

Decisions and Reasons: Examining Preservice Teacher Decision-Making through Video Self-Analysis

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ABSTRACT

METHODS USED TO STUDY TEACHER THINKING have both provided insight into the cognitive aspects of teaching and resulted in new, as yet unresolved, relationships between practice and theory. Recent developments in video-analysis tools have allowed preservice teachers to analyze both their practices and thinking, providing important feedback for self-improvement as well as insights into their thinking. In this study, four student teachers used the Video Analysis Tool to enquire about and analyze their teaching. Constant-comparative methods revealed different decision-making and reasoning patterns, indicating decisions driven primarily by teacher-centered thinking and decisions driven primarily by student-centered thinking. We discuss how understanding these differences might benefit the teacher education community and describe the implications of video analysis in both research and practice. (*Keywords: video analysis, teacher education, self-assessment, reflection, beliefs*)

INTRODUCTION

IN THEIR SEMINAL CHAPTER “Teachers’ Thought Processes,” Clark and Peterson (1986) proposed that, “the ultimate goal of research on teachers’ thought processes is to construct a portrayal of the cognitive psychology of teaching for use by educational theorists, researchers, policymakers, curriculum designers, teacher educators, school administrators, and by teachers themselves” (p. 255). Over the past forty years, researchers have employed several techniques to elicit teachers’ thinking in order to better understand and influence teacher practice. Research on teacher thinking is particularly important in teacher education, as it promises to help novice teachers inquire, understand, and analyze their own and others’ practice. Three methods have been used extensively to study teacher thinking: reflective thinking, examination of beliefs, and stimulated recall.

Recently, teacher educators have implemented reflection to help preservice teachers inquire about and analyze their own thinking. Reflective practices have been examined prior to (Conway, 2001), during (Schön, 1983), and after (Field & Latta, 2001; Collier, 1999) preservice teachers’ teaching experiences. However, results of research on the impact of reflection on teacher practice have been mixed (Loughran, 2002). While it is common practice in teacher education programs to encourage reflection, most reports of the influence of reflection on teachers’ actions are anecdotal (Korthagen & Wubbels, 2001).

Reflective thinking emerged as a practical method to help preservice teachers elicit and analyze their own thinking about teaching. Efforts to implement reflective practices in teacher education programs vary greatly (Jay & Johnson, 2002). For example, Collier (1999) studied preservice teachers’ post-teaching reflective statements, which promised to influence future teaching decisions (Field & Latta, 2001) by helping teachers think about their reasons for enacting practices. In contrast, Schön (1983) initially characterized “reflection-in-action” as a way to transform the practitioner into an evaluator via formative, in the moment, self-evaluations. Still others, however,

suggest that reflection be conducted *prior* to teaching (Conway, 2001). Anticipatory reflection (Van Maanen, 1995) serves as an advance organizer for one's own actions.

Researchers have also explored how inquiry into teachers' tacit assumptions influences their actions. Researchers have attempted to help teachers recognize inconsistencies between their beliefs about teaching—personal, psychological, and emotional representations of how teaching ought to be (Nespor, 1987; Clark, 1988)—and their enacted practices (Abell, Bryan, & Anderson, 1998; Pajares, 1992). Beliefs encompass the role of the teacher as educator, personal epistemologies on the nature of knowledge, and value-laden opinions of how students learn and internalize information (Clandinin & Connelly, 1987). Since few novices have had first-hand experiences as a teacher (Richardson, 1996), preservice teachers' beliefs emerge largely via interpretations of their experiences as students (Abell & Bryan, 1997; Clark, 1988; Cuban, 1986).

Recently, researchers have sought to demonstrate the elusive link between teachers' practice and beliefs (Cheek, Steward, & Launey, 2004; Christensen, Wilson, & Sunal, 2004; Sturtevant & Linek, 2003). Despite intuitive appeal, only sparse evidence connecting preservice teacher actions with beliefs about teaching and learning has been published to date (Borko & Putnam, 1996; Woolfolk Hoy, Davis, & Pape, 2006). Individual beliefs about teaching and learning may prove more transient than often assumed. More than three decades ago, Schutz (1970) suggested that individual beliefs are often ill-specified and contradictory. Paradoxically, recent developments demonstrate that preservice teachers' beliefs may actually contradict their practices (Abell, Bryan, & Anderson, 1998; Conway, 2001). Similar to evidence on reflective practices, research examining the influence of beliefs about teaching or personal pedagogies on teacher action has yielded mixed results. For example, while Richardson (1996) argues that preservice teachers' lack of teaching experience may interfere with efforts to engender dissonance between their beliefs and practice, Bryan and Recesso (2006) used video successfully to help preservice teachers identify this dissonance.

Finally, several researchers have examined the thought and judgment processes underlying teachers' instructional decisions using stimulated recall (Clark & Yinger, 1979; Johnson, 1992; Housner & Griffey, 1985; Jensen & Winitzky, 2002; MacKay & Marland, 1978; Meijer, Zanting, & Verloop, 2002; Schepens, Aelterman, & Van Keer, 2007). During preservice education, such methods typically involve videotaping while teaching or "microteaching" to a group of peers, followed by replaying the video to stimulate teacher thinking as they observe and comment on their recorded actions. Presumably, since teachers' actions are directed by their thoughts (Shavelson & Stern, 1981; Clark & Yinger, 1979), stimulated recall makes visible otherwise invisible but important cognitive processes. While these studies frequently compare novice and expert thinking, they often reveal little about how the thinking of novice teachers can become more expert. Clark (1988) noted, "the study of the thoughts, knowledge, and dispositions of *experienced* teachers (important as this is) does not answer the questions of what novices should be taught and how they should be prepared" (*italics original*, p. 6).

The aforementioned methods commonly used to elicit teacher thinking offer complementary insights but limited utility for preservice teacher inquiry. Despite evidence of widespread use across teacher education programs (Hatton & Smith, 1995; Lee, 2005), no evidence on the effects of reflection was reported in AERA's report on teacher education research (Cochran-Smith & Zeichner, 2005). Where studies were conducted, researchers concluded that preservice teacher's reflections often were not sufficiently self-critical to influence their subsequent teaching (Zeichner, 1994; Collier, 1999; Jay & Johnson, 2002). Similarly, the study of teachers' beliefs promises to reveal tacit, underlying assumptions about teaching, teachers' own actions, but teacher actions cannot be accounted for by beliefs alone. Finally, research conducted through stimulated recall served to reify teachers' thought processes, but often proved impractical in teacher education. However, each method also offers potential strengths for understanding teachers' thinking. Reflection potentially elicits teachers' thinking and provides a means to examine and refine those thoughts. By

encouraging teachers to examine their own beliefs, we can identify potentially powerful, but tacit, influences on teachers' actions. Finally, stimulated recall utilizes captured evidence of teaching practices to associate action with teacher intentions.

Video has long been used to help teachers observe, assess, and confront their own actions. Since the 1960s, researchers have utilized video to help teachers review and improve their own teaching practice (Fuller & Manning, 1973). Teacher education programs routinely employed microteaching activities, wherein preservice teachers teach and record brief lessons to peers and receive feedback from both peers and supervisors. According to Grossman (2005), "microteaching grew out of the process-product line of research, which identified particular teaching skills that correlated with gains in student achievement and then tried to teach these discrete skills to teachers" (p. 429). Typically, this research demonstrated changes in preservice teachers' behaviors and actions (Copeland, 1982; Perlberg, 1987).

Recently, video capture and analysis tools have been developed to optimize the benefits of these methods, providing potentially deeper and more precise insights into teachers' thought processes for practical inquiry. New methods of annotation have emerged that afford even greater power and utility for examining and improving instructional decision-making. Video analysis programs such as DIVER™ (diver.stanford.edu), Orion™ (www.videoresesarch.org), Transana™ (www.transana.org), and Studiocode™ (www.studiocodegroup.com), provide significant data mining capabilities, management, and fine-grained analysis and reporting. Yet few have been implemented in teacher education with widespread impact. These tools allow an individual to both capture *and* analyze teaching practice, allowing preservice teachers to review, analyze, and synthesize video of their own teaching in authentic classroom contexts to examine relationships between and among teaching context, practice, and instructional decision-making.

While video has been used recently to combine methods to improve instructional decisions, most studies document overall experience and perceptions of teachers (Preston et al., 2005; van Es &

Sherin, 2002; Wright, 2007). These have helped researchers and teacher educators to begin to understand the consequences of such analysis on teaching. In contrast, by examining *what* instructional decisions preservice teachers' focus on in their video analyses, we may better understand *how* their inquiries lead to, or influence, future actions. The purpose of this study was to investigate the instructional decisions preservice teachers chose to focus on during their analyses and their thinking behind these decisions.

BACKGROUND

WE ANALYZED THE VIDEO ANALYSIS COMMENTS of four student teachers—Karen, Lisa, Susan, and Zoe—during their student teaching experience. Their comments were documented through individually-defined teaching inquiries using an online, video-based tool. During the course of a 10-week student teaching internship, a cohort of 26 preservice teachers engaged in a scaffolded teacher inquiry project to systematically investigate, analyze, and adapt a particular facet of their teaching. Participants identified an area of their teaching they wished to inquire about during student teaching, then planned for and collected videos of their teaching in order to investigate their inquiry focus. Next, they used the Video Analysis Tool (VAT) to analyze their individual videos and identified actions to take to refine their focus. Participants subsequently enacted their action plan and repeated the inquiry process of refining their focus, planning for and collecting teaching videos, analyzing those videos in the VAT (vat.uga.edu), and acting out a course of action in response to their video analyses.

We inspected the specific instructional decisions identified by participants in their video analyses and examined their rationale for those decisions. While the entire cohort participated in the student teacher inquiry project, we solicited in-depth participation by individuals with varied motivation to participate in this project. Due to attrition and concerns over increased workload during student teaching, we report findings for four students.

METHODS

DATA & INSTRUMENTATION

SINCE EXISTING LITERATURE ON VIDEO ANALYSIS of teacher thinking lacked description at the analysis level, we used the annotation feature of the Video Analysis Tool to capture and analyze student teachers' commentary during analysis of their student teaching.

The Video Analysis Tool (VAT) is an online video annotation tool created to aid in the analysis and interpretation of video evidence. A VAT *clip* is a specific video segment that has been identified by the user as relevant to the inquiry and annotated accordingly. Users annotate or comment clips by: (a) choosing a video to annotate, (b) identifying the start time of the video, (c) typing their analyses in the comments area, and (d) submitting their clips to the library. For example, Figure 1 shows that clip number 10667 started 9 minutes, 15 seconds and ends at 10 minutes, 9 seconds (Step 1). Once the start-end points are defined, the clip can be accessed by clicking the corresponding button. As shown in Step 2, the student teacher annotated the clip, questioning whether or not the student activity evident was active engagement. Users can create multiple clips for consideration and temporarily store each in a bin (Step 3). Once finished, the student teacher can determine which annotated clips to keep or discard, and submits the "keepers" to permanent storage on the VAT server (Step 4).

After annotating videos, users can review them individually via the "view clips" screen. As shown in Figure 2, all saved clips including start-end times and comments can then be accessed on demand during subsequent reviews. To review clips, users select the button of the initially defined "start time" (Step 1), and the corresponding video clip will play until the designated end time. Because VAT appends XML metadata rather than altering the actual content of a video, participants can edit and re-edit their comments without changing the physical makeup of their videos; likewise, teacher educators

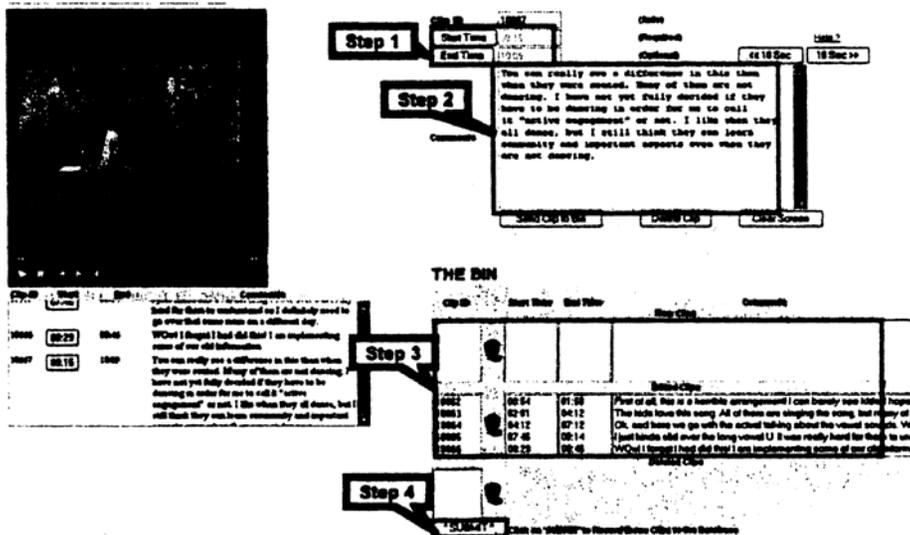


Figure 1. Making comments in the video analysis tool

and cooperating teachers can view, analyze, and comment on the same clips for independent review, or to review side-by-side with the student teacher's self-analysis and comments. Since the VAT is a Web-based video annotation tool, participants can upload and edit their videos from any location in the world with a sufficient Internet connection.



Figure 2. Video clips screen (VAT)

PROCEDURES

The procedures are summarized in Figure 3. Since preservice teachers tend to benefit from focus to their inquiries, each established a lens unique to their investigations. Consistent with principles of teacher inquiry (Hubbard & Power, 2003) and to minimize interference with extraneous aspects of the captured video, each participant first identified a specific aspect of teaching to examine and analyze closely in her video. Student teachers then recorded an instance of their teaching using a JVC Everio camcorder—a digital format that facilitated both video conversion and file transfer. Participants transferred their video files from their cameras to a laptop computer which contained PowerDirector Express®, software that converted their video files to the windows media (.wmv) format. This converted individual video files to a streaming 256 Kbps .wmv files in a 320 x 240 format. Participants were trained to use the VAT, the camcorders, and conversion software in a prior study (Rich, Recesso, Allexsah-Snyder, & Hannafin, 2007). After converting, participants uploaded their files to the VAT. The entire process of converting and uploading a video file was normally completed in less than one hour, so student teachers could potentially analyze their video(s) the same day as recorded.

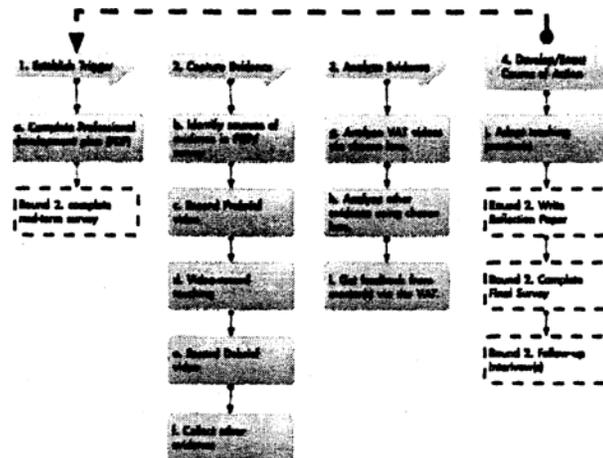


Figure 3. Procedures for identifying inquiry focus, analyzing video, and adapting practice

Table 1.
Examples of a Lens Available to Participants to Guide /Interpret Their Inquiries

Domain: Assessment: Teachers understand and use a range of formal and informal assessment strategies to evaluate and ensure the continuous development of all learners				
Attribute H:	Not yet evident	Basic	Proficient	Advanced
Identification of student strengths and needs		<ul style="list-style-type: none"> • Develops differentiated assessment plan/activities • Applies differentiated assessment to all students. • Needs routine direction and support to develop and implement differentiated assessment. • Is knowledgeable of varied assessment approaches. 	<ul style="list-style-type: none"> • Organizes assessments based on individual student needs. • Applies methods for assessing individual student needs • Uses feedback from peers to revise assessments for individual student needs. • Seeks support to revise assessments. • Seeks opportunities to discover new assessment methods. 	<ul style="list-style-type: none"> • Dynamically adapts assessments to address specific students' needs • Implements a <i>range</i> of assessments for the needs of each child. • Develops innovative assessments for specific students • Modifies assessments on the fly based on "teachable moments" to account for individual student needs • Is a resource to peers for sharing varied and individualized assessment methods.

After participants uploaded their videos into the VAT, they became available in the individual's library. To analyze a VAT video, participants first chose their video from a list and selected a lens—an externally defined framework for interpreting evidence of practice—appropriate to analyze that video [An example is shown in Table 1]. For this study, participants were instructed to analyze their practices using a statewide framework for teacher development.

While analyzing their videos during their inquiry, participants identified specific aspects of their teaching to reinforce, alter or adapt future practice. For example, one participant's initial inquiry was to "actively engag[e] all students in the lesson." Upon video analysis, she identified students who did not participate when they seemingly

did not understand, but participated actively when they did. Thus, she refined her second inquiry to “set [Limited English Proficiency students] up for success . . . because you couldn’t just ask them a question and then expect [them] to answer . . . that’s why they weren’t participating . . . they didn’t understand.”

DATA ANALYSIS

VAT comments were imported into Atlas.ti®. Using an inductive constant comparative approach (Strauss & Corbin, 1990), we looked for emergent themes within and across participants’ comments. Because we focused on instructional decisions and actions, we used Charmaz’s (2002) concept of action verbs to describe decision/reason pairs. Participants initially described their actions (decisions) and provided the rationale for their actions (reasons). For example, “I made sure to call students’ names who were not [participating] [to make sure] they were involved” reveals both a decision (call on nonparticipating students) and a reason (to engage students). We categorized each decision and reason independently in order to classify the underlying reasoning guiding particular actions. We used Atlas.ti®’s “network” function to create and view relationships between and among themes. Once general themes were established, we defined properties and dimensions of each (Glaser & Strauss, 1967) using the software’s “comment” feature, and exported the results to a codebook. Through constant comparison of codes and network graphs, we modified and updated the definitions. Two hundred and forty-seven coded instances of decisions and associated reasons were initially identified across the four participants’ VAT annotations.

We tentatively identified 10 decision themes and seven reason themes. To address reliability and validity, we then employed three other qualitative researchers who were aware of, but not associated with, this study to independently code the decision/reason pairs using: (a) the decision/reason pairs; (b) the lists of themes, properties, and dimensions; (c) a codebook; and (d) the original VAT transcripts so the reviewers could review the excerpted comment in context and make independent assessments. Reviewers were asked to code deci-

sions and reasons independently at the thematic level for each excerpt and at the property and dimension levels according to the guidelines provided.

We then used MS Excel to make side-by-side comparisons across coders. Fifty percent of the cases resulted in initially high agreement (three or more researchers coded the data identically); two or more raters agreed in approximately 90% of cases. An analysis of interrater agreement revealed that initial agreement was initially very high but became increasingly variable during subsequent ratings. This suggested that initial definitions were sufficiently distinct to guide analysis, but that coders may have created nuances as they progressed through the task. The coders then attempted to reconcile differences by discussing each decision and reason theme and, when appropriate, properties of themes.

RESEARCHER STATEMENT

THIS RESEARCH was conducted through E-TEACH, a federally funded Preparing Teachers to Use Technology (PT3) grant. Through this design-based research initiative, we have been involved with the successive implementation and adaptation of studies on the use of the Video Analysis Tool in different varied teacher education contexts with the goal of refining the tool itself, advancing theory related to its use in teacher education, and test the tool in authentic, everyday situations. We hope to begin to advance the utility video-analysis tools might have in teacher education, and to promote applications to improve teacher practice. Consistent with both qualitative and design-based research approaches, we believe that the use of video-analysis tools can benefit teacher education, but also harbor a healthy criticism of our own work in order to critique and improve the tools and methods employed. The following presentation seeks to benefit the teacher education community through an optimistic, but critical representation of our work.

FINDINGS & INTERPRETATIONS

WHILE PARTICIPANTS' ANALYSES were guided by their inquiry focus and framed within a state teaching framework, they received no formal guidance to structure the semantic content of their analyses. Still, though participants typically provided both a decision and an associated rationale for the decision, they reported them differently. While Karen, Lisa, and Zoe commented comparably, Susan made slightly more than half of the overall decisions and reasons comments. In the following, we describe and illustrate how themes were manifested across participants.

DECISIONS

The breakdown of each participant's instructional decisions by inquiry focus is illustrated in Figure 4. Decisions are descriptive comments of student teachers' actions during a given lesson clip. Whereas participants did not use the VAT to highlight all decisions made during teaching, follow-up interviews indicated that video analysis triggered recall of forgotten, overlooked, or personally important instructional decisions. Two prevalent themes emerged: "employing teaching strategies," and "managing classroom needs."

Employing Teaching Strategies. Overall, roughly 49% of student teachers' decisions focused on how participants employed a variety of teaching methods. As noted in Figure 4, employing teaching strategies' accounted for a sizeable proportion of each participants' reported decisions. For example, Lisa commented: "The questions that I ask throughout the book are an assessment of the students' comprehension of the book and also their empathy skills." She classified her decision to ask questions as a purposeful method to gauge student comprehension and ability. Similarly, Susan indicated intent to utilize a specific teaching strategy: "I gave more open-ended options, like 'will you raise your hand if you have a connection to this book?'" Both participants described their actions as intentional teaching strategies.

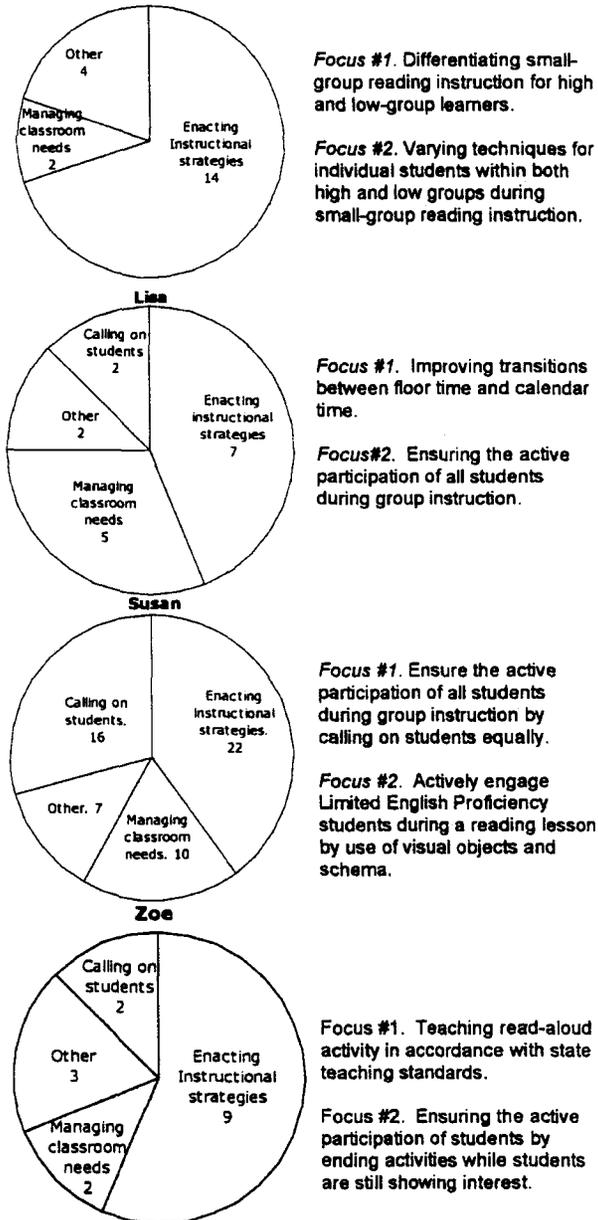


Figure 4. Breakdown of participants' decision and associated inquiry focus

Participants identified a total of 13 different teaching strategies they employed during instruction. Several strategies were noted by multiple participants. Susan noted nine different teaching strategies across her two-video analyses (one-on-one, asking questions, body language, group work, guiding, modeling, repetition/reinforcement, teaching a learning strategy, and waiting). In contrast, the remaining participants identified a similar number, but different types, of learning strategies. Karen, who analyzed four videos that lasted 15-20 minutes each, identified six different teaching strategies (assessment, differentiation, guiding, individual work, modeling, and teaching a learning strategy). Lisa also identified six different teaching strategies (asking questions, assessment, modeling, repetition/reinforcement, and teaching a learning strategy), while Zoe described five different teaching strategies across two videos (assessment, discussion, repetition/reinforcement, teaching a learning strategy, and waiting). While the most frequently identified properties were guiding and repetition/reinforcement, they were not noted across participants' analyses; only assessment and teaching a learning strategy were mentioned by all participants.

The focus on teaching strategies was prevalent among student teachers, but their repertoire of teaching strategies varied considerably. These varied teaching strategies suggest that student teachers' video analyses emphasized pedagogical techniques even though a broad range of related and appropriate teaching attributes were available. Understanding the strategies student teachers highlight may provide insights as to the repertoire of strategies available during the early stages of teaching as well as measures of their perceived self-efficacy as teachers.

Managing Classroom Needs. Classroom management actions, defined as administrative or managerial actions that do not directly relate to learning (but may affect learning indirectly), were identified in 17% of the decisions across participants. Management comments were exemplified by statements such as, "I give tallies to tables that follow directions" (Susan, awarding students) or "reminding students how we should sit during the read aloud" (Lisa, class rules). Man-

agement actions included awarding students, setting class rules, ensuring participation, easing teaching load, gaining attention, and addressing social needs.

REASONS

Figure 5 illustrates the distribution of participants' reasons by inquiry focus. Most decisions were accompanied by a specific reason, providing both a first-person description of what occurred as well as an associated rationale. The relationship between each participant's decisions and corresponding reasons is shown in Figure 6. Participants' reasons for instructional decisions were their stated justifications or explanations for actions taken. We identified 4 themes across participants—pedagogy, engagement, administration, and assessment.

Pedagogy. As noted in Figure 5, pedagogical reasons, which reveal underlying beliefs about the nature of learning or how a student teacher approaches teaching and learning, were provided comparably by all participants: Karen and Lisa each provided six pedagogical reasons, Zoe presented seven, and Susan offered eight pedagogical reasons for her decisions. Lisa's reason for asking questions, "because they are putting themselves in someone else's shoes," suggests that asking questions was intended to help students take different perspectives. Similarly, Karen cited a pedagogical reason for modeling: "I wanted them to hear it and see it so that they could model it," and Susan described her reason for changing facial expression during a read-aloud "so everyone could relate and understand—a visual almost universal expression." The rationale provided by Zoe's suggestion that students take notes during her read aloud was "so that they might listen with the lens of predicting who our author is." The explicit reasons provided for choosing methods suggests implicit assumptions about the utility of such pedagogies for learning. While numerous pedagogical properties emerged, student learning needs remained the most frequently represented, indicating that pedagogy was influenced by tacit assumptions about the usefulness of specific methods for fostering student learning.

EXAMINING PRESERVICE TEACHER DECISION MAKING

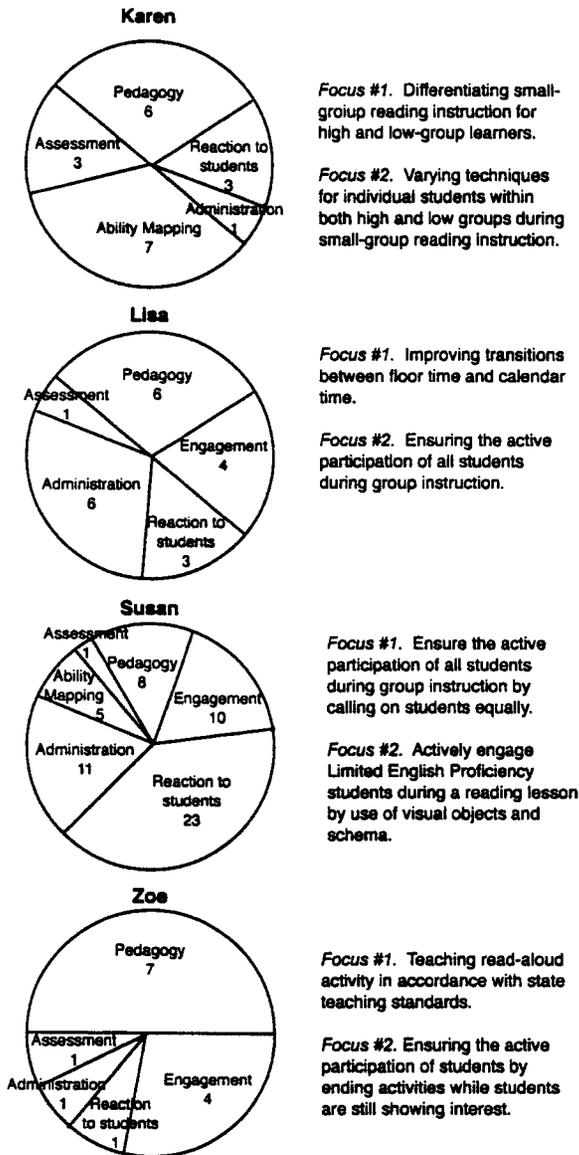


Figure 5. Breakdown of participants' reasons for instructional decisions by inquiry focus

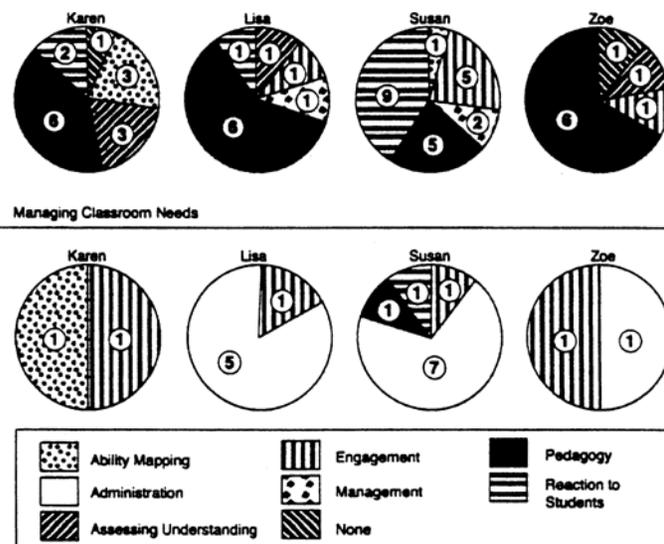


Figure 6. Breakdown of participants' reasons for specific instructional decisions

Engagement. The second most frequent rationale for instructional decisions that appeared across multiple participants was “ensuring participation and attention through involvement or motivation.” Lisa’s comments are embodied in her statement: “because whether they can count or not they are still involved.” Susan’s engagement comments echo her goal that she allows all students to participate in the activity: “[I] wanted everyone to participate, and only a few would if I left it wide open for response.” Likewise, Zoe’s engagement comments reflect her need to maintain student interest in the content being taught: “By calling it a challenge, I re-engage any student who may have stopped listening during the brain drain.” These three participants were concerned with ensuring their students were noticeably involved during the lesson.

Administration. Administrative reasons included character education, class rules, easing teaching load, ensuring participation, motivation, and time. While participant comments reflected administrative concern, they were not as prevalent in their video analyses as we

might have predicted. Only 19 of 110 (17%) participant reasons were rated as administrative. As shown in Figure 6, a strong relationship was apparent between administrative reasons and management decisions. Lisa's justification for having students talk one at a time demonstrated concern for teaching class rules and character education: "This is a good way for the students to realize that they are interrupting and talking when Gary should be talking" (Lisa). Likewise, Susan's reasoning is consistent with and reflects her concern for maintaining orderliness: "Their desks are clean and they are at their seats."

Assessment. All participants discussed their efforts to assess student comprehension by gauging student understanding in a preplanned or interactive manner. Lisa explained how an assessment technique she used was designed to gauge both whole class and individual comprehension, Zoe conducted a preassessment to assess students' entry level comprehension and to hopefully interest them in a task, Susan used body language to understand an individual students' thinking, and Karen asked students to read individually so she could measure, "just a little of what they were struggling with." While all participants included at least one assessment reason, this was the least common category among all participants (6/110), demonstrating less of a focus on assessment than other concerns.

THE INFLUENCE OF INQUIRY FOCUS

Thus far we presented decisions and reasons that were shared across participants. However, the influence of inquiry focus on instructional decisions and reasons was often represented in individual comments. As evident in Figures 4 and 5, inquiry focus appeared to influence participants' decision-making and rationale.

Calling on Students. The second most frequent decision theme (20/108) was "calling on students," which was principally characterized by "asking questions." Asking questions involved calling on students to create, reinforce, or ensure comprehension. While Zoe and Lisa each highlighted two instances during which they called on students, 82% of the remaining comments (18/22) were made by Susan.

This may be influenced by Susan's inquiry, which was initially triggered by her observation that both she and her mentor teacher tended to call on the students who already knew the answer. She explained during a follow-up interview:

From several weeks of observing, I noticed that [the same students] got called on a lot more than some of the students who didn't really know what was going on, so they didn't want to embarrass themselves by raising their hands, or they weren't engaged enough to know what question was being asked . . . it's just so much easier to call on the kids who are raising their hand . . . I just wanted to make sure that everyone was really paying attention and draw them in.

Susan, therefore, decided to implement different methods to ensure the active participation of all students through questioning. An analysis of her VAT comments reveals that the 18 times she mentioned a decision to call on students referenced nine different children by name, including efforts to ensure involvement, providing or guiding a response, and making a prediction. Thus, Susan's inquiry focus was evident throughout her VAT analysis.

Reacting to Students. While pedagogy and engagement were the most prevalent themes across participants' reason themes, 'Reacting to Students' emerged most frequently. More than three-fourths of these reasons were provided by Susan: "When tuning in to each of them individually, I noticed that this was a word that they all struggled with." Of her 23 comments while reacting to students, 74% were made to an individual, while 26% focused on a group or the entire class. Citing several reasons, she cited 'attending to student learning needs' most frequently (9), demonstrating a concern for ensuring students' comprehension.

Karen recorded twice as many videos as the other participants but provided no engagement rationale for her instructional decisions; with four-five students per group, and an inquiry focus on differentiation, engagement may have been less relevant to her analytical focus. Karen made seven of the 13 overall participant "ability mapping" comments (54%)—an important activity for differentiated instruction. She noted, "This group is capable of reading the rest of the story and

comprehending it I chose a book that was on an upper fifth grade level, because this group is a higher level.”

AXIAL COMPARISONS

In order to further relate decision themes with reason themes, we applied axial coding principles (Strauss & Corbin, 1990) to assess the extent to which themes interrelated or opposed each other. To compare themes, we then noted commonalities by merging shared properties from different themes. As shown in Figure 6, differences are evident across participants in their reasons for enacting teaching strategies and managing classroom behavior. All participants focused more on instructional techniques than management/administrative decisions. Both Susan and Lisa commented regularly on managerial decisions (45% and 60%, respectively), but Karen (7%) and Zoe (11%) rarely included a management focus in their comments.

Pedagogical reasoning accounted for a large proportion of each participant's reasons for enacting a particular teaching strategy; that is, their rationales for teaching strategies reflected individual perceptions of pedagogical importance. Further analysis (at the property level) indicates that participants employed teaching strategies to address student learning 62% of the time. For example, Karen describes her decision to allow her high group to continue reading as, “a conscious effort to allow them to figure out the information using context.” While coded thematically as a particular pedagogy, the pedagogical property relates to her desire to address the different learning needs of high learners. Similarly, Susan explained her decision to address an individual learning need: “I didn't say ‘Wrong’—I just said, ‘Let's think’ and explained another way to do it. I knew Shelby would have trouble, so I scaffolded for her.” Most decisions to enact a particular teaching strategy were intended to address student learning needs. A similar pattern emerged when comparing the reasoning associated with teaching a metacognitive strategy, for which 73% of explanations provided focused on teaching strategies. Thus, while reasons were influenced by individually perceived pedagogical significance, the majority of reasons for employing a particular teaching strategy or for teaching

a metacognitive strategy were to address individual student-learning needs.

In contrast, reasons associated with administration decisions were dominated by concerns for management. A typical attempt to manage classroom behavior is evident in Susan's attempt to gain students' attention while explaining procedures, "so that they would NOT shout out this time." Lisa similarly explained her decision to say, "I want to see everyone's beautiful faces" as facilitating transitions between activities. Even participants who made the fewest management attributions provided administrative rationale. Zoe changed the lesson presentation, "because half the class leaves during reading"; Karen's instructed that "everyone follow along, so they would focus on the text." These findings may reflect the need to establish effective classroom control where management decisions are a concern.

GENERAL DISCUSSION

WHILE PAST RESEARCH suggested teacher-centered concerns, our research indicated considerable student-centered thinking among preservice teachers. In the following, we relate the current study to prior studies on novice teachers' concerns and examine the emergence of student-centered thought via video-enhanced self-analysis.

TEACHER-CENTERED DECISIONS AND REASONING

Managing Classroom Needs. Consistent with previous research, our findings suggest that participation and classroom management influence how student teachers analyze videos of their own practice. Prior literature has suggested that novice teachers are largely concerned with teacher-centered issues, beliefs and concerns, such as management and engagement, and are heavily influenced by entrenched pedagogical beliefs (Kagan, 1992). In 1990, Borko and Shavelson reviewed nearly fifteen years of research on teacher thinking, concluding that, "inexperienced teachers attend more to information that

model, through which teachers' concerns were classified as survival concerns, teaching situation concerns, and impact concerns. Since then, applications of the model have consistently demonstrated novice teachers' initial concern with issues such as classroom management and ensuring that students are participating in their lessons (see, for example, Pigge & Marso, 1992; Smith & Sanche, 1992, 1993).

Not surprisingly, our student teachers also focused attention on administrative concerns in their analyses, as indicated by 'management' decisions and 'administration' reasons. The most frequently cited rationale for management decisions involved administrative concerns, such as the need to finish on time, enforcing class rules, disciplining a student, or easing a teaching load. These concerns are related to teacher-centered issues that do not directly relate to student learning or understanding. Thus, the present study both reinforces classroom management as a concern among preservice teachers and provides preliminary evidence of their acting on these concerns during video self-analysis. Further, the study demonstrates that when student teachers focus on management issues, they tend to characterize their reasoning as classroom focused on administration rather than student needs and not student learning, per se.

Engagement. Some researchers have concluded that teachers are influenced heavily by student involvement, or engagement, in a lesson (e.g., Johnson, 1992). O'Donnell, Reeve, and Smith (2007) describe a distinction among behavioral, emotional, and cognitive engagement. Cognitive engagement is concerned with engaging a students' mind (often measured by his or her initiative for seeking out information), and emotional engagement refers to issues of positive or negative feeling. Behavioral engagement, in contrast, is concerned with what students are doing, measured by effort and attention. Student teachers in the present study demonstrated a concern for behavioral engagement, commenting on students' level of attention, justifying their actions, and reasoning how actions might increase involvement. Student teachers sought to engage their students by ensuring that they participate during the lesson, but focusing on other forms of engagement much less frequently. This is consistent with prior

research on teacher thinking: “perceived student participation in the lesson emerges . . . as the foremost behavioral cue by which teachers judge the success or failure of a lesson” (Parker, 1984, p. 221). Thus, while student engagement is one predictor of student achievement (Connell, Spencer, & Aber, 1992), preservice teachers demonstrated more concern with behavioral means of ensuring students’ active participation.

STUDENT-CENTERED THINKING

The emergence of student-centered thinking, in contrast, is inconsistent with much prior research on teacher-thinking. In the present study, student teachers’ reasons for instructional action were often rooted in individual student concerns. Among reasons for instructional decision-making, whole class reasons were given 42% of the time, individual student reasons 40% of the time, and small-group reasons only 14% of the time. While these findings reinforce the importance of class-based decisions among preservice teachers, they also highlight the impact of video analysis on individual, student-based decisions. Researchers have reported that while novice teachers are concerned with group responses, expert teachers attend to individual needs (Borko & Shavelson, 1990). Similarly, Fogarty, Wang, and Creek’s (1983) report that novices fail to adapt instruction based on student cues. Our analysis reveals that student-teachers’ reasons for initiating instructional decisions were triggered nearly as often by individual student concerns and that they reportedly adapted their actions accordingly.

Our participants chose an area of their teaching to improve. Yet, while inquiry focused on actions and decisions, participants cited student-centered reasoning. In-the-moment decisions demonstrated a concern for student understanding. In many instances, they identified how their teaching strategies would address different cognitive aspects of student understanding. They explained that many decisions were meant to engage students in learning and encourage their active participation. In addition, in-the-moment decisions demonstrated a concern for gauging student understanding. This may suggest that

supporting preservice teachers to analyze their own actions using video may sensitize them to making decisions based on student needs.

Years of research on teacher thinking suggest that information about students is critical for effective teacher planning (Borko & Shavelson, 1990). Interestingly, the most cited reason our participants provided for their decisions was the presumed cognitive development of either an individual student or a group of students (i.e., “addressing student learning needs”). Despite relative inexperience, participants enacted strategies based on information about their students, demonstrated by Karen’s individual assessment of reading abilities while enacting teaching strategies to allow support for students to work individually, Susan’s increased emphasis on calling on students who might not normally participate, Lisa’s whole class assessment questioning strategy, or Zoe’s preassessment teaching strategy to know how to direct the lesson. Fuller and Bown’s (1975) model of teacher concerns emphasizes the tailoring of instruction to individual needs during the most advanced stage of preservice teacher development. The findings of the present study support the notion that preservice teachers moved beyond initial teacher-centered concerns and implemented practices based on concerns for individual and groups of students. They cited such concerns most when discussing their employed teaching strategies or their efforts to teach a metacognitive strategy to students. Thus, encouraging student teachers to focus their video-self analyses on their teaching strategies may help them to better account for student information when they plan for and enact teaching.

Pedagogy. Despite longstanding and recent research indicating that teachers’ actions and beliefs often do not coincide (Borko & Niles, 1982; Woolfolk Hoy & Pape, 2006), instances emerged in which participants’ pedagogical reasons aligned with instructional decisions. It is important to note differences between prior approaches to examining teacher reasoning and the methods used in the present study. Pedagogical rationales were often expressed as nonsituated reasons for applying a particular strategy. In the present study, teachers’ statements about pedagogy revealed beliefs about the importance of spe-

cific teaching actions taken, such as modeling, note taking, and open-ended teaching strategies. Allowing teachers to relate their beliefs with actions during video analysis may provide a more explicit link among beliefs, thoughts, and actions than previously available. The connections between beliefs and actions may be extended from broad aspects of beliefs to highly situated teaching actions and events. Previously, researchers typically elicited teachers' beliefs by having teachers write out explicit statements of their purported convictions or approaches to teaching (Bryan & Recesso, 2006; Kagan, 1992); in contrast, after identifying their specific inquiry focus, our student teachers used a scaffolded tool to analyze videos of their own practices. In so doing, each student teacher associated their teaching beliefs and rationales with specific, observable actions.

Similarly, the emergence of student-centered reasoning may have been influenced by the method used to elicit their thinking. Whereas past investigations have attempted to explain teacher enactments, the video self-analysis in the current study required that teachers select and comment on issues of specific aspects of their own inquiries. Despite the varied inquiries, all participants provided student-centered reasons for their decisions.

CONCLUSIONS

THE FORMATIVE USE OF VIDEO ANALYSIS enabled our participants to highlight teacher- and student-centered concerns, actions, and reasoning. When student teachers' analyses focused on management or engagement, their reasoning became increasingly teacher-centered, whereas when focused on teaching strategies their reasoning became increasingly student-centered. In addition, their pedagogical reasoning revealed implicit beliefs about and rationales for using specific teaching strategies. Video analysis may offer potentially rich, complementary, and highly situated methods to elicit teachers' beliefs about *specific* teaching practices. Video analysis may provide a valuable tool for both researchers and teacher educators to

assess, understand, and affect student teacher thinking and action in context.

Video self-analysis is becoming increasingly powerfully and accessible among teacher education programs. Still, longitudinal research is needed to examine how student teachers engage in inquiry about their own instructional decisions, and the teaching, management, and engagement issues that emerge over time. In this way, student teachers may become increasingly capable of examining the relationships between their own actions and their students. Further, video self-analysis may provide a window into teacher thinking to extend the way researchers conceive of the connection between beliefs and actions.

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REFERENCES

- Abell, S.K., Bryan, L.A., & Anderson, M.A. (1998). Investigating preservice elementary science teacher reflective thinking using integrated media case-based instruction in elementary science teacher preparation. *Science Teacher Education*, 82, 491-509.
- Borko, H., & Niles, J.A. (1984). Instructional planning. In J. Keefe & J. Jenkins (Eds.), *Instructional leadership handbook*. Virginia: National Association of Secondary School Principals.

- Borko, H., & Shavelson, R.J. (1990). Teacher decision making. In B.F. Jones & L. Idol (Eds.), *Dimensions of thinking and cognitive instruction* (pp. 311-346). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- Bryan, L.A., & Recesso, A. (2006). Promoting reflection with a Web-based video analysis tool. *Journal of Computing in Teacher Education*, 23(1), 31-39.
- Charmaz, K. (2002). Qualitative interviewing and grounded theory analysis. In J. Gubrium & J.A. Holstein (Eds.), *Handbook of interview research* (pp. 675-694). Thousand Oaks, CA: Sage.
- Cheek, E.H., Jr., Steward, F.A., & Launey, B.L. (2004). Facilitative reading instruction: Preservice teachers' voices and perceptions. *Reading Improvement*, 41(2), 129-142.
- Christensen, L.M., Wilson, E.K., & Sunal, C.S. (2004). Through the looking glass: Reflection or refraction? Do you see what I see? *Journal of Social Studies Research*, 28(1), 33-46.
- Clandinin, J., & Connelly, F.M. (1987). Teachers' personal knowledge: What counts as 'personal' in studies of the personal. *Journal of Curriculum Studies*, 19, 487-500.
- Clark, C.M. (1988). Asking the right questions about teacher preparation: Contributions of research on teacher thinking. *Educational Researcher*, 17, 5-12.
- Clark, C.M., & Peterson, P.L. (1986). Teachers' thought processes. In M.C. Wittrock (Ed.), *Handbook of research on teaching* (3rd ed, pp. 225-296). New York: Macmillan Publishing.
- Clark, C.M., & Yinger, R. (1979). *Three studies of teacher planning*. East Lansing, MI: Michigan State University Institute of Research on Teaching.
- Cochran-Smith, M., & Zeichner, K. (Eds.). (2005). *Studying teacher education: The report of the AERA panel on research on teacher education*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Collier, S.T. (1999). Characteristics of reflective thought during the student teaching experience. *Journal of Teacher Education*, 50(3), 173-181.

Connell, J.P., Spencer, M.B., & Aber, J.L. (1994). Educational risk and resilience in African-American youth: Context, self, action, and outcomes in schools. *Developmental Psychology*, 65, 492-506.

Conway, P.F. (2001). Anticipatory reflection while learning to teach: From a temporally truncated to a temporally distributed model of reflection in teacher education. *Teaching and Teacher Education*, 17(1), 89-106.

Cuban, L. (1986). *Teachers and machines: The classroom use of technology since 1920*. New York: Teacher's College Press.

Ericsson, K.A., & Simon, H.A. (1993). *Protocol analysis: Verbal reports as data* (Rev. ed.). Cambridge, MA: MIT Press.

Field, J.C., & Latta, M.M. (2001). What constitutes becoming experienced in teaching and learning? *Teaching and Teacher Education*, 17(8), 885-895.

Fogarty, J.L., Wang, M.C., & Creek, R. (1982, March). *A descriptive study of experienced and novice teachers' interactive instructional decision processes*. Paper presented at the annual meeting of the American Educational Research Association, New York City.

Fuller, F.F., & Bown, O.H. (1975). Becoming a teacher. In K. Ryan (Ed.), *Teacher education: 74th yearbook of the National Society for the Study of Education, (part II)*. (pp. 25-52). Reston, VA: Association of Teacher Educators.

Glaser, B., & Strauss, A.L. (1967). *The discovery of grounded theory: Strategies for qualitative research*. Chicago: Aldine De Gruyter.

Hatton, N., & Smith, D. (1995). Reflection in teacher education: Towards definition and implementation. *Teaching and Teacher Education*, 11(1), 33-49.

Housner, L.D., & Griffey, D.C. (1985). Teacher cognition: Differences in planning and interactive decision-making between experienced and inexperienced teachers. *Research Quarterly for Exercise and Sport*, 56, 45-53.

Hubbard, R.S., & Power, B.M. (2003). *The art of classroom inquiry. A handbook for teacher-researchers* (2nd ed.). Portsmouth, NH: Heinemann.

- Jay, J.K., & Johnson, K.L. (2002). Capturing complexity: A typology of reflective practice for teacher education. *Teaching and Teacher Education*, 18(1), 73-85.
- Jensen, J., & Winitzky, N. (2002). *Exploring preservice teacher thinking: A comparison of five measures*. Paper presented at the annual meeting of the American Association of Colleges for Teacher Education.
- Johnson, K. (1992). Instructional actions and decisions of preservice ESL teachers. *TESOL quarterly*, 26(3), 507-534.
- Kagan, D.M. (1992). Implications of research on teacher belief. *Educational Psychologist*, 27(1), 65-90.
- Killion, J., & Todnem, G. (1991). A process for personal theory building. *Educational Leadership*, 48(6), 14-16.
- Lee, H.-J. (2005). Understanding and assessing preservice teachers' reflective thinking. *Teaching and Teacher Education*, 21(6), 699-715.
- MacKay, D.A., & Marland, P.W. (1978, March). *Thought processes of teachers*. Paper presented at the annual meeting of the American Educational Research Association, Toronto, Canada.
- Meijer, P., Zanting, A., & Verloop, N. (2002). How can student teachers elicit experienced teachers' practical knowledge? Tools, suggestions, and significance. *Journal of Teacher Education*, 53(5), 406-419.
- Nespor, J. (1987). The role of beliefs in the practice of teaching. *Journal of Curriculum Studies*, 19, 317-328.
- O'Donnell, A., Reeve, J., & Smith, J. (2007). *Educational psychology: Reflection for action*. Hoboken, NJ: John Wiley & Sons.
- Pajares, F. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of Educational Research*, 62, 307-332.
- Parker, W.C. (1984). Developing teachers' decision-making. *Journal of Experimental Education*, 52(4), 220-226.

- Pigge, F., & Marso, R. (1997). A seven-year longitudinal multi-factor assessment of teaching concerns development through preparation and early teaching. *Teaching and Teacher Education*, 13, 225-235.
- Perlberg, A. (1987). Microteaching: Conceptual and theoretical bases. In M. Dunkin (Ed.), *The international encyclopedia of teaching and teacher education* (pp. 715-720). Oxford: Pergamon Press.
- Preston, M., Ginsberg, H. P., Jang, S., Eisenband, J. G., Moretti, F., & Sommer, P. (2005). *Video interactions for teaching and learning (VITAL): A learning environment for courses in early childhood mathematics education*. Paper presented at the American Educational Research Association. from http://ccnmtl.columbia.edu/vital/nsf/VITAL_AERA_2005.pdf
- Rich, P., Recesso, A., Alleksaht-Snyder, M. & Hannafin, M. (2007, April). *The use of video-based evidence to analyze, act on, and adapt preservice teacher practice*. Paper presented at the annual meeting of the American Educational Research Association, Chicago, IL.
- Richardson, V. (1996). The role of attitudes and beliefs in learning to teach. In J. Sakula (Ed.), *Handbook of research on teacher education*. (2nd ed., pp. 102-119). New York: Simon & Schuster Macmillan.
- Schepens, A., Aelterman, A., & Van Keer, H. (2007). Studying learning processes of student teachers with stimulated recall interviews through changes in interactive cognitions. *Teaching and Teacher Education*, 23(4), 457-472.
- Schön, D. (1983). *The reflective practitioner: How professionals think in action*. San Francisco: Jossey-Bass.
- Schutz, A. (1970). *On phenomenology and social relations*. Chicago: University of Chicago Press.
- Shavelson, R.J., & Stern, P. (1981). Research on teachers' pedagogical thoughts, judgments, decisions and behavior. *Review of Educational Research*, 51(4), 445-498.
- Sherin, M.G., & van Es, E.A. (2005). Using video to support teachers' ability to notice classroom interactions. *Journal of Technology and Teacher Education*, 13(3), 475-491.

- Smith, D., & Sanche, R. (1992). Saskatchewan interns' concerns at three stages of a four-month practicum. *The Alberta Journal of Educational Research*, 38(2), 121-132.
- Smith, D., & Sanche, R. (1993). Interns' personally expressed concerns: A need to extend the Fuller model? *Action in Teacher Education*, 15(1), 36-41.
- Strauss, A., & Corbin, J. (1990). *Basics of qualitative research: Grounded theory procedures and techniques*. (2nd ed.). Newbury Park, CA: Sage.
- Sturtevant, E.G., & Linek, W.M. (2003). The instructional beliefs and decisions of middle and secondary teachers who successfully blend literacy and content. *Reading Research and Instruction*, 43(1), 74-89.
- van Es, E.A., & Sherin, M.G. (2002). Learning to notice: Scaffolding new teachers' interpretations of classroom interactions. *Journal of Technology and Teacher Education*, 10(4), 571-596.
- Van Manen, M. (1995). Epistemology of reflective practice. *Teachers and Teaching: Theory and Practice*, 1(1), 33-50.
- Woolfolk Hoy, A., Davis, H., & Pape, S. J. (2006). Teacher knowledge and beliefs. In P. A. Alexander & P. H. Winne (Eds.), *Handbook of educational psychology* (2nd ed., pp. 715-737). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Zeichner, K. (1994). Research on teacher thinking and different views of reflective practice in teaching and teacher education. In I. Carlgreen, G. Handal & S. Vaage (Eds.), *Teachers minds and actions: Research on teacher's thinking and practice*. London: Falmer Press.

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