis concerns the operation of larger aggregates, such as social institutions, entire cultural systems, and whole societies.

- Argument1

The education system legitimates economic inequality by fostering and reinforcing the belief that economic success depends essentially on the possession of technical and cognitive skills.

Bowls and Gintis believe that the educational meritocracy (test scores) contributes little to individual economic success. They demonstrate that IQ scores cannot statistically account for educational success and higher economic status and conclude that, therefore, inequality under capitalism is rooted not in individual deficiencies but in the structure of production and property relations. Further, they argue that the social function of education is to reproduce inequality by justifying privilege and attributing poverty to personal failure.

- Argument2

The education system contributes to the stratification of the labor force in capitalist societies. Bowles and Gintis have proposed a correspondence theory of the relationship between the nature of work and the education system in capitalist societies. That is, if the society is stratified by social class, the education system mirrors that stratification. The education system plays a central role in preparing individuals for the stratified work relationships of the capitalist production process. The authors show how various aspects of work correspond to features in the education system and its hidden curriculum (hidden curriculum usually refers to tacit messages in school settings). The organization of the education system mirrors the way work is organized in Capitalist societies.

- Conclusions

The authors conclude that "The social relationships of education—the relationships between administrators and teachers, teachers and students, students and students, and students and their work—replicate the hierarchical division of labor. Hierarchical relations are reflected in the vertical authority lines from administrators to teachers to students. Alienated labor is reflected in the student's lack of control over his or her education, the alienation of the student from the curriculum content, and the motivation of school work through a system of grades and other external rewards rather than the student's integration with either the process (learning) or the outcome (knowledge) of the educational "production process" (p.131). "The lowest levels in the hierarchy of the enterprise emphasize rule-following, middle levels, dependability, and the capacity to operate without direct and continuous supervision while the higher levels stress the internalization of the enterprise. Similarly, in education, lower levels (junior and senior high school) tend to severely limit and channel the activities of students. Somewhat higher up the educational ladder, teachers and community colleges allow for more independent activity and less overall supervision. At the top, the elite four-year colleges emphasize social relationships conformable with the higher levels in the production hierarchy" (p.132). Lower levels of students are trained to take orders, to be obedient, and are subject to more discipline while the students of

higher levels are trained using more progressive methods, which gives them critical thinking, internal discipline, autonomy and self-confidence.

4th artifact

Lampert, M. (1985). How do teachers manage to teach? Perspectives on problems in practice. *Harvard Educational Review*, 55(2), 178-194.

- Objective

To understand the nature of teaching by portraying two stories where teachers manage dilemmas

- Method

Case study, A micro analysis of teaching (This deals with small slices of time, space, or numbers of people)

- 1st case: Lampert's dilemma

Lampert's classroom has two chalkboards on opposite walls, and the students of the fifth grade class sit at two tables and a few desks, facing in all directions. Since the children rarely choose to sit near their peers of opposite sex, the boys sit together at the table near one of the black boards and the girls at the table near the other. The boys work productively only under close supervision, and if left to their own devices, they bully each other, tell silly jokes, and fool around math materials. Lampert developed a habit of curtailing these distractions from the lesson by teaching at the black board on the boy's end of the classroom but she realized that this habit put the girls in "the back" of the room, and that she was less aware of and less encouraging toward the more well-behaved girls. However, if she switched her position to the black board on the girls' side of the room, she would be less able to keep the boys on task. Whether she chose to promote classroom order or equal opportunity, either the boys or the girls would miss something she wanted them to learn.

Answer: Instead of putting the boys or the girls in the back of the room, Lampert divided the class into four small groups, moved one group of boys to the area near the girls' blackboard and one group of girls to the other side of the room, and put her student teacher, Sandy, in charge of two groups.

- 2nd case: Rita's dilemma

Rita, a fourth-grade teacher in a small, urban public school, was faced with a dilemma in a science class. The topic was "The Cycle of Water" The workbook presented the students with a picture of a cloud, and next to it a question: "Where does the water come from?" Rita had marked it right when students answered "cloud" but Linda, one of girls in the class, came up to have her work corrected and insisted that "the answer is the ocean because the clouds pick the water up but it puts the water from the ocean back in the clouds." Rita decided that Linda "knew" what she was supposed to learn from the lesson even though her answer did not match the answer in the teacher's guide. However, one student, Kevin, led the class in an argument with Linda and with their teacher. He argued that Linda was wrong because it did not match what the book and his teachers said was "right" although he "got" Linda's explanation—her individual understanding of the matter was not his concern. Rita thought Linda's answer as a valid representation but she also thought that both she and Linda should concur with the answer in the teacher's guide. She needed to mediate the conflict between conventional knowledge and individual understanding in the situation.

Answer: Rather than siding with Kevin or Linda, Rita said to Kevin, Linda, and her whole class that Kevin and Linda were both right but they understood on two different planes and Rita

understood on a third one. She made no stark choices: she did not throw out the textbook and tell Kevin and Linda it didn't matter, nor did she tell Linda that she was wrong because she did not conform to the book's expectations.

- **Conclusion**

The two cases portray the teacher as an active negotiator, a dilemma manager, a broker who balances a variety of interests that need to be satisfied in classrooms. Lampert argued that teachers' dilemmas often require coping with rather than solving: Sometimes choosing one value is not the best way to manage dilemmas because there cannot be one perfect solution to most dilemmas in teaching and all problems in teaching do not let teachers make the most "reasonable" choice based on research knowledge. This perspective of a teacher as a dilemma manager or a broker contrasts with prevalent academic images of a teacher as a problem solver. While Lampert views teaching as the acceptance of continuous conflict with which teachers can learn to cope, where educational researchers have often considered a teacher to be technical production managers who make choices among competing options and implement theories on learning of what researchers and policymakers say should be done with or to students.

5th artifact set: Group learning

- Kindergarten students are too young to get benefit from pair work that is supposed to exchange ideas and comment each other in learning to write. They are too young to understand their job in the pair work, so tend not to give each other valuable feedback.
- At the early elementary levels, teachers should not use ability grouping. Since ability groups produce social and cultural differentiation in schoolwork, it has not been successful in meeting individual needs.

6th artifact set: Techniques to foster home support in reading instruction

- One is to create The Take-Home Journal — a plastic bag with a book and a notebook in it. There are these simple directions on the front. (e.g., *Your child has brought home the book, Flight. Read the book with your child and talk about it. Then use one page in the journal to write what you all thought about this book.*) The Take-Home Journal comes back the next day and then goes home to someone else. The teacher shares the family journal entries in class.
- Another technique is to send home a writing kit packed in a briefcase with paper, pencils, and crayons. The kit encourages kids to write a story or a book at home with their family members. These ideas—which encourage shared reading and real writing—are much preferable to sending home worksheets. When you ask families to discuss, read, and write with their children, you're asking them to reinforce your most important goal: to help students develop the habits of literacy.

7th artifact

Use behavior notes! You check off what students have done inappropriately and then the parent has to sign it and they have to bring it back.

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