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UNIVERSITY OF CALIFORNIA, SAN DIEGO

The Reflective Lens:
The Effects of Video Analysis on Preservice Teacher Development

A dissertation submitted in partial satisfaction of the
requirements for the degree of Doctor of Education

in

Teaching and Learning

by

Christopher P. Halter

Committee in Charge:
Randall Souviney, Chair
James Hollan
Edwin Hutchins
James Levin

2006

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Chair

University of California, San Diego
2006

Dedication

My parents, Rosemary and Lawrence have always been an inspiration to me throughout my academic career. Both of my parents have been a source of strength to all their children and have taken pride in our accomplishments. They continue to be role models for us as we make our way through life.

This entire journey would not have been possible without the constant support of my wife Julie and our beautiful children Alex and Olivia. Julie was my strength as I tried out the thoughts and ideas of this research. Her expert copyediting of my work, as well as her literary vision, and unswerving moral support made this work possible.

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Vita

- 1986 Bachelor of Science, The College of Charleston, Charleston, S.C.
- 1993 Single Subject Teaching Credential, University of California, San Diego
- 1995 Master of Arts, University of California, San Diego
- 2006 Doctor of Education, University of California, San Diego

Abstract of the Dissertation

**The Reflective Lens:
The Effects of Video Analysis on Preservice Teacher Development**

by

Christopher P. Halter

Doctor of Education in Teaching and Learning

University of California, San Diego, 2006

Randall Souviney, Chair

Reflection-on-practice has become a critical component of teacher professional development over the past decade. As a result, it is increasingly important for teacher educators to better understand the relationship between reflection and the development of professional expertise. The term *reflection* is often loosely defined in the literature as a range of instructional practices, including observation journals, group discussions, or formal writing. These reflective writing or discussion activities may be implemented by individuals, within collaborative peer groups, or through guided conferencing with a mentor.

This study involved a particular kind of self-reflection that utilized video of credential candidates' own teaching as the object of reflection. This preliminary study examined an intact group of preservice teacher candidates who exhibited typical

performance scores on the Performance Assessment for California Teachers (PACT) Teaching Event, a standardized preservice teacher performance instrument. Preservice intern teachers were given periodic reflective writing tasks around their own classroom practice. Reflection on the lesson was facilitated by either recall only or videotaped lesson analysis, and the writing samples were coded for three types of reflective writing (descriptive reflection, dialogic reflection, reflective critique) and three reflective foci (technical focus, practical focus, critical focus).

The study showed that reflective writing type, or voice, remained constant throughout the four-month period of the study. However, the focus of reflection increased in sophistication when students used videos of their own teaching as objects of self-reflection. Video analysis is a powerful tool to support the growth of preservice teachers in making the critical connections between pedagogy and actual classroom interactions as evidence supporting their pedagogy decisions. The effect of video analysis can persist over time and do not need to be used for every reflection task. The results of this study strongly suggest that activities and instructional procedures that target improved reflection-on-practice through the use of video analysis can be accomplished within the time constraints of a credential program. Also, analysis of PACT performance data showed that reflective practice was predictive of beginning teachers' abilities to assess student learning needs, but not planning or instruction performance. More study about this interrelationship is warranted.

Foundations of Preservice Teacher Development

The term “quality teacher” has received a great deal of attention in recent years. Teacher education has been given the charge to educate new teachers to be “highly qualified” (Moore, 1998; Whitehurst, 2002) and possessing the characteristics of a quality teacher as defined by the profession. What should a quality teacher be able to do and say? How can we structure learning experiences for teacher candidates to help them attain this level of quality? What are the markers of a quality teacher?

Many states and educational agencies began to publish K-12 academic content standards as well as define educational practices that would support the attainment of the academic reforms. However, it has not been until recent years that we have seen a renewed effort to examine the development of novice teachers in an effort to impact student learning. Recent research in this area has produced some common recommendations for the advancement of the teaching profession and the development of new teachers (Kennedy, 1987; Morey *et al.*, 1997; Putnam & Borko, 2000; Tardif, 2001).

These studies point to the need for extended fieldwork by preservice teachers, providing them with the opportunity to learn-in-context and to practice making decisions in authentic classroom settings. They also express the need to connect preservice experiences with the professional development experiences of credentialed teachers. Transitional experiences provided in preservice development should mirror, or at least relate to, the professional development experiences of teachers. And we must provide the experiences and tools that not only allow the novice teacher the

opportunity to learn and practice pedagogical skills, but the opportunity to reflect on those experiences and to “transform [a novice teacher’s] cognition” (Putnam & Borko, 2000, p. 10) about teaching.

Teacher professional development relies on powerful practices in learning, including reflection and critical dialogue about practice. Reflection in teacher development can be found in the theories of John Dewey and later refined by Donald Schön (1987). As a new teacher engages in the reflective process about their own teaching practice, their ideas, views and beliefs about teaching and learning, as well as a refined view of classroom dynamics, should become increasingly refined. These learning experiences should scaffold the new teacher’s gain in teaching expertise.

As we will see in the literature review, research has identified the markers that indicate a progression from a novice to an expert teacher (Kennedy, 1987; Shulman, 1987; Smith & Tiberius, 2002). There is also some research indicating that novice teachers can be seen progressing through various stages of reflective practice (Schön, 1987; Van Manen, 1999). But are these two gains related? Does reflective practice support the development of expertise in teaching? Can we scaffold early experiences for preservice teachers that will support the process of developing reflective practice and teaching expertise? This study will attempt to address critical elements of these issues.

Previous studies have invoked the term “reflection” in contradictory ways, treating reflection as a verb – an act to be performed, and as a noun – something that is done. For example, Dewey and Schön view reflection as a verb; Dewey as an integral element of learning as a social process and Schön as an action occurring in different

temporal spaces; reflection-on-action and reflection-in-action. Van Manen described reflection as a noun, a technical, practical or critical creation by an individual learning complicated new skills and procedures. Research studies typically examine the timing, voice or focus of participants' reflections, but lack rationale for selecting particular aspects of reflection for analysis. If we are going to begin to understand reflection, it is important to explicitly describe the reflective dimension(s) being studied and the rationale for analysis. This study explicitly defines the two reflective dimensions and analyzes the writing samples across both of these dimensions to uncover patterns and use by the Interns. One dimension, the reflective type examines the process as an action; the way these Interns express themselves through reflective writing. The second dimension, the reflective focus examines the process as an object; classroom artifacts that the Interns chose to analyze in their reflective writing.

Conceptual Framework

Theoretical Constructs

This study is concerned with the development of teaching expertise in novice teachers. Generally, the cognitive science novice-expert models point out the differences in how novices and experts approach problem solving (Chi, 1993; Chi *et al.*, 1988; Glaser, 1985b). Other studies have offered various expertise models that apply to many fields, including the technical-skills, application of theory, critical analysis, and the deliberate-action models, however, none of these models clearly capture the necessary requirements of expertise in teaching (Kennedy, 1987). Kennedy also states that of the expertise models that can be shown to have some application to teaching, such as technical-skills and deliberate-action, have fallen short of accurately describing the nature of expertise in teaching.

The Pedagogical Content Knowledge (PCK) model has been put forward as a way to describe the complexities of teaching expertise (Shulman, 1987). PCK recognizes the importance of deep content specific knowledge as well as the pedagogy skills necessary in teaching. This model of expertise claims that teaching expertise has four components: 1) general pedagogy knowledge, 2) general understanding of student learning, 3) specific content domain knowledge, i.e. language arts, biology, chemistry, physics, or mathematics, and 4) specific knowledge about learning in that content domain.

This study uses the Performance Assessment of California Teachers (PACT) instrument as a standardized measure of preservice teaching performance. PACT was developed by a consortium of California universities to eventually become a key element in credentialing decisions for new teachers in the State. The PACT rubrics (Appendix C) measure the Teaching Performance Expectations (TPE) for California Teachers (Appendix D) that were adopted by the California Assembly under AB2042. The four components of the PCK model can also be found to correspond with the domains of the TPEs. The domains of Engaging and Supporting Student Learning (TPE 4,5, 6, and 7) and Planning Instruction and Learning Experiences (TPE 8 and 9) correspond to the PCK component of general understanding of student learning and general pedagogy knowledge, while the domain of making Subject Matter Comprehensible (TPE 1) relates to the PCK component of specific content domain knowledge and specific knowledge of learning in a content domain.

A second important feature of this study is the use of reflective practice to scaffold and support the development of expertise. Reflection has been described as an essential component in the building of expertise (Adler, 1990; Bauer, 1991; Berliner, 1988; Schön, 1987). However, in recognizing the recall limitations of novice teachers (Allen & Casbergue, 2000; Byra, 1996), video recording and video analysis was used in an attempt to mitigate this hurdle.

The PCK model of teaching expertise recognizes the importance of a foundation of knowledge that relies on both content-specific knowledge as well as

knowledge about classroom practices and student learning. This kind of expertise is informed by learning theories, developed through *lived* experiences, and further enhanced by deliberate consideration and analysis of these experiences.

Defining Terminology

Reflective practice is used to represent both anticipatory reflection of future teaching actions as well as retrospective reflection on past teaching actions. The reflections used in this study were text narratives created by the participants in response to video images of their own classroom teaching.

Those new to the teaching profession come with many labels. “Preservice teacher” can represent someone in the process of attaining his or her initial teaching credential. However, the terms “student teacher”, “intern teacher”, and “teacher candidate” can also be applied to a subset of the more general group “preservice teacher”. Novice teacher can be applied to anyone who is in the process of attaining teaching expertise skills. This includes those who are pursuing a teaching credential as well as newly credentialed teachers. This project focused on the growth and development of Intern teachers in the process of gaining their teaching credential.

The “California Intern Teacher Credential” is a specialized teaching certificate given to preservice teacher candidates independently teaching in public school classrooms. These preservice teacher candidates concurrently participate in professional certification studies at either a university or in a school district. Participants in this study are all secondary Intern teacher candidates.

The participants in this study reflected on “focus lessons” from a single class period or a series of closely associated lessons. A focus lesson is defined as the specific lesson used for self-reflection by the preservice teacher. All the participants in this study teach at the secondary education level in departmentalized content areas. A class period was typically 50 minutes duration in a traditional school schedule, or as many as 90 to 110 minutes in a block schedule school day.

The Problem

Reflective practice has been growing in its popularity within Teacher Education Programs and Schools of Education over the past 15 years. Initially defined by John Dewey in the early twentieth century and further developed by researchers such as Donald Schön in the early 1980s, reflective practice among teachers is viewed as a vehicle to gain professional expertise. Some researchers state that reflection is one of the main *experiences* leading to professional growth in novice teachers (Freese, 1999; Hammerness *et al.*, 2001; Moallem, 1998).

Reflective practices and the development of reflective practitioners has become a foundational goal of many teacher education programs, taking on an importance equal to developing the use of technology, social justice curriculum, and equitable practices in the classroom. The rationale for this emphasis on reflection by novices is the belief that this act supports the development of teacher expertise, leading to enhanced student learning. The further goal of programs emphasizing reflective practice is that reflective practice will *accelerate* the development of expertise (Farrell, 2001; Freese, 1999; Hammerness *et al.*, 2001; Reven *et al.*, 1997).

There is a lack of research on the connection between the ability to reflect on one's own teaching practice and the rate of development of teaching expertise in novice teachers. Much of the research depends on novice teacher self-report statements and interviews. There is very little empirical performance data to support

the connection between reflective practice and the development of teaching expertise for novice teachers (Hammerness et al., 2001). To determine if reflection on one's own practice can enhance novice teacher performance, research needs to address the following two objectives:

1. Establish a measure of the ability of preservice teachers to reflect on their own practice as a measure of professional growth, and
2. Examine if there is a relationship between reflective ability and teaching expertise using standardized measures of teaching performance.

The goal of every teacher education program is to support the growth and development of effective classroom teachers. The challenge comes in determining what activities support the growth of these preservice teachers as they progress. A second challenge to teacher education is the time required to reach proficiency as a teacher. Recent studies of new teacher development, it takes as much as 4 years or more for teachers to become competent professionals. The literature suggests that a combination of reflection on practice and the effective use of video may support teacher development (Berliner, 1988; Dreyfus, 2004; Feiman-Nemser, 2001a).

In addition to structuring the activities that lead to professional growth, teacher education is increasingly interested in accelerating the professional growth of new teachers. The timeline for teachers to attain levels of competency, proficiency, and expertise have been defined, but are these timelines realistic? We continually look for the structures, activities, and processes that bring new teachers to higher levels of skill in less time. However the main factor that effects teacher skills seems to be experience

(Darling-Hammond, 1985; Mundry *et al.*, 1999; Pittard, 2003). And this experience seems to be gained through classroom practice.

Literature Review

A Teacher Development Continuum

In order to make sense of teacher development, we must view teaching as a continuous system of change; a continuum of practice. It was not until the late 1980's that the idea of an expert teacher began to take shape. The National Board for Standards in the Teaching Profession (NBSTP) began the National Board certification portfolio process to identify teachers who had reached a high level of expertise in their teaching practice. So we could now envision a continuum with newly credentialed teachers on one end and experts in their practice on the other end, but what happens between these two extremes? Furthermore, a new teacher could begin the national board process after just three years of teaching. The question is, how much expertise can realistically be gained during three years of practice?

In the late 1990's, states including California and Connecticut embraced idea of a teacher-development continuum and launched intensive beginning teacher induction programs. These programs were designed to provide the critical support and professional development teachers needed in their first few years in the classroom.

Researchers and policymakers have described the teacher continuum as an institution-based process. Teachers progress in their expertise from the start of their university credential program, to the school district induction program, and then to National Board certification. Sharon Feiman-Nemser (2001a) offers a different perspective on the teacher continuum. She argues that it should be viewed

from a process perspective that requires coherent and connected learning opportunities that make strong links from preparation, through induction, and continued through ongoing professional development. “There is no connective tissue holding things together within or across the different phases of learning to teach” (Feiman-Nemser, 2001a). The connective tissue is a process that includes inquiry into one’s own classroom practice and critical conversations about classroom experimentation situated in the everyday task of teaching. In this view of teaching, the process is a coherent set of professional growth practices that retain similar features throughout the continuum, but steadily increase in complexity.

Progression from Novice to Expert

The goal of teacher education and the teaching profession in general is to move professionals along the teacher continuum – transforming novice teachers into expert teachers as they gain experience and expertise in the classroom. Expertise is described as a domain specific (Glaser, 1985a) set of skills, practices, and knowledge that an expert uses effortlessly and appropriately (Berliner, 1994; Smith & Tiberius, 2002). Researchers from many professions, e.g. accounting, law and medicine have studied the attainment and development of expertise, in an effort to further professional growth in these fields. One profession noticeably lacking in this research is teaching (Berliner, 1988, 1994).

Kennedy (1987) describes four definitions of expertise that have been applied to teaching over time. These models can be described as:

1. Expertise as *technical skills* comprised of specific knowledge and tasks to be performed,
2. Expertise as *application of theory* consisting of a body of principles,
3. Expertise as *critical analysis* providing a paradigm to examine and analyze situations based on learned case studies, and
4. Expertise as *deliberate action* embodying the analysis of a situation in the context of the situation.

However, each of these definitions fails to capture the complex task of how to gain expertise in teaching. In the end, Kennedy states that despite the attempts to define and describe the acquisition of expertise that there has been “very little research on the nature of professional expertise or on the implications ... for its acquisition” (Kennedy, 1987, p. 27).

Berliner (1994) describes five stages of expertise development in teaching. They are 1) novice, 2) advanced beginner, 3) competent level, 4) proficient level, and 5) expert. These stages of development represent steps in a teacher’s progression from a teacher-centered view of his or her actions to a student-centered view. But Berliner points out the difficulty inherent in any expertise study due to the time required to *reach* expertise - about 10,000 hours of teaching experience (Berliner, 1994). Despite this drawback, there have been some significant studies that compare the characteristics and differences between the various levels of expertise.

When we compare experienced teachers with novice teachers, one of the differences is that veteran teachers notice things that novice teachers do not. Experienced teachers are able to identify and select important noteworthy classroom situations, make connections between their classroom interactions and the broader concepts of teaching and learning, and use what they know about the context of the

classroom to offer solutions (Sabers & Cushing, 1991; van Es & Sherin, 2002).

Experienced teachers are therefore able to view the entire classroom, determine where to focus their attention, and adjust the flow of the lesson to keep their students engaged and learning. They have developed the skills to *notice* and interpret classroom interactions (van Es & Sherin, 2002).

A teachers' professional vision is part of his/her pedagogical skills and can be developed through training and experience (Sabers & Cushing, 1991). Novice teachers need to have the opportunities to practice noticing important classroom events by observing and reflecting upon and discussing their observations with peers and experts. (Sabers & Cushing, 1991; van Es & Sherin, 2002).

Kennedy (1987) attempts to define teaching expertise as *deliberate action*. In developing this sort of professional expertise, the practitioner, or in this case the preservice teacher, needs to learn how to analyze situations in the context of the classroom and then learn how to react to those situations. This idea is closely related to Schön's (1987) levels of reflection, where a learner begins by reflecting on experiences away from the classroom setting, then begins to deliberately reflect on situations as they occur in the classroom setting, and finally, reflective decisions become a natural part of his/her practice.

However, none of these expertise models, technical skill, application theory, critical analysis, or deliberate action, adequately describes teacher expertise. Technical skill implies that teaching requires a memorized, well-rehearsed set of skills that can be learned and then enacted in the classroom. Application theory reduces teaching to a

body of general principles to be applied in specific situations. Critical analysis implies that teaching expertise can be gained by careful analysis of case studies. It does not take into account the unique qualities of each classroom and group of students. Deliberate action assumes that expertise develops out of experience and the relationship between experience and analysis.

Each of these models is able to describe a single aspect of teaching or a thin slice of what it means to be a professional teacher, however, they fail to capture the complexities of learning that are shaped by the interactions in the classroom. Kennedy concludes that while each successive theory improves upon the previous but only by complicating the definition of teaching expertise (Kennedy, 1987). “[E]ducators must define expertise, define the relationship between codified knowledge and experiences in the formation of expertise, and determine the appropriate type and scope of transitional experiences” (Kennedy, 1987, p. 27). The review of expertise provided by Kennedy seems to indicate the need to provide new teachers with authentic classrooms practice within the well-structured, scaffolded environment to analyze those experiences and make links between the realities of teaching and the theories about learning.

A Proposed Model of Teaching Expertise

Recognizing the shortcomings of current expertise models, Shulman (1987) has suggested an alternative model of expertise that accounts for both content specific knowledge and pedagogical knowledge. The model has been called Pedagogical

Content Knowledge (PCK) or content-specific pedagogical knowledge by researchers. It attempts to describe the complexities that makeup teacher expertise. The model asserts that teacher expertise has four components that, while they operate in concert with one another, they do not necessarily develop at the same rate. Shulman (1987) defines the four central components of PCK as,

1. overarching concepts of teaching,
2. understandings of student learning,
3. content-specific knowledge, and
4. knowledge of instructional practices specific to the content.

This model of teacher expertise is a departure from the *technical skills* model described by Kennedy (1987) that asserts expertise is tied to a set of defined skills and practices. It also differs from the current content knowledge expertise models that relate quality teaching to academic understanding of the content area. Shulman (1987) describes PCK as “that special amalgam of content and pedagogy that is uniquely the province of teachers, their own special form of professional understanding” (p. 8). Shulman does not suggest that teacher expertise is any different than the expertise in other professions. More general expertise models tend to describe expertise as domain-specific knowledge or ways of thinking that are developed over long-term experience within a defined field (Bromme, 1995; Chi, 1993; Chi et al., 1988; Glaser, 1985b).

The implication that expertise develops as a result of experience suggests that a crucial component of expertise development is explicit reflection on one’s own practice and experiences. Shulman (1987) states that reflection “is what a teacher does when he or she looks back at the teaching and learning that has occurred, and

reconstructs, reenacts, and/or recaptures the events, the emotions, and the accomplishments. It is that set of processes through which a professional learns from experience” (p. 19).

As we have seen, there are various models and definitions of expertise, and teacher education programs have attempted to apply various models to the development of teachers as experts (Kennedy, 1987). All of these expertise models link the development of expertise to some kind of tangible experience. For example the “technical skills model” defines expertise as the ability to apply a learned set of skills and the “deliberate action model” defines expertise as the ability to analyze situation occurrences in the context of action, or to be able to *think on your feet*. Berliner (1994) estimates the attainment of teaching expertise at about six years of teaching experience. This observation is consistent with other studies. So is the development of expertise tied to time and the amount of experience one has with classroom situations, or can it be enhanced by other experiences outside the classroom? And what role does reflection play in the development of expertise along this timeline?

A View of Becoming a Teacher

The goal of teacher education, and the teaching profession in general, is to move professionals along the teacher continuum – transforming novice teachers into expert teachers as they gain experience and expertise in the classroom. Expertise is described as a domain specific (Glaser, 1985a) set of skills, practices, and knowledge

that an expert uses effortlessly and appropriately (Berliner, 1994; Smith & Tiberius, 2002). Researchers from many professions, e.g. accounting, law and medicine have studied the attainment and development of expertise, in an effort to further professional growth in these fields. But one profession noticeably lacking in this research is teaching (Berliner, 1988, 1994).

The concept of *becoming a teacher* has many implications for teacher education and new teacher development. Depending on one's view of this process, the way teacher training is enacted will vary. No matter what one's view is of the process, there are some common threads that bind the process together and guide how new teachers are indoctrinated into the teaching profession.

The path to designing and implementing teacher training begins with the overarching view of teaching as a profession – the continuum. The idea of a continuum connects all the various phases of developing as a professional in a connected, coherent set of processes. Historically teaching was viewed as a vocational activity, as evident by the establishment of Normal Schools for the education of prospective teachers in the early 1800's. In the 21st century, the view of teaching as a continuum is catching on slowly. Teacher education programs across the U.S. are exploring the nature of teacher expertise and how that expertise can best be developed. Professional activities and supports are then put into place to scaffold the new teachers as they progress from novice to expert in teaching.

In order to make sense of teacher development, we must view teaching as a continuous system of change; a continuum of practice. Currently there are several

views of the teaching continuum. Each takes a different perspective on the phases, resulting in a different view of the process. As the National Board for Standards in the Teaching Profession began its certification of expert teachers in the late 1980's, the teacher continuum took on an institutional perspective. The steps to becoming an expert teacher were closely aligned with institutions and certifications given by those institutions.

The process, in this *institutional view* of the continuum, begins with preliminary certification by universities and schools of education. New teachers then enter induction programs sponsored by local school districts. These programs are designed to provide a systematic structure of support for beginning teachers. Then as teachers become pedagogical experts, they receive their final certification from the NBSTP organization.

An alternative perspective shifts the teacher continuum from institutionally bound certification steps to a *process perspective* driven by activities and practices (Feiman-Nemser, 2001a, 2001b; Feiman-Nemser *et al.*, 1999). This view relies on the individual teacher progressing in expertise through the activities they pursue as they grow in professional skill and knowledge. The new teacher begins with reflection on teaching while in a teacher education program. They progress in examining their own practice within the scaffolded processes of an induction program. Then they engage in professional growth activities within a community of practice having critical conversations about classroom experimentation situated in the everyday task of teaching (Feiman-Nemser, 2001a). In this view of teaching, the process is a coherent

set of professional growth practices that retain similar features throughout the continuum, but steadily increase in complexity.

Attempts to define teacher expertise often have shortcomings in describing the richness and complexity of teaching (Kennedy, 1987). Kennedy states that despite efforts to define and describe teacher expertise that there has been “very little research on the nature of professional expertise or on the implications ... for its acquisition” (Kennedy, 1987, p. 27).

Berliner points out the difficulty inherent in any expertise study due to the time required to *reach* expertise - about 10,000 hours of teaching experience (Berliner, 1994). Despite this drawback, there have been some significant studies that compare the characteristics and differences between the various levels of expertise (Kennedy, 1987).

When we compare experienced teachers with novice teachers, one of the differences is that veteran teachers notice things that novice teachers do not. Experienced teachers are able to identify and select important noteworthy classroom situations, make connections between their classroom interactions and the broader concepts of teaching and learning, and use what they know about the context of the classroom to offer solutions (Sabers & Cushing, 1991; van Es & Sherin, 2002). Experienced teachers are therefore able to view the entire classroom, determine where to focus their attention, and adjust the flow of the lesson to keep their students engaged and learning. They have developed the skills to *notice* and interpret classroom interactions (van Es & Sherin, 2002). Novice teachers need opportunities to practice

noticing important classroom events by observing and reflecting upon and discussing their observations with peers and experts. (Sabers & Cushing, 1991; van Es & Sherin, 2002).

“[E]ducators must define expertise, define the relationship between codified knowledge and experiences in the formation of expertise, and determine the appropriate type and scope of transitional experiences” (Kennedy, 1987, p. 27).

Current research seems to indicate the need to provide new teachers with authentic classrooms practice within the well-structured, scaffolded environment to analyze those experiences and make links between the realities of teaching and the theories about learning (Berliner, 1988; Britzman, 2003; Cattani, 2002; Darling-Hammond, 1985; Hiebert *et al.*, 2002; Kennedy, 1987; WestEd, 2000).

Shulman (1987) has suggested an alternative model of expertise that accounts for both content specific knowledge and pedagogical knowledge. The model has been called Pedagogical Content Knowledge (PCK) or content-specific pedagogical knowledge by researchers. It attempts to describe the complexities that makeup teacher expertise. The model asserts that teacher expertise has four components that, while they operate in concert with one another, they do not necessarily develop at the same rate. Shulman (1987) defines the four central components of PCK as,

1. overarching concepts of teaching,
2. understandings of student learning,
3. content-specific knowledge,
4. and knowledge of instructional practices specific to the content.

It also differs from the current content knowledge expertise models that relate quality teaching merely to academic understanding of the content area. Shulman

(1987) describes PCK as “that special amalgam of content and pedagogy that is uniquely the province of teachers, their own special form of professional understanding” (p. 8). It does not seem that Shulman is suggesting that teacher expertise is any different than the expertise in other professions. More general expertise models tend to describe expertise as domain-specific knowledge or ways of thinking that are developed over long-term experience within a defined field (Bromme, 1995; Chi, 1993; Chi et al., 1988; Glaser, 1985b).

The implication suggested by Shulman that expertise develops as a result of experience suggests that a crucial component of expertise development is explicit reflection on one’s own practice and experiences. Shulman (1987) states that reflection “is what a teacher does when he or she looks back at the teaching and learning that has occurred, and reconstructs, reenacts, and/or recaptures the events, the emotions, and the accomplishments. It is that set of processes through which a professional learns from experience” (p. 19).

As we have seen, there are various models and definitions of expertise, and teacher education programs have attempted to apply various models to the development of teachers as experts (Kennedy, 1987). All of these expertise models link the development of expertise to some kind of tangible experience. The challenge to those involved with new teacher development is to provide these opportunities as well as coordinating those opportunities across the continuum of teacher development.

Teacher Assessment

Teacher testing has been a topic of debate for many years. Political pressures for the competency measurements of both teachers and students have been on the rise. This measurement typically takes one of two forms; the paper-and-pencil test or a performance assessment. Paper-and-pencil tests seem to show very little about a teacher's ability to teach but do seem to be linked with a teacher's academic ability (Latham *et al.*, 2005). These tests also do not seem to be linked with performance as a teacher or with student achievement (Miles & Lee, 2002). Paper-and-pencil tests are easy to score and cost effective. Performance tests, on the other hand, may be able to measure a teacher's ability, but they are expensive and time consuming to score. However, in spite of the demands required by the administration of performance tests, many institutions, states, and countries has begun to adopt this evaluation method over the traditional paper-and-pencil evaluations of teacher competency. Connecticut and California have begun to implement performance assessment instruments for both preservice and continuing service teachers while others states participate in the Interstate New Teacher Assessment and Support Consortium (INTASC) consisting of thirty-seven states using a portfolio assessment system (Peccheone *et al.*, 2005).

Measuring teacher competence in a performance tests seems to be a major hurdle in the development and implementation of these evaluation instruments. Miles (2002) points out that "the primary argument against teacher testing...was that it was difficult, if not impossible, to achieve consensus on a definition of teacher competency" (p. 9). "Competence seems so simple when viewed from afar, and so

complex when analyzed in detail” (Piper & Houston, 1980, p. 38). So where can we find explicit, well defined competencies for preservice teachers?

Teacher preparation professionals have been developing better assessment tools that measure subject matter content knowledge, pedagogy knowledge, and the ability to apply both in real classroom situations (Latham *et al.*, 2005). In 1998, California Assembly Bill 2042 established the Teacher Performance Expectations (TPE) consisting of six domain areas of teacher competency and approximately 150 identifiable skills within those domains (see Appendix D). These TPE’s were adapted from the previously existing California Standards for the Teaching Profession (CSTP) that also contains six domain areas and approximately 300 skills. Galluzzo (2005) suggests a way to visualize such standards as a tool in teacher development. “Imagine the simple tool, the wedge. There is a pointed tip at one end, and it is much wider at the other end. Picture the wedge as a tool to be used” (Galluzzo, 2005, p. 143) to bring about educational change. Galluzzo’s model describes the NBPTS’s core propositions and standards as the tip of the wedge. Further back, as the wedge widens, he describes assessment and professional development. A common set of standards could provide the focus needed to bring about change, reform, and renewal. The assessment and growth of new teachers should grow from these standards and expectations.

At the heart of effective teacher assessment, there must be a balance between external evaluation of teacher competence and internal reflective evaluation of one’s own teaching practice. Performance assessments must provide new teachers with

feedback from their peers, develop self-assessment techniques, and use expert evaluation to guide new teacher growth (Latham et al., 2005).

Reflection

It is believed that reflective practice is a vital component in progressing from novice to expert (Adler, 1990; Bauer, 1991; Feiman-Nemser, 2001a; Ferraro, 2000; Schön, 1987; Van Manen, 1999). New teachers need to examine and re-examine the classroom events to analyze the effects their actions had on student learning. Schön calls this the *artistry of good teaching* (Schön, 1989). As novice teachers gain expertise in their own teaching practice, they engage in this reflective practice and develop new understandings about teaching and learning (Campoy & Radcliffe, 2002; Clark, 2001; Danielewicz & NetLibrary Inc., 2001; Danielewicz, 1998; Feiman-Nemser, 2001b; Freese, 1999). Schön (1987) describes the lineage of these ideas as coming from Dewey, Schultz, Vygotsky, and Piaget's work on reflection and personal growth.

Various models of reflection have been discussed in the research. Schön (1987) describes three phases of reflection, which can be mapped onto the teacher development continuum:

1. Reflection-on-practice; when new teachers examine classroom actions and decisions after the fact,
2. Reflection-in-practice; comes as teachers begin to view the classroom environment and make teaching decisions in the moment,
3. Knowing-in-action; comes as the experienced teacher relies upon a repertoire of images, instances, and experiences that can be drawn upon and used to make decisions without much conscious reflection (tacit knowledge).

Schön's three stages of reflection represent an increase in complexity as the teacher gains expertise. The teacher moves along a continuum of being able to step-back and reflect on their teaching, to making those conscious decisions while teaching, to gaining the tacit knowledge of an expert teacher. These phases of reflection have formed the foundational concepts for many teacher education programs that design reflective practice experiences for student teachers.

As Schön (1983) describes reflection as a social process that is embedded in practice, two important ideas converge. The first idea comes from the Vygotskian theory of learning and social interaction. Vygotsky proposed that learning is scaffolded within a zone of proximal development (ZPD), the gap between what an individual can accomplish independently and what he or she can accomplish with the help of a more competent other (Moll, 1990). This concept of learning within a social context is furthered by the idea of "communities of practice". Participants develop knowledge within a structured social framework (Lave & Wenger, 1991; McLellan, 1996) as members of a community that works together to understand and develop knowledge in a specific domain (Eden, 2002). Knowledge development within a community of practice supports the development of expertise in novice teachers as a domain specific skill (Chi et al., 1988). It also may support the development of their teaching identity.

Van Manen (1999) states that the trend of reflective practice in teacher education is a "case of reflectivity [that] has been made rather unreflectively" (p. 6). Van Manen's argument with Schön's levels of reflection seems to do with the

reflection-in-practice phase. “The attractive, but problematic claim is that action, and reflection on this action, can be simultaneous” (Van Manen, 1999).

[On] the one hand, the theory of reflective practice seems to overestimate the possibility of introspective "reflection on action while acting" (van Manen 1994, 1995). Phenomenologically it is very difficult, if not impossible, for teachers to be [immersed] in interactive or dialogic activities with their students while simultaneously stepping back from the activity. On the other hand, the theory of reflective practice seems to underestimate the complexity of the organization of ordinary teaching practices, and the incredible intricacies of practical actions in teaching-learning situations. [It] may be this noncognitive dimension of practice that continually challenges us in our efforts to provide for quality teacher education or teacher professional development. (Van Manen, 1999)

Van Manen (1977) also defines three levels of reflection:

1. Level one: *technical rationality* involves the teacher applying the knowledge and principles of teaching,
2. Level two: *practical action* is the phase when a teacher can analyze both teacher and student behaviors,
3. Level three: *critical reflection* is when the worth of the knowledge and the social circumstances of the classroom can be considered.

Van Manen’s three levels of reflection also represent an increase in the complexity of reflective practice as the teacher gains expertise. However it differs from Schön’s model in that Van Manen allows the focus of the reflection to change over time. Both models of reflection, Schön’s and Van Manen’s, can be viewed as describing the reflective process from different perspectives. Schön’s model of reflection can be related to the context in which the reflection occurs. The reflective process progresses from being able to consider one’s teaching actions after the experience, to deliberately considering teaching choices during the experience, and finally attaining the tacit teaching knowledge of an expert teacher. Van Manen’s

model of reflection can be considered as specific levels of reflection that can occur in increasingly complex contexts. In Van Manen's view, the reflective process progresses from focusing on the planning and evaluation of those plans, to being able to consider student learning and behavior in response to those plans, to situating the learning experience into the larger sociocultural context of teaching.

Reflection has been described as a marker of professional growth (Berliner, 1988; Chi *et al.*, 1994; Dreyfus, 2004; Feiman-Nemser, 2003; Schön, 1991; Van Manen, 1999). The kind of reflection one uses can indicate progression of growth and complexity of professional vision. Two basic categories of reflection are often described as reflection type and reflective focus. Reflection type is the *voice* used for the reflection. It describes the thought process that is being used to explore the issues and experiences. This study categorized the type of reflection as descriptive reflection, dialogic reflection, and reflective critique. Reflective focus is the perspective taken by the participant. The actions, situations, and occurrences become the focus of analysis. This study described the reflective focus as having a technical perspective, a practical perspective, or a critical perspective. Together, reflection-type and reflection-focus make up a cohesive unit of reflection that contains both a purpose and a point of view.

As a preservice teacher gains in both expertise and experience, these researchers propose that they will move through the levels of reflection that represent increasing complexity. One characterization of this hierarchy of complexity begins with *descriptive* reflection, followed by *dialogic* reflection and culminating with reflective *critique* (Berliner, 1988). The focus of reflection offers another hierarchical

progression of complexity, beginning with *technical* perspective, followed by *practical* perspective, and culminating with *critical* perspective (Van Manen, 1991, 1999).

Lastly, Hatton (1995) describes four levels of reflection among preservice teachers when writing about their own practice. Hatton & Smiths four levels are: *descriptive writing* (containing descriptions and reports of events), *descriptive reflection* (expressing some reasons or justifications for the events that are being reported), *dialogic reflection* (demonstrating a ‘stepping back’ from the events and the able to explore other alternatives exploring the events in a dialogue with themselves), and *critical reflection* (considering the events within the broader historical and socio-political contexts). He claims that these stages represent an increasing level of complexity and reflective practice. The characteristics of these levels are described in more detail in Appendix B.

Reflection, Expertise and Implications for Teacher Education

Much of the literature on reflective practice suggests that reflectivity leads to professional growth and expertise, and some researchers even argue that the attainment of expertise is not possible without reflection (Allen & Casbergue, 2000). However, the literature leaves unanswered some important questions about the specific relationship between reflection and expertise. We must consider if reflection is a critical component to the *development* of expertise or if it is a *byproduct* of increasing levels of expertise. There are also some questions as to whether or not

novices possess the ability to effectively reflect on their own actions. And finally we must consider if the attainment of expertise can be supported or accelerated through reflective practice or if the development of expertise bound by a fixed timeline of experience, say 10,000 hours of classroom teaching.

Reflective practice in education seems to have emerged in response to a shift from the technical skill view of teaching to the deliberate action view of teaching as a profession (Kennedy, 1987). This view comes into serious question when we consider the actual reflective practices of novice teachers. During preservice and early teaching, it seems that teachers tend to focus on their own classroom actions and the technical aspects of the lesson (Allen & Casbergue, 2000; Van Manen, 1999). Hatton (1995) reports the difficulties in moving preservice teachers beyond basic levels of reflection, even when that was the aim of the teacher education activity. And further examination of preservice teacher's recall accuracy points to some potential problems in the use of reflective practice with this group. Allen (2000) reports that the reflection of novice teachers "lacked accurate/thorough recall of their own and their students' specific classroom behaviors" (p. 742).

To compound the problem of accurate and thorough recall, it has also been noted that novice teachers often have selective recall ability when the classroom activities seemed to be unpleasant occurrences that cast them in seemingly unfavorable light (Allen, 1998; Allen & Casbergue, 2000; Hatton & Smith, 1995). Van Manen (1999) describes the *slippery* nature of teaching as a practice that is "not

directly accessible, observable, measurable, definable, [but rather, it is] hidden, tacit, often linguistically inexpressible” (p. 16).

Taking into account the research findings that novice teachers often have faulty recall (Allen & Casbergue, 2000) of their own classroom practice and that the development of expertise is closely tied to experience over time (Berliner, 1988), we need to consider how to overcome these hurdles in order to support the professional growth of novice teachers.

Digital video may provide a tool for overcoming both of these hurdles. A video record of classroom interactions would minimize the effects of poor novice teacher recall and it would allow the novice to experience classroom interactions multiple times, learning more from the experience after each viewing. By removing these two obstacles we may be able to determine if the reflective practices of novice teachers can move beyond basic levels and if the timeline for the development of expertise is indeed fixed or if it can be shortened or accelerated.

Teacher Development and Adult Learning

To further understand the professional development of teachers we must focus on adult learning theory. The theories of adult learning are wide ranging and rely on different models of learning in general to describe adult learning. Most learning theories are focused on children and the learning in a school context. Attempts to describe adult learning often attempt to use the developmental models of childhood learning (Barton & Tusting, 2003). Early attempts at defining adult learning suggested

that the developmental stages described by Piaget extended longer into early adulthood while other models suggested additional stages into Piaget's model to account for adult learning (Merriam & Caffarella, 1991).

In reaction to the child-based learning theory came the development of andragogy as a contrast to pedagogy (Barton & Tusting, 2003). These views typically follow on of four views of learning; behaviorists, cognitivists, humanists, or social learning. Each of these theories focuses on the differences of motivation in adult learning. These various models can be generally divided along two lines. Learning is viewed as either a process that occurs within the individual or as a socially situated phenomenon (Barton & Tusting, 2003).

Dreyfus (Berliner, 1988; Dreyfus, 2004) describes adult learning as skill acquisition that can be describes as having five stages. These stages move from novice, advanced beginner, competent, proficient, and expert. The novice stage is characterized by the development of rules for determining actions based on context-free features. The advanced beginner starts to develop an understanding of how relevant context interact with these rules for action. The competent stage sees the learner beginning to devise plans and take on various perspectives as they gain through instruction and experience. The learner is better able to choose from the many learned rules to that are appropriate for the specific situation (Dreyfus, 2004). As the learner moves to the proficient stage the reliance on rules is replaced by situational discriminations to guide practice. Dreyfus (2004) claims that proficiency can only develop if "experience is assimilated in this embodied, a theoretical way" (p. 179).

The expert stage is characterized by more subtle discriminations in the chosen course of action in each situation. Tennant (1995), however, warns against teaching expertise, stating that novice-type behavior may be a key component to the development of expertise.

As described in a research review of models in adult learning (Barton & Tusting, 2003), the authors find several key features that characterize adult learning across the various models. These features include:

1. Learners build on their prior knowledge and experiences.
2. Adults can benefit from reflection about their own learning process.
3. People learn by engaging in practice.
4. Adults reflect and build upon their experiences.
5. Reflective learning is unique to each person.

From the adult learning features cited above, it would seem that reflection has a prominent, central role in adult learning (Barton & Tusting, 2003; Bauer, 1991; Brookfield, 2002). It suggests that reflection is how adults make sense out of their experiences and grow in knowledge or expertise in a particular area. It is also suggested by many researchers that adult learning cannot be separated from context (Barton & Tusting, 2003; Brookfield, 2002; Coben *et al.*, 2002).

While many adult learning theorists describe the process as a progression through stages (Barton & Tusting, 2003; Baxter Magolda, 1992; King & Kitchener, 1994; Merriam & Caffarella, 1991), ranging from absolute, context-free theories, to a stage of relativism, to a final stage of contextual knowledge, some critics resist this linear path toward knowledge. They cite the many situations in which adults learn and the various outcomes. Many suggest that fixed phases and stages often ascribed to

adult learning do not acknowledge the features of the adult learner. They suggest that adult educators must recognize the multiple and non-linear paths through which adults pass to gain knowledge and expertise (Tennant & Pogson, 1995).

Video As A Transformational Tool

Analyzing video recorded events has become an important professional development tool in many fields. Video contains a rich source of information that has been effectively exploited by researchers and teachers, but video analysis also involves significant time commitments and thoughtful methodological decisions. Digital video equipment has become much more affordable and digital video editing software is inexpensive and easy to use. Broadband Internet access – the type that is required to deliver digital video streams to others across a network – has become widespread in many communities. Even so, the promise of video as a data source has not yet been fully realized. Because of the accessibility of equipment and the ease of editing, there has been a rush to use digital video as a tool in the classroom without the benefit of guidance and research on whether or not it is effective (Pea, 2002).

While digital video equipment and broadband access are relatively inexpensive, finances may still prove to be a hurdle for the novice teacher. They are low on the salary scale so unless the school provides video equipment and computers capable of storing and editing digital video, this technology will likely be too expensive for new teachers. Since broadband access is generally several times the cost of dial-up access, new teachers may also not be able to broadband access at home. Also, new

teacher are frequently assigned to low performing, urban schools that may face the similar economic hurdles in obtaining equipment and broadband access.

One advantage of video is that it provides a permanent record of the rich interactions in a classroom. It preserves a visual and audio record to help make sense of those interactions. It does not rely on the memory or interpretation of notes from an outside observer as the sole basis for reconstructing interactions of interest. However, video does suffer from the problem of perspective (Goldman-Segall, 1998). The visual record captured on video is from the perspective of the videographer. The classroom interactions that were of interest to the videographer become the focus of the camera and the peripheral view of other classroom interactions is lost. On the other hand, if the camera is stationary and positioned to view a wide sweep of the classroom, it preserves student interactions, but at the expense of capturing interaction details among sub-groups within the scene.

Video also offers the novice teachers a new perspective on their own teaching practice. The novice teacher, who is a participant in the classroom interactions, has an understanding of the context of those interactions. Video allows the novice teacher to revisit the classroom interaction multiple times from different perspectives in order to make more refined decisions about future teaching and learning in the classroom. This process of incremental review and reflection on their own classroom practice may serve to magnify the experience (Crismond, 2003; McCurry, 2000; Sherin, 2000, 2002; Spurgeon & Bowen, 2002; Stigler *et al.*, 1999; Tomlinson, 1999; van Es & Sherin, 2002). It allows the novice to engage in reflection-on-teaching away from the

demands and pace of the actual classroom practice (Schön , 1987). However, novice teachers may be reluctant to allow video recording of their lessons, viewing the "unblinking eye" of the camera as a potential source of embarrassment since it records every decision and interaction.

The use of video supports three premises of developing expert classroom practice in novice teachers. It helps new teachers develop the ability to identify what is important in the teaching situation, allows novices to make connections between classroom decisions and their actions within the broader concepts of teaching and learning, and allows novices to use their knowledge of the context of the classroom to make observations that would not otherwise be possible by the casual observer (Sherin, 2002).

To test this premise, a group of new teachers participated in a project called Video Club, sponsored through the Education Department of Northwestern University in 2001. As these teachers engaged in the review and analysis of their own classroom practice through video, five changes occurred in their commentaries (Sherin, 2002):

1. Attention shifts from teacher actions to student thinking
2. The range of events noticed and discussed changes
3. Analysis becomes organized around specific events
4. Comments become more interpretive rather than evaluative
5. Interpretations are based on evidence from video rather than beliefs about what happened.

Experts in the Digital Video Inquiry (DVI) field are attempting to guide and create organized toolsets for an expanding group of educators (Pea, 2002).

Although the hurdles to using digital video with novice teachers may seem daunting, this does not mean that it is not a worthwhile endeavor. Schön (1987)

describes the problems of greatest human concern as “the swampy lowlands of professional practice, often defying technical solutions”. Classroom interactions and the use of video data both lie in this *swampy* lowland of research. This terrain may be difficult to navigate, but important to understand.

Research Design and Methodology

Research Questions

The Reflective Lens study focused on three questions:

1. How do Intern teachers use reflection to describe their own practice?
2. How does Intern teacher reflective ability change with the use of video recordings of his or her own classroom teaching as the object of reflection?
3. Is there a relationship between the application of reflective skills and teaching expertise as measured by PACT?

Research Design and Methodological Approaches

The present study utilized a series of written reflective essays completed at different intervals during the professional development of the participating preservice Intern teachers as well as performance assessment data administered as part of the capstone event in the credentialing process to better understand the relationship between reflection and expertise development. Questionnaires were administered to the participants near the completion of their credential program. Data collected from the written reflective essays were used to help reveal the type of reflective writing, the focus of the reflections, and changes in these features over time. The scores from the performance assessment were analyzed to uncover any relationships between the various measures, such as lesson planning, classroom instruction, student assessment, and reflection on practice.

One feature of this study is the use of video evidence of classroom teaching as an object of reflection. The Intern teachers engaged in a series of lesson reflections.

Some of these reflections were aided by the use of video taken of the lesson. Other lessons relied entirely on the recall ability of the Intern teacher. The protocol used was able to inform the use of video as a tool to build expertise and professional vision in new teachers. As seen in previous studies, the recall of new teachers about classroom events is faulty, inaccurate, and limited (Allen, 1998; Allen & Casbergue, 2000) while other studies point to the benefits of video in new teacher development (Beck *et al.*, 2002b; Capraro *et al.*, 2001; Copeland & Decker, 1996; McIntyre & Pape, 1993; Sherin, 2000, 2002). These studies did not look at comparable groups in a series of reflections either using video evidence or relying on the teacher's recall of classroom events. This study examined the progression of reflection under specific conditions.

Participants

There were 34 participants in the 2004-05 and 33 participants in the 2005-06 cohort preservice Intern teachers for a total of 67 participants in the study. These preservice teachers are working towards their teaching credential as well as a Master's of Education at a large Southern California university. Preliminary pilot data was obtained from the 2004-2005 cohort participants. Study data was obtained from the 2005-2006 cohort participants. Each cohort includes preservice Single Subject Credential Intern teachers pursuing their preliminary teaching credentials in English Language Arts, Science, or Mathematics. Each cohort participates in a 15-month program designed to provide the Intern teachers with authentic, yearlong classroom experiences and opportunities to develop their teaching expertise.

The Intern teachers in this cohort represent a variety of backgrounds and experiences shared by many potential teachers. Some of the Interns were recent undergraduates and some are career changers from other professions. Some of the Intern teachers are native English speakers while others learned English in school. No significant differences in teaching performance were found between gender, age, classroom assignment, content specialty, ethnic subgroups of novice teachers taking the PACT portfolio-based assessment in California (Pecheone & Chung, 2006). Specifically, the technical report states;

To test for fairness across these demographic indicators, an ANOVA or t-test methodology was used. For the 2003-04 pilot, there were no significant differences in scores by race/ethnicity of candidates, percent of ELL students in candidates' classrooms, grade level taught (elementary versus secondary), academic achievement level of candidates' students, and months of previous paid teaching experience. There were significant differences between male and female candidates (with females scoring higher) and between candidates teaching in schools in different socio-economic contexts (with candidates in suburban schools scoring higher than those in urban or inner-city schools). (Pecheone & Chung, 2006, p. 5)

The only measurable variation on the PACT assessment was between native and non-native English speakers, which may be due, in part, to the reliance on written evidence when scoring PACT Teaching Events.

Intern teachers participated in a teacher education program that included frequent opportunities for reflective practice. Also, as a cohort-based program of study, the group of Intern teachers shared many common experiences and assignments that focused on the review, reflection, and discussion of their professional growth.

Interns were hired in a variety of content-course teaching assignments at grade levels 6-12. Some taught sheltered English Language Learner courses, others taught remedial classes and others taught advanced placement classes. The schools were located in suburban or urban schools and included large comprehensive secondary schools, small school-within-a-school settings, and charter schools.

Measures

The data collected for this study included written reflections by the Intern teachers, questionnaires about their own professional growth, and PACT results. . Table 1 gives the data collection timeline.

The written reflections consisted of a series of assignments where each Intern teacher analyzed and reflected on an individual lesson he or she had planned and implemented. The writing sample demonstrated by the experiences Interns chose to describe what they valued in their practice, as well as the content and focus of the reflection narrative itself.

Table 1: Data collection timeline

Participants	Data			
2004-2005 Pilot data Intern cohort	<i>Fall (Sep)</i> <i>No data collected</i>	<i>Fall (Oct-Nov)</i> Reflective Lesson: single lesson plan with video	<i>Fall (Dec)</i> Video Paper Reflection: collection of video clips	<i>Winter QTR</i> Questionnaire / Focus Group Interview PACT Scores: Pedagogy and Reflective component
2005-2006 Study data Intern cohort	<i>Fall (Sep)</i> Reflective Lesson: single lesson plan. <i>Two randomly assigned groups. One group will use video and the other will not use video.</i>	<i>Fall (Oct-Nov)</i> Reflective Lesson: single lesson plan. <i>The two groups from previous Reflective Lesson will change roles.</i>	<i>Fall (Dec)</i> Reflective Lesson: single lesson plan. <i>All participants will use video</i>	<i>Winter QTR</i> Questionnaire / Focus Group Interview PACT Scores: Pedagogy and Reflective component

The PACT assessment contained five measures of new teacher proficiency. It examined planning ability, instruction, analysis of student assessment, reflection of their practice, and the development of student academic language. Through a combination of writing prompts and classroom artifacts, the PACT Teaching Event documents 5-6 hours of teaching practice, typically about one week of lessons. The PACT Teaching Event has been administered for the past three years to about 700 preservice teachers each year at a dozen or more institutions throughout California.

The questionnaire and interview data were used to gain insights into the thought processes, beliefs, and struggles of the Intern teachers throughout their development as a new teacher

Data Collection Procedures

Study groups. The data was collected from two consecutive Intern cohorts. Analysis of the pilot data from the 2004-2005 cohort group was used to guide the final design of the data collection procedures during the following year. Preliminary coding and analysis of the pilot-group reflections provided valuable information to shape the analysis plan for the following year. Also, the questionnaire and interview questions were field tested with the pilot group and refined for use with the 2005-2006 Intern cohort, the primary participants in the Reflect Lens study.

The PACT Teaching Event is a statewide “capstone”, or culminating, assessment given by all participating teacher credentialing institutions, such as local school district Intern programs. PACT procedures were mostly consistent for the pilot and study groups, with only minor changes in some teaching event prompts and the associated scoring rubric. The PACT outcomes for the pilot and study groups were also compared to the statewide results.

Reflective writing samples (pilot group). Throughout a year-long seminar, the pilot-group Interns were required to engage in various reflective-practice exercises that focused on their own teaching. Much of this reflection was facilitated with video recordings of their own practice in the classroom. This study examined various reflective writing exercises that occur at incremental points in the credential program.

These reflective writing exercises were normal components of the coursework. The pilot-group Interns were given access to DIVER, a newly developed video analysis tool, and *Video Paper Builder*, a tool that facilitates the integration of written

reflections and digital video clips. A small subgroup of the pilot-group Interns chose to use this tool for their video reflections.

Pilot-group reflective writing data came from two different writing activities. Before the assignment, the Interns received guided instruction and practice on reflective writing about schools, teaching in general, and their own lesson planning. The first reflection exercise occurred within the first two months in the program. The Interns were asked to design a detailed lesson plan using a common template, video the lesson implementation, review the video shortly after teaching the lesson, and then annotate various parts of the lesson plan with their reflections. The second reflection exercise occurred midway through the academic year, typically in December. The Interns were asked to create a collection of video clips of their teaching and described how these images reflected their development of teaching expertise.

The analysis of these reflective writing samples occurred after grades for the courses had been posted. The analysis of the pilot data helped to establish stable procedures and coding routines that were used the following year with the study group.

Reflective writing samples (study group). The study-group Intern teachers were also required to engage in several reflective writing exercises throughout the credential program. The procedures used in these exercises were adjusted to accommodate what was learned during the pilot year. A cycle of three reflective writing activities were implemented that systematically introducing video-recorded

lessons as the object of reflection. Interns were randomly assigned to two groups who completed the same three writing activities, but in different orders.

The study reflective writing data came from three writing activities. These Reflective Lesson Plan (RLP) writing activities occurred early in the development of the Intern teacher's practice. The first RLP occurred in September. The cohort participants were randomly assigned to one of two groups. The first group created a classroom lesson plan, taught this lesson, and then reflected on the lesson implementation, their teaching role, and the student learning using a reflective writing guide (See Appendix E). This group did not video record the lesson, but relied on their recall and perceptions of the classroom experience. The second group engaged in the same planning procedures, but they video recorded the class lesson and used the video as their object of reflection.

In the second reflective lesson plan cycle was similar to the first except that participants changed roles. The group that did not video record their implementation in the first activity now video recorded the lesson and used it as the object of reflection and the group that previously used video had to rely on their memory of the lesson.

In the third iteration of the reflective lesson activity all participants used video of the lesson as their object of reflection.

Intern teacher expertise measures. With the passage of Assembly Bill 2042 by the California State Legislature, teacher credential institutions were required to administer a culminating Teacher Performance Assessment (TPA). Later this requirement was put on hold pending the allocation of sufficient funding to support the

implement of this requirement in all California institutions that offer teaching credentials. Senator Scott has recently introduced bill that, if passed, will reinstate the TPA requirement by 2008. The Performance Assessment for California Teachers (PACT) is one TPA-model developed by a consortium of private and public universities. The PACT Teaching Event is intended to be a capstone authentic performance assessment to measure a preservice teacher's capabilities in planning, instruction, assessment, and reflection, as well as their support of academic language use by their students. The PACT Consortium views the design of the PACT Teaching Event as measuring how well the preservice teacher candidate integrates their knowledge of content, student needs, and instructional context when planning their teaching as how well they are able to analyze these skills through written self-reflection (Pecheone & Chung, 2004; Pecheone *et al.*, 2005). The Teaching Event is divided into five different tasks, four of which are scored, that require the preservice teacher to collect evidence from their actual classroom teaching and to reflect on the experience through a series of guiding questions. The scoring process used for the PACT Teaching Event includes systematic training of scorers through benchmarks, calibration training, and score audit procedures. Trained scorers assess the PACT Teaching Event with an eleven-item rubric. The rubric has both common criteria items as well as content specific criteria items.

Multiple scorers assessed some participant's PACT Teaching Event. This multiple scoring occurs for a variety of reasons, such as trainer benchmarking, scorer calibration, and to check for scorer drift. In the cases where multiple scores appeared

for an individual participant, the result from the scorer with the most training was used in this study. This choice has been made to ensure the most reliable data possible for analysis.

The PACT consortium has conducted independent validity and reliability studies separate from this study. Their work found the PACT Teaching Event to be both reliable and valid in the assessment of preservice teacher skills in the domains of planning, instruction, assessment, and reflection with little differences across gender, grade level, and content area boundaries (Pecheone & Chung, 2004). The 2005-06 Intern Teacher cohort is the fourth statewide group using the PACT Teaching Event.

PACT scores were used as a measure of Intern teaching Expertise. PACT has five subtasks, Task 1 (Context of Learning), Task 2 (Planning), Task 3 (Instruction), Task 4 (Assessment) and Task 5 (Reflection). Table 2 outlines each Teaching Event tasks as described in the PACT Technical Report. Task 1 is not scored in the PACT Teaching Event and is included by the candidate to provide a brief overview of important features of the classroom, school site, or school district that may influence teaching decisions made during the PACT teaching Event.

Table 2: Description of PACT Teaching Event tasks (Pecheone & Chung, 2006)

<i>Task 2 (Planning Curriculum, Assessment, and Instruction)</i>	<p>Teacher candidates begin by describing the instructional context in which they will be teaching the learning segment for the Teaching Event. In order for raters to understand their teaching decisions, candidates are asked to write a commentary of about two pages that describes the describe key characteristics of the class that affect the planning and teaching of the learning segment, such as characteristics of students in the class, the curriculum, and instructional context, including any constraints on their teaching. Candidates also complete an instructional context form in which they report the number of students in the class, the grade level of the class or any specialized features, the number of special needs and English learners, the title of the textbook used (if any), and the number of available computers in the class and school. Candidates then provide an overview of their planned learning segment spanning 3-5 days of instruction, lesson plans for each lessons, assignments and other instructional materials for the learning segment.</p>
<i>Task 3 (Implementing Instruction)</i>	<p>Candidates video one or more of their lessons from the learning segment, select up to two 10-20 minute clips of the video (based on criteria set for each content area) and write a commentary on the unedited video clip(s) they have selected. In their commentary, candidates describe the context of the video clip (what happened before and after the clip); routines or working structures seen in the clip and how students were prepared for these routines; the ways in which the candidate engaged students with the lesson content; strategies used to address specific individual learning needs; and any language supports provided to students to understand the content or academic language.</p>
<i>Task 4 (Assessing Student Learning)</i>	<p>Candidates collect and analyze student work from the learning segment. In the whole class learning commentary, candidates are asked to provide a context for the assessment, including a rationale for selection and the conditions under which students completed it; summarize student learning across the whole class relative to the learning goals; and discuss what most students seem to have understood and any misunderstandings, confusions, or special needs. In addition, candidates propose next steps in instruction based on their analysis of student learning. In the individual student learning commentary, candidates select two students in the class (who represent different instructional challenges) to focus on in analyzing student learning over time. In this task, candidates collect and analyze three samples of each student's work that reflect his or her growth or progress with respect to a central goal of your class. Candidates are also asked to describe the feedback provided to students on their work.</p>

Table 2 (cont.)	
<i>Task 5 (Analyzing and Reflecting on Teaching and Learning)</i>	Candidates are prompted to reflect daily on their lessons after each day of instruction. At the end of the learning segment, candidates are asked to reflect on what they learned from their teaching of the learning segment and to describe what they would do differently if they were to teach the same content to the same group of students. They are also prompted to explain how their proposed changes would improve the learning of their students and to cite specific evidence and theoretical perspectives and principles that inform their analyses.
<i>Academic Language</i>	This is not a task in the Teaching Event, it comprises an analytic category in the scoring rubrics. The Academic Language rubric is scored based on evidence drawn from all of the tasks. Teacher candidates are prompted in the Planning and Instruction tasks to describe how their lessons and instruction help to build students' acquisition and development of Academic Language. For example, in Task A, candidates are prompted to describe the language demands of the learning and assessment tasks that are likely to be challenging for their students. They are also asked to describe how they planned to support students in meeting those language demands. Task B asks candidates to describe any language supports they used to help students understand the content and/or academic language. Task C asks candidates to discuss the progress in learning over time for two students, one of which must be an English Learner or another student who is struggling with academic English. Reflection on the successes and problems in each lesson with respect to developing language proficiency is prompted in Task D.

Trained scorers using 4-point rubric criterion determined each subscore. The criterion scores were averaged each criterion are then combined to produce a mean score for the overall Teaching Event. Table 3 outlines the scoring process used for the PACT Teaching Event.

Table 3: Scoring and evidence gathering process (Pecheone & Chung, 2006)

Scoring process	<ol style="list-style-type: none"> 1. Scorers read and record evidence related to the Context/Planning category of the TE and score the rubrics for the associated Guiding Questions (GQs); 2. Scorers view the video clips, read the commentary and score the GQs related to the Instruction category; 3. Scorers evaluate student work samples for the whole class and two individual students as well as the commentary on student learning, and then score the GQs associated with the Assessment category; and 4. Scorers read the candidate commentaries/reflections and score the GQs related to the Reflection category.
Evidence Gathering process	<ol style="list-style-type: none"> 1. Scorers independently take notes as they read through each portfolio task (PIAR); 2. Scorers independently read all documents that have been provided by the candidate to illustrate their teaching - lesson plans, assignments, reflective commentaries - as well as student work samples (including formal and informal assessments); 3. Scorers independently review their raw notes and construct evidence to support their rubric ratings on each of the GQs; and 4. Scorers record their scores for each GQ on a standardized form.

Scorers for the PACT assessment were recruited from various educational institutions, such as Teacher Education Programs, master teachers, and school district teacher support providers. The scorers received standardized training to ensure inter-rater reliability. This scorer training was provided through a trainer-of-trainers model in which all the trainers receive centralized instruction on the scorer training process. The trainers then conducted on site training with the scorers. The PACT Teaching Event guiding questions and scoring rubric underwent minor changes between the 2004-05, the pilot-year, and 2005-06, the year of the study.

In their technical report on PACT reliability and validity, Pecheone and Chung report that PACT scoring procedures had a high degree of inter-rater reliability and validity studies strongly suggests that it also a valid measure of preservice teacher expertise (Pecheone & Chung, 2004). They also include evidence of a strong link

between the PACT Teaching Event scores and the California Teacher Performance Expectations (TPE), required beginning-teacher skills and competencies. No significant differences were found between mean scores of groups based on gender, ethnicity, English as a first language, grade level or subject area taught, or previous paid teaching experience. These results suggest that PACT scores measure significant domains of teaching performance. Scores for PACT subtasks 2, 3 and 4 were used as indicators of Intern teacher expertise in this study since these elements were most closely related to the lesson planning and teaching reflection activities in the Intern credential program. Analysis of the PACT data in this study occurred after the PACT scoring process had been completed in the early spring.

Questionnaire and focus group interviews. In addition to the written sources of data, all of the Intern teachers from the cohort were surveyed about their beliefs and attitudes towards teaching using an interview protocol based on the protocol described by Perrone (1991) see Appendix E for sample questions. All of the Intern teachers in each of the cohort groups received the questionnaire. A random sampling of Interns from each cohort was invited to participate in a focus group discussion. A total of three Intern teachers were part of each focus group, with one focus group interview being conducted each cohort year. The questions used in the focus group session were examined from any common *threads of language* (Gee, 1999) that arose from analysis of the questionnaires. A trial survey was conducted with the 2004-2005 cohort participants. Based on the results from this trial, the 2005-2006 cohort participants used a similar survey instrument.

Data Analysis Procedures

Data analysis plan overview. Table 4 shows and analysis procedures employed in the Reflective Lens study.

Table 4: Data Analysis Plan

Data	Statistical Analysis	Remarks
Reflective Writing Samples	Discourse Analysis (using the Hatton-Smith Scale)	Explore patterns among the various reflective writing samples
PACT Summary Scores	Correlation Regression Analysis Factor Analysis	To find if there exists any relationship among the various expertise and reflection measures in the scores
Questionnaire / Focus Group Interview	Discourse Analysis	To uncover any patterns within the Questionnaire / Focus Group Interview Responses.

Reflective writing samples. The reflective writing samples were analyzed using the Hatton-Smith Reflective Writing Scale (Appendix B) following the protocol described in their 1995 study of preservice teachers in Australia (Hatton & Smith, 1995). This protocol has been employed in several similar studies and found to have a high degree of inter-rater reliability (Hatton & Smith, 1995). While this coding instrument has not undergone formal reliability studies, Hatton reports that several trial runs of the protocol confirmed the robustness of the procedures and reliability researchers would code the writing samples in “exactly the same manner” (Hatton & Smith, 1995). The results found by Hatton and others were typically reported with descriptive statistics of the coding units found within the writing.

The reflective writing codes used by Hatton and Smith described increasing levels of reflectivity expressed in the writing of a novice teacher. The first level,

descriptive writing, merely contains descriptions and reports of events. The second level, *descriptive reflection*, shows an increased awareness of the events. The writer expresses some reasons or justifications for the events that are being reported. The third level, *dialogic reflection*, demonstrates a ‘stepping back’ from the events. The writer is able to explore other alternatives to their perspective and explores the events in a dialogue with themselves. The fourth level, *critical reflection*, the writer not only explores the events but also is able to consider the events within the broader historical and socio-political contexts. Hatton and Smith’s four levels of reflective writing describe cognitive elements of increasing complexity when Interns write self-reflections. Table 5 describes the characteristics of the types of reflective writing used in the Hatton-Smith’s reflective writing scale.

Table 5: Hatton-Smith Reflective Writing Scale

Type of Reflection	Characteristics
<u>Descriptive Writing</u>	<ul style="list-style-type: none"> • Not reflective. • Description of events that occurred/report of literature. • No attempt to provide reasons/justification for events.
<u>Descriptive Reflection</u>	<ul style="list-style-type: none"> • Reflective, not only a description of events but also some attempt to provide reason/justification for events or actions but in a reportive or descriptive way.
<u>Dialogic Reflection</u>	<ul style="list-style-type: none"> • Demonstrates a 'stepping back' from the events/actions leading to a different level of mulling about, discourse with self and exploring the experience, events and actions using qualities of judgment and possible alternatives for explaining and hypothesizing.
<u>Critical Reflection</u>	<ul style="list-style-type: none"> • Demonstrates an awareness that actions and events are not only located in, and explicable by, reference to multiple perspectives but are located in, and influenced by, multiple historical, and socio-political contexts.

The reflective writing samples were also coded for the *focus* of the reflection. Van Manen defined the three levels of reflective focus: *technical rationality*, *practical action*, and *critical reflection* (Van Manen, 1991, 1999). Table 6 describes Van Manen three levels of reflectivity used in the Reflective Lens study.

Table 6: Van Manen levels of reflection

Reflective Level	Focus	Characteristics
1. Technical Rationality perspective	Characterized by a <i>personal</i> view of the pedagogical skills and procedures of the teacher.	Describes teacher-centered knowledge and principles of teaching.
2. Practical Action perspective	Characterized by discussion of the <i>interactions</i> between the skills and the student/teacher behaviors in the classroom.	Describes both teacher and student behaviors during instruction event.
3. Critical perspective	Characterized by <i>contextualization</i> of pedagogical and classroom behaviors and the effect of instruction on student learning.	Describes the intrinsic value of the knowledge and the social circumstances of the classroom.

The analysis protocol described above is designed to capture two of the crucial dimensions of the reflective writing. Together, these two dimensions provided a picture of the reflectivity of the novice teacher. The form of the reflective writing suggests the cognitive levels of the novice teacher's writing and the focus of the writing suggests the development of professional vision in the novice teacher.

The reflective writing samples were coded using a protocol closely modeled on those of Hatton and Smith (1995). Once the readers assigned codes on the writing samples, I examined the results for patterns of growth in the level of reflective writing.

Descriptive statistics were used to describe trends and features of these reflective writing samples.

Reflection and teaching expertise (PACT scores). The PACT Teaching Event scores were analyzed and compared using correlation and regression analysis to determine if there was a relationship between teaching expertise and reflective practice ability. The Teaching Event contains five tasks, as described in Appendix C. Each task is a measure of different teaching practices as well as reflective practice as described in Table 2.

Rubric scores are typically considered to be ordinal values. Within statistics there are several techniques for handling statistical analysis with this sort of data. However, it is also common practice among researchers to treat ordinal data as continuous variables when the ordinal items are combined to produce a composite variable (Agresti, 1984; Cliff, 1996; Long, 1997). The PACT sub scores for Planning, Instruction, Assessment, and Reflection, as well as the total overall score, represent a combination of individual criterion scores. The scores from each section, Planning, Instruction, Assessment, and Reflection, of the PACT Teaching Event were analyzed for a relationship between the various teacher skills measured.

Based on the results of prior studies, it was expected that reflection would have a strong influence on the development of professional expertise (Adler, 1990; Berliner, 1988; Chi, 1993; Chi et al., 1994; Feiman-Nemser, 2001a; Freese, 1999; Schön, 1987; Van Manen, 1999). The current study tested the hypothesis that reflection skill would be a good predictor of the teaching expertise measured in the PACT assessment;

Planning, Instruction, and Assessment. It also seemed plausible that a combination of reflection and planning are predictor variables for instruction and assessment. Novice teachers often spend a great deal of time planning their lessons, providing them with an anticipatory reflection experience as they consider how the plan will be implemented, the students' reactions to various parts of the lesson, and potential student misconceptions in regards to the concepts being explored in the lesson. This is an important consideration since the planning process is a form of reflection on what the teacher expects to see happening during the lesson.

Questionnaires and focus group interviews. Previous studies have found that one's perceptions concerning feedback, mentoring, coaching, and reflection play an important role in the effect of those efforts on professional development (Beck *et al.*, 2002a; Bowman & McCormick, 2000; Byra, 1996; Capraro et al., 2001; Chi et al., 1994; Danielewicz, 1998; Girod & Pardales, 2002; Kelehear, 2002). It is important to understand how the novice teacher makes sense of these professional growth activities in order to design experiences that will have the greatest impact on their growth as a teacher. In an attempt to capture the thoughts and beliefs of the preservice teacher about reflection and professional growth, the 2004-2005 cohort and the 2005-2006 cohort Intern teachers were invited to participate in both an initial questionnaire and then follow-up interviews.

Each preservice teacher candidate of the study cohort creates a professional growth portfolio in WeTeach, an online webportal for teachers designed by the University of California to support preservice teacher development and ongoing

teacher professional development. Teacher education programs throughout the state use WeTeach to submit class assignments, analyze participant surveys, and implement the PACT Teaching Event portfolio. WeTeach allows candidates to create and upload their teaching artifacts, enter reflections, and receive feedback from their supervisors. The site also provided excellent tools to facilitate PACT scorer training and the entire scoring process.

Participants were sent a questionnaire about their thoughts on teaching, reflection, mentoring, and professional growth. The questionnaire contained seven questions ranging from their goals for student learning, to working with their university field supervisor, to their use of video to support reflective writing, as shown in Table 7. All of the Intern teachers in the cohort received the same survey questions near the end of their credential program. Questionnaire data was summarized and the results offered guidance for specific questions presented to focus groups.

Table 7: Survey questions sent to 2004-2005 and 2005-2006 cohort participants

Survey Questions
1. What is your process to plan and provide your students with learning opportunities?
2. How do you view your own development as a teacher? How do you assess your own teaching skill?
3. When reflecting on your teaching without video, what did you tend to focus on about the lesson or the class?
4. When reflecting on your teaching with video, what did you tend to focus on about the lesson or the class?
5. In terms of viewing video of yourself teaching, did watching these videos affect your teaching? Please explain?
6. How does observing and reflecting on your own teaching compare to receiving feedback from your supervisor(s)?
7. What sort of activities bring about changes in your teaching?

Three Intern teachers from the cohort group was randomly selected from the three content areas of English, Mathematics, and Science and invited to participate in a focus group interview. These Intern teachers were interviewed for approximately 40 minutes about their classroom practice, their teaching abilities, and their beliefs about student learning. These focus group interviews were recorded. Generally, the discourse analysis of both the questionnaires and the focus group interviews followed the guidelines described by Gee (1999). The talk of the focus group participants focused on their language in *use* and the sociopolitical use of their language about teaching and learning. Gee describes this kind of discourse analysis as exploring what is *sayable* within the constraints of specific time and place. The discourse analysis of the focus group interview will be concerned with the participants' use of language in context to describe their own views on becoming a teacher given their *social identity* and *social activity* (Gee, 1996, 1999) as preservice Intern teachers.

Results

Reflective Writing Samples

The reflective writing tasks. Participants in the 2004-05 Single Subject Teacher Credential Intern Program were asked to provide two reflective writing samples. Students in this program are working towards certification to teach in public secondary schools, typically in grades 7-12. The purpose of these samples was to verify, test, and inform the study design. The samples were taken early and late in their first teaching semester. The first writing sample, typically completed in October, was a reflection based on a single lesson using video of the lesson as a support to the reflective writing process. The second writing sample, completed by most students in December, was based on a series of lessons taught over the previous 4 months with video used as both a support to the reflective writing process and as evidence for the statements made in the writing.

Participants in the 2005-06 Single Subject Teacher Credential Intern Program were asked to provide three reflective writing samples. All three of these samples focused on a single lesson from a single class period. The samples were completed at three intervals during their first teaching semester; early experience, mid-experience, and late experience. They were typically completed in early October, early November, and early to mid-December of the academic school year.

The 2005-06 participants were randomly assigned to one of two groups. The first group taught their early October lesson and then completed a written reflection

about the lesson based on their recall of classroom events. The second group was to video record this lesson and then observed the video while they wrote the reflection. The second written reflection assigned these two groups to different roles. The first group that previously did not video record their lesson was now instructed to video record their November lesson and to observe that lesson while they completed the written reflection. The second group that previously used video of the lesson as a support in the reflective writing process was instructed to teach the lesson and to rely on their memory of the experience to complete the written reflection. Both groups used video as a support tool for the third reflective writing sample completed in December. The written reflections were annotated across two dimensions: the type of reflective writing and the focus of the reflective writing.

Types of reflection. The type of reflective writing can be thought of as one's reflective voice. It refers to how statements are made and the way thoughts are constructed. The descriptors for this dimension of reflection have been adapted from those used in previous studies of reflective writing with preservice teacher candidates (Hatton & Smith, 1994, 1995). The reflective statements within the writing samples were annotated as *descriptive reflection* (providing some rationale or justification for the statement), *dialogic reflection* (a self-conversation about the experience or statement made), or *reflective critique* (placing the experience within the larger socio-historical, political, or economical context of education and analyzing the teaching experience). Table 8 gives a definition for each type of reflection.

Table 8: Definitions for Coding Type of Reflection in Written Samples

Type of Reflection	Definition
Descriptive Reflection	Writing includes a description of events with some attempt to provide justification for classroom events and actions.
Dialogic Reflection	Writing reflects a discourse with oneself, including rationale for classroom events and actions that presents possible alternatives and inconsistencies.
Reflective Critique	Writing attempts to explain and evaluate one's teaching, referencing multiple historical, and socio-political contexts as well as the perceived worth of knowledge and the social circumstances of the classroom.

Descriptive reflections attempt to justify and explain events. This justification refers to how the new teacher makes sense of the decisions made and the actions taken.

Descriptive reflection differs from mere descriptive writing. Descriptive reflection attempts to make sense of the experience through reasons and rationale, while descriptive writing merely reports events and experiences. Examples of descriptive reflection from the sample writing included statements such as:

My role as the teacher was to lecture on how to write a speech and how to structure that writing. The students were well behaved and were paying close attention because they knew they were going to need the material to do well on their literature movement project. High School ELA Intern Teacher

I felt that this part of the lesson was greatly aided by an analogy that I used. I talked about adding 2 oranges and 3 apples. I asked the class if adding the oranges changed the number of apples. The class was able to see that adding the oranges did not change the total number of apples. 7th Grade Math Intern Teacher

During this challenge students were to complete a problem and hold it up in front of the class. Because of this particularly public display it was obvious to see which groups understood the material and which ones did not. High School Algebra Intern Teacher

Dialogic reflection is an exploratory conversation with oneself about the experience. This form of reflection ties together retrospective and perspective reflection; the events are analyzed and discussed while future occurrences may be considered. Examples of this dialogic reflection from the sample writing included statements such as:

I felt that I needed to deliver the information to the students in a more organized way. I was getting a lot of questions from students, which is due to me not giving instructions clearly. Looking back I could have done a graphic organizer or put it all on the overhead or in a power point. I noticed that students were more concerned with writing down the information instead of listening to what I was saying. High School ELA Intern Teacher

I think that I sort of wasted time being nitpicky about how students were sitting, but that in the long run it was better for student learning since when students are sitting properly in the meeting area and are close to the front, facing the right way, and not far enough where they easily get off task, more learning occurs. I think that I may have prevented later disruptions and may have kept students in a position where they can be more engaged by sacrificing some time in the beginning. Middle School Science Intern Teacher

However, I don't really know how I could have spiced up the lesson. Maybe I could have had pictures of some sort, or a few quick pair shares. This could have come from more extensive planning, but also I don't think I had expected it to be as dry as it turned out to be. Middle School Science Intern Teacher

In *reflective critique*, teaching is examined through learning outcomes. The events were discussed in an evaluative way emphasizing the results and how they are viewed in a much larger context of leaning beyond just the classroom and a particular lesson. Examples of this reflective critique from the sample writing included statements such as:

After today, I learned that it is more effective for the students to work the problems out with just a little help. They need to struggle with these problems so that they can learn them. High School Chemistry Intern Teacher

I hope that they would be able to use it in their lives. However, one thing for sure is that this lesson help them to use their observations and critical thinking and that is a must have in order to do well in their lives. Thus, this lesson connected to their lives in a way that it trains them to think more critically and have a better observation of what they are doing. Both of these skills are valuable to have in their lives. High School Geometry Intern Teacher

I like this strategy because it allows the students to learn from each other and teach one another about the macromolecules rather than having me tell them and them being passive and taking notes. Research shows that it is more conducive to students' learning having them be the "experts" about their particular macromolecules and then teaching the "non-experts" what they need to know. High School Biology Intern Teacher

Analysis of reflective writing type. Intern Teacher participants writing samples in both the 2004-2005 cohort and the 2005-2006 cohort generally contained 43-71% descriptive reflections, 35-48% dialogic reflection, and 1-2% were reflective critiques. This finding is consistent with previous studies (Campoy & Radcliffe, 2002; Hatton & Smith, 1994, 1995; Sherin, 2002). Differences between the two groups, with or without the use of video as a reflective support tool, and over an extended period of time were not found to be statistically significant. The type of reflective writing remained consistent over time and across groups with different reflective experiences, i.e. whether or not video was used as a support tool for reflective writing. The time period and the use of video as a support tool did not influence the type of reflective writing produced by participants in these two study groups. Table 9 shows the percentages of each reflective writing type (descriptive, dialogic, or critique) used in

the reflective writing samples completed by each cohort group and subgroup within the cohort.

Table 9: Reflective Writing Type percentages used in the reflective writing of participant groups

	Oct Writing Task	Nov Writing Task	Dec Writing Task
2004-2005 Cohort Group			
Descriptive	69	NA*	78
Dialogic	29	NA*	21
Critique	2	NA*	1
2005-2006 Cohort Group 1			
Descriptive	61	51	62
Dialogic	39	48	38
Critique	0	1	0
2005-2006 Cohort Group 2			
Descriptive	60	65	61
Dialogic	40	35	38
Critique	0	0	1

*Note: The 2004-2005 Cohort Intern Group did not complete a November writing task

A sub-group from the 2004-05 Intern cohort used the DIVER video analysis software as a tool to conduct their written reflections. The other preservice teachers in this particular cohort group used more traditional methods to view the video of their classroom teaching. During the winter writing sample both groups of preservice teacher candidates produced writing samples that were predominately descriptive reflections with fewer instances of dialogic reflections and reflective critiques. However, the DIVER group demonstrated a more sophisticated use of descriptive reflection than the group using more traditional video self-analysis techniques, specifically this group watched the video and then wrote their reflections. The DIVER

group's writing sample contained 86% descriptive reflection, 14% dialogic reflection, and no reflective critiques while the traditional video group's writing was more in keeping with previous studies, containing 76% descriptive reflection, 23% dialogic reflection, and 1% reflective critique. The DIVER group's increase in descriptive reflection statements compared to the type of reflective writing of the main participant group was found to be statistically significant, $X^2(2, N=574) = 6.73$ ($p = 0.04$, $\alpha = 0.05$).

However, when the reflective writing type for the DIVER sub-group was compared with their earlier writing samples when they used more traditional video technology, the differences between the type of reflection was not statistically significant. The fall written reflections of this sub-group using traditional video media as a support tool contained 80% descriptive, 12% dialogic, and 8% critical reflections. Their winter written reflections using the DIVER software as a video support tool contained 87% descriptive and 13% dialogic reflections. They did not experience a significant shift in their reflective writing type over time. It seems that this particular subgroup of participants tended to have a more descriptive writing voice.

The type of reflective writing by this study group was not significantly affected by time or the use of specialized video analysis tools such as DIVER. The preservice teachers in this study maintained a consistent use of descriptive reflective writing, with occasional uses of both dialogic reflection and reflective critique.

Focus of written reflections. The reflective focus refers to the topics of the reflection. The writing samples were annotated for the focus of each reflective

statement. The focus was divided into three categories: technical perspective, practical perspective, or critical perspective. Table 10 provides definitions for each focus of the written reflections. These definitions for the focus of reflective writing are based on the Van Manen levels of reflection (Van Manen, 1999) and from previous studies examining the focus of reflections with preservice teacher candidates (Byra, 1996).

Table 10: Definitions for Coding the Focus of Reflection Writing Samples

Focus of Reflection	Definition
Technical Perspective	Involves the teacher applying context-free knowledge and principles of teaching. The students referred to in this type of reflection are general and could apply to any group of students.
Practical Perspective	Involves the teacher applying context-specific knowledge their teaching and students. The teacher can analyze both teacher and student behaviors and reactions to the decisions made by the teacher. Specific examples are provided as evidence.
Critical Perspective	Involves the teacher applying multi-context knowledge of their teaching and students. May explore the social, ethical, or political issues of teaching.

Technical perspective reflections included context-free generalizations about teaching and learning. These statements were not connected to any specific incident from the classroom experience but rather were made about their teaching or classroom experiences in general. Examples of this technical focus from the sample writing included statements such as:

I need more time to read and reread the text we are studying in the class so that I can ask questions that will make the students think more critically. I need more time to lesson plan and to prepare for class.
High School ELA Intern Teacher

I tried to make it less boring by calling on students and trying to get some discussion going in between paragraphs. I also tried to break down the text by rephrasing it in more everyday language that they

might be able to understand better, and using more real life examples.
Middle School Science Intern Teacher

The purpose of the graphic organizer that I created for this activity was to keep the students engaged in the ideas that their classmates had presenting on the different topics given to the class. In planning this lesson, I wanted students to be accountable not only for their own ideas, and the ideas of their group members, but for the ideas that their classmates provided as well. High School Biology Intern Teacher

The *practical perspective* or focus statements were context-specific reflections about teaching and learning that were grounded by an example from the classroom experience. The statements were prompted by incidents or specific student actions during the focus lesson. The reflections focused on teaching skills and decisions supported by examples from the classroom interactions of the focus lesson. Examples of this practical focus from the sample writing included statements such as:

Another thing I took away from watching my lesson was how effective the fruit analogy was for the students. I have noticed that some students have difficulty grasping abstract concepts like variables. Comparing them to fruits helped to make the concept more concrete. While watching the video I was able to recount the number of hands that were holding up the correct number of fingers and gave me an even better idea of how many students understood the lesson. Middle School Mathematics Intern Teacher

I did think, though, that my students could handle a discussion about the topics and really thought that they would be interested in all of the issues the groups worked on. Apparently this was not the case because the majority of the class seemed to not care at all about anything the groups had to say on their posters. High School Biology Intern Teacher

I worked with the group to make sure each student had a specific role, understood their specific role and were working on that role. Although one student still did more work than she should have, the intervention insured that all students were partially involved. Middle School Science Intern Teacher

Critical perspective or focus statements were multi-contextual in nature. These statements were grounded by specific incidents or actions that occurred during the focus lesson, but were also applied across other teaching contexts. The preservice teacher postulates how their analysis of the focus lesson could apply to other lessons, groups of students, or different courses. Examples of this critical focus from the sample writing included statements such as:

As the students were researching, they were discussing their online findings with each other. This, to me, signified an understanding and a deeper meaning from the material. High School Geometry Teacher

I will continue to use hands-on activities in class because it is so important for students to discover new facts and concepts on their own instead of through a teacher telling them that something is a certain way. Middle School Science Teacher

Some of the students were correcting the film and showed that they understand more than what was being shown to them, so I thought that was an effective way to see that the students are thinking critically about what they see and read. High School Biology Intern Teacher

Analysis of reflective writing focus. With the 2004-05 Intern cohort group, all the participants used video as a reflection support tool for the fall reflective writing assignment. The focus exhibited a balance between a technical focus and a practical focus when the preservice teachers used more traditional video methods to analyze their own teaching. When this group completed their winter reflective writing assignment, this balance between the technical and practical perspective was maintained. The fall writing contained 44% technical perspective reflections, 43% practical perspective reflections, and 13% critical perspective reflections. In the winter the writing samples contained 50% technical perspective reflections, 40% practical

perspective reflections, and 10% critical perspective reflections. The focus shows a balance between technical and practical perspective using video as a support tool and did not significantly change over time. Table 11 shows the percentage of reflective writing foci in the reflective writing samples of the 2004-2005 Intern cohort.

Table 11: Reflective Writing Focus percentages used in the reflective writing of 2004-2005 participant group

	Oct Writing Task	Nov Writing Task	Dec Writing Task
2004-2005 Cohort Group			
Technical	44	NA*	47
Practical	43	NA*	46
Critical	13	NA*	7

*Note: The 2004-2005 Cohort Intern Group did not complete a November writing task

During the winter reflective writing assignment, one group continued to use traditional video techniques to reflect on their teaching while a sub-group of this cohort used the DIVER video analysis software to reflect on the classroom lessons. The reflective writing of the main participant group continued to have the balanced focus exhibited in the earlier reflective writing sample that also had them use traditional video technology as a support. The sub-group of participant's reflective focus shifted from being balanced to containing more practical reflections, approximately 61% of the overall reflections, 38% technical reflections and 1% critical reflections. With an alpha level of 0.05, the differences between the focus of the reflective writing was statistically significant, $X^2(1, N=574) = 12.6, p < 0.001$, with the DIVER group having an increase in their use of practical perspective reflective statements. The use of a specialized video analysis tool such as DIVER had

an impact on the focus of the reflective writing when compared to the group using traditional video technology. The DIVER video analysis environment with its virtual camera to pan and zoom within the video clip, the integrated writing tools to both view the video and annotated the clips, and well as the ability to group video clips together for analysis supported an increase in a practical focus of the reflective writing.

Table 12: Reflective Writing Focus percentages used in the reflective writing of 2004-2005 DIVER subgroup from the participant group

	Oct Writing Task	Nov Writing Task	Dec Writing Task
2004-2005 Cohort Group			
Technical	45	NA*	38
Practical	34	NA*	61
Critical	21	NA*	1

*Note: The 2004-2005 Cohort Intern Group did not complete a November writing task

Inferences based on the reflective writing samples from the 2004-2005 DIVER participant subgroup must be viewed cautiously. This particular subgroup was an extremely small sample of the entire participant group consisting of 7 members drawn from 2004-2005 Intern cohort. This group self-selected to use the DIVER video analysis tool based on personal interest in new software and a desire to explore the powerful features of this application. The DIVER subgroup also represented participants who met the hardware requirements, which included a PC running Windows 98, 2000, or XP, 1GHz P3 processor or better, 256MB of RAM or greater to use the DIVER application on their personal computers.

With the 2005-2006 Intern cohort, during the first reflective writing assignment in October, group 1 was instructed to reflect on their lesson using just their memory and recall of events to complete the reflection task. Group 2 was directed to reflect on the classroom lesson using a video recording of the lesson as a support to their recall of the lesson. Group 2, using video to support their reflective writing, exhibited a balance between the technical and practical perspectives in their writing while group 1, relying on their recall of the lesson, tended to focus predominately on the technical aspects of their teaching. Group 1's reflective writing samples were 71% technical perspective and 29% practical perspective while group 2, using video as a reflection support, had 50% technical perspective and 50% practical perspective. Group 2's reflective writing exhibited a more balanced focus between pedagogy (i.e. the rules of teaching) and classroom interactions. With an alpha level of 0.05, the differences between the focus of the reflective writing between the two groups was found to be statistically significant, $X^2(1, N=300) = 13.5, p < 0.001$. Table 13 shows the percentage of reflective foci used over the three reflective writing samples by the 2005-2006 Intern cohort.

Table 13: Reflective Writing Type percentages used in the reflective writing of 2005-2006 participant groups

	Oct Writing Task	Nov Writing Task	Dec Writing Task
2005-2006 Cohort Group 1			
Technical	71	44	43
Practical	29	54	55
Critical	0	2	2
2005-2006 Cohort Group 2			
Technical	50	51	40
Practical	50	49	60
Critical	0	0	0

In contrast, when both groups used video to support the reflective writing, their writing contained a similar balance between a technical perspective and a practical perspective in their reflective statements. Group 1's reflective writing contained 44% technical perspective, 54% practical perspective and 2% critical reflection in November when they used video as a support tool and their writing contained 43% technical perspective, 55% practical perspective, and 2% critical reflection in December when they again used video as a support tool. Group 2's reflective writing contained 51% technical perspective and 49% perspective in their November even without the use of video as a support tool. The December writing samples were found to have 40% technical perspective and 60% practical perspective when they once again used video as a support tool to the reflective writing. During the November and December reflective writing assignments, both groups exhibited a balanced focus between pedagogy and classroom interactions. The difference between the foci of the

reflective writing samples of the two groups during the November or December reflective writing assignments were not found to be statistically significant.

The use of video for self-reflection supports a balanced focus in the reflective writing of preservice teachers assisting the preservice teacher in using his/her pedagogy knowledge to support thoughts about the specific classroom interactions. The effects of using video for self-reflection also seem to be persistent over time and continue when video is not specifically used as a support tool to reflective writing.

Analysis of intragroup reflective writing focus. A sub-group of the 2004-05 Intern cohort group used traditional video technology to reflect on their fall teaching and used a specialized video analysis tool called DIVER to reflect on their winter teaching. The fall writing of this sub-group exhibited a balanced focus between technical and practical reflections. In the winter when they used the DIVER software, the focus shifted to a practical focus accounting for approximately 61% of the reflections, with 38% technical focus and 1% critical focus (see Table 12 for reflective foci percentages used in the reflective writing sample). The DIVER application video analysis environment supported a shift from the balanced perspective seen when traditional video techniques are used to a focus on the practical aspects of their teaching. With an alpha level of 0.05, the differences in the focus of the reflective writing for this sub-group was found to be statistically significant, $X^2(1, N=170) = 4.67, p = 0.04$. The DIVER analysis environment focused the preservice teacher specifically on classroom interactions and less of a focus on their teaching or pedagogy.

The 2005-06 Intern cohort reflective writing samples were analyzed for the reflective writing focus within the specific participant groups. Group 1 was randomly assigned to use a reflection protocol of no video support for the October writing and to use video support for both the November and December writing. Group 1's writing samples were primarily technical in nature for the October sample and contained a more balanced writing focus between technical and practical for both the November and December samples after using video as a support tool (see Table 13 for percentage of foci used in the reflective writing samples). The differences in writing foci over the three writing samples was found to be statistically significant, $X^2(4, N=474) = 84.8$ ($p < 0.001$, $\alpha = 0.05$). Without video of the lesson, the preservice teachers focused on their teaching and teacher skills. With the introduction of video to support their reflections this focus was balanced with reflections about the classroom interactions as well as reflections about teacher skills.

In contrast, Group 2 was randomly assigned to use a reflection protocol of video support in October, no video support in November, and video support in December. The differences between the writing foci for Group 2 was not found to be statistically significant, displaying approximately equal technical and practical perspective reflection across the three writing samples. Again, the use of video supported a balanced focus between teacher skills and classroom interactions. When the preservice teacher reflected on another lesson without the use of video, but shortly after experiencing a video reflection, the benefits of video as a support tool were persistent.

Inter-rater reliability. Inter-rater reliability of the coding dimensions used in this study were established using the Cronbach's alpha intra-class correlations (Fleiss *et al.*, 2003; Shrout & Fleiss, 1979). The intra-class correlation was selected to measure the reliability of the written reflection coding scheme for establishing reliability between 3 or more raters because this coefficient corrects for flaws present in product-moment correlations and other methods (Howell, 1997; Orwin, 1994). The Cronbach's alpha takes into account variance between raters as well as correcting for random effects of both the raters and the objects being rated.

Table 14: Reliability Analysis – Scale (Alpha)

		Mean	Standard Deviation	Cases
1.	SCORER1	1.3571	0.48	56.0
2.	SCORER2	1.2857	0.46	56.0
3.	SCORER3	1.4286	0.57	56.0
4.	SCORER4	1.6071	0.53	56.0
5.	SCORER5	1.7857	0.62	56.0
6.	SCORER6	1.7321	0.49	56.0
7.	SCORER7	1.6250	0.78	56.0
8.	SCORER8	1.8571	0.75	56.0

Alpha = 0.76

A reliability study was conducted with eight raters analyzing and coding a randomly selected 10 percent sample drawn from the reflective writing data set. The raters were trained in the use of the two coding dimensions, the type of reflective writing and the focus of the reflective writing. After the raters became versed in the coding scheme, they independently coded the selected writing samples across the two dimensions of analysis. The results were analyzed for reliability using Cronbach's alpha intra-class correlation coefficient for absolute agreement with a 0.05 alpha level.

The coding scheme for this study was found to have “high reliability” (Cocchetti & Sparrow, 1981; Hinton, 2004; Howell, 1997), producing an alpha of 0.76 in the inter-rater reliability coefficient.

PACT Assessment

Correlation analysis: PACT Teaching Event Task scores. As the results in Table 15 illustrate, there is a strong relationship between the skill components of the PACT Teaching Event and the Reflection Component.

Table 15: Correlations of PACT 2004-2005 Scores from the study participant group

	1	2	3	4	5
	Student Scores (N=34)				
1. Planning	–	.50**	.48*	.36*	.63**
2. Instruction		–	.64**	.38*	.55**
3. Assessment			–	.69**	.58**
4. Reflection				–	.39*
5. Academic Language					–

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Reflection has a strong correlation with the teaching skill components of planning, instruction and assessment, as demonstrated in the 2004-2005 PACT Teaching Event. The observed relationship is strongest between reflection and assessment. In general these results are consistent with those found across the PACT consortium preservice teacher participants, consisting of approximately 700 preservice teachers. Statewide PACT Teaching Event scores showed a strong correlation between

reflection and the other components of planning, instruction, and assessment (Pecheone & Chung, 2004).

Table 16: Correlations of PACT 2005-2006 Scores from the study participant group

	1	2	3	4	5
	Student Scores (N=26)				
1. Planning	–	.46*	.55**	.29	.58**
2. Instruction		–	.06	-.21	.17
3. Assessment			–	.63**	.68**
4. Reflection				–	.59**
5. Academic Language					–

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 16 shows the correlations between 2005-2006 PACT Teaching Event measures. As seen in the results, the Reflection measure has a strong relationship with the Assessment task. However, unlike the 2004-2005 PACT Teaching Event, the Reflection task does not show any correlations to the measures of Planning and Instruction.

Factor analysis. The PACT Teaching Event is organized around five different dimensions that are thought to be important to teaching. These dimensions are represented as individual task: Task 2 Planning, Task 3 Instruction, Task 4 Assessment, and Task 5 Reflection. The fifth teaching dimension within the PACT Teaching Event is Academic Language, which is embedded in all the PACT tasks. It was hypothesized by the PACT research group at Stanford University that if the

PACT tasks truly represented important teaching dimensions, then the data should cluster around these dimensions (Peccheone & Chung, 2004).

A factor analysis of common rubric items, known as guiding questions within the PACT scoring rubric, was conducted. Using the Principal Analysis extraction method and the Varimax rotation method with Kaiser Normalization, similar to the analysis conducted by the Stanford research group on the larger PACT data set, the scores from the 2004-2005 Intern cohort were analyzed for factors. Table 17 shows that two factors (1: Planning/Instruction / Academic Language; 2: Assessment / Reflection) emerged after three iterations. There is a strong overlap between these factors; the teaching dimensions being measured by the PACT Teaching Event and the structure of the teaching event tasks. The factor analysis shows that the PACT Teaching Event may be measuring two constructs of preservice teacher ability: the ability to plan and execute a lesson and the ability to analyze and reshape one's own teaching practice to meet student learning needs.

The constructs that emerge through the factor analysis suggest that the PACT Teaching Event may be measuring two teacher skill areas. The first construct represents a teacher's ability to demonstrate some *skill* in either lesson planning or instruction. The second construct may represent a teacher's ability to demonstrate *insights* about his or her own teaching practice either through the analysis of student work or reflecting on the classroom experience.

Table 17: Common rubric item (guiding questions) factor loadings for the 2004-2005 Intern cohort PACT scores (N=34) and the 2005-2006 Intern cohort PACT scores (N = 27)

Rubric Guiding Questions (GQ)	Component 2004-2005 PACT		Component 2005-2006 PACT	
	1 skills	2 insights	1 skills	2 insights
Task 2 Planning: GQ1 Balanced instructional focus	0.66		.69	
Task 2 Planning: GQ2 Accessible content	0.71		.52	.57
Task 2 Planning: GQ3 Assessment design	0.71		.72	
Task 3 Instruction: GQ4 Engagement in learning	0.58		.83	
Task 3 Instruction: GQ5 Monitoring learning	0.50		.81	
Task 4 Assessment: GQ6 Analysis of student work		0.76		.83
Task 4 Assessment: GQ7 Assessment informing teaching		0.76		.70
Task 5 Reflection: QG8 Monitoring student progress		0.89		.73
Task 5 Reflection: QG9 Reflection on learning		0.85		.77
Academic Language GQ10 Understanding language demands	0.76			.79
Academic Language GQ11 Supporting academic language development	0.77			.67

Regression analysis: Reflection with Planning and Instruction. A standard multiple regression analysis was performed between the planning task score as the dependent variable and the scores from instruction, assessment, and reflection as the independent variables. The same analysis was performed using the instruction task score as the dependent variable and the scores from planning, assessment, and reflection as the independent variables. Analysis was performed using SPSS REGRESSION and SPSS FREQUENCIES for the evaluation of assumptions.

Table 18 shows the unstandardized regression coefficient (B), the standardized regression coefficient (β), and the multiple regression correlation coefficients (R , R^2 ,

and the adjusted R^2). The effect of reflection on the planning component was found to be statistically significant ($\alpha = 0.05$, $F(1, 33) = 4.73$, $p = 0.04$). The effect of reflection on the instruction component was also found to be statistically significant ($\alpha = 0.05$, $F(1, 33) = 5.50$, $p = 0.03$). These results suggest that reflection is a predictor of a preservice teacher's performance on the Planning and Instruction tasks of the PACT Teaching Event.

Table 18: Summary of Regression Analysis for Reflection Task predicting the Planning Task score and the Instruction Task score in the 2004-2005 PACT Teaching Event (N = 34)

Variable	<i>B</i> Unstandardized Coefficients	<i>SE B</i> Standardized Error	β Standardized Coefficients
Planning Task			
Reflection	0.23	0.10	0.36
R = 0.36, $R^2 = 0.13$, Adjusted $R^2 = 0.10$			
Instruction Task			
Reflection	0.28	0.12	0.38
R = 0.38, $R^2 = 0.15$, Adjusted $R^2 = 0.12$			

Sequential regression was employed to determine if reflection alone contributed to the prediction of the Planning and Instruction task performance by preservice teachers. This method was to control for the effects of the other performance tasks measured by the PACT assessment. Analysis was performed using SPSS REGRESSION and SPSS FREQUENCIES for evaluation assumptions. A regression analysis was not performed between the Reflection task and the measures for Planning or Instruction since Table 16 did not show any correlations between these measures.

Table 19 shows the unstandardized regression coefficient (B), the standardized regression coefficient (β), and the multiple regression correlation coefficients (R , R^2 , and the adjusted R^2) after entry of all three independent variables. In an effort to control for the effects of instruction and assessment on the planning task, the independent variables were entered in two blocks. Block one contained the measures for instruction and assessment. Block 2 contained the measures for reflection. R was significantly different from zero at the end of each step. After step 2, with all independent variables in the equation, $R = 0.55$, $F(3, 33) = 4.22$, $p = 0.01$.

After step 1, with instruction and assessment in the equation, $R^2 = 0.29$, $F(2, 33) = 6.41$, $p = 0.01$. After step 2, with reflection added to instruction and assessment, $R^2 = 0.30$, $F(3, 33) = 4.22$, $p = 0.01$. The addition of reflection did not result in a significant increase in R^2 .

Similar results were found when the same statistical method was applied to control for the effects of planning and assessment on the instruction task. The independent variables were entered in two blocks. Block one contained the measures for planning and assessment. Block 2 contained the measures for reflection. R was significantly different from zero at the end of each step. After step 2, with all independent variables in the equation, $R = 0.69$, $F(3, 33) = 8.88$, $p < 0.001$.

After step 1, with planning and assessment in the equation, $R^2 = 0.46$, $F(2, 33) = 13.29$, $p < 0.001$. After step 2, with reflection added to planning and assessment, $R^2 = 0.47$, $F(3, 33) = 8.88$, $p < 0.001$. Again, as shown in the analysis for the Planning

task, the addition of reflection did not result in a significant increase in R^2 for the Instruction task.

Table 19: Summary of Hierarchical Regression Analysis for variables predicting 2004-2005 PACT Teaching Event Planning and Instruction Task scores (N = 34)

Variable	<i>B</i> Unstandardized Coefficients	<i>SE B</i> Standardized Error	β Standardized Coefficients
Planning Task			
Step 1			
Instruction	0.28	0.17	0.33
Assessment	0.17	0.13	0.27
Step 2			
Instruction	0.29	0.17	0.33
Assessment	0.13	0.16	0.20
Reflection	0.006	0.13	0.09
Step 1 $R = 0.54$, $R^2 = 0.29$, Adjusted $R^2 = 0.25$			
Step 2 $R = 0.55$, $R^2 = 0.30$, Adjusted $R^2 = 0.23$			
Instruction Task			
Step 1			
Planning	0.39	0.11	0.53
Assessment	0.29	0.18	0.25
Step 2			
Planning	0.45	0.15	0.61
Assessment	0.29	0.18	0.25
Reflection	-0.09	0.13	-0.13
Step 1 $R = 0.68$, $R^2 = 0.46$, Adjusted $R^2 = 0.43$			
Step 2 $R = 0.69$, $R^2 = 0.47$, Adjusted $R^2 = 0.42$			

The regression analysis seems to suggest that reflection does not significantly contribute to the prediction of performance on the planning task or the instruction task when the effects of the other PACT performance tasks are controlled. Apparently, the relationship between the reflection task and both planning and instruction tasks is mediated by the relationships between the other tasks.

Regression analysis: Reflection and Assessment. A standard multiple regression analysis was performed between the assessment task score as the dependent variable and the scores from planning, instruction, and reflection as the independent variables. Analysis was performed using SPSS REGRESSION and SPSS FREQUENCIES for the evaluation of assumptions.

Table 20 shows the unstandardized regression coefficient (B), the standardized regression coefficient (β), and the multiple regression correlation coefficients (R , R^2 , and the adjusted R^2). The effect of reflection on the assessment component in the 2004-2005 PACT Teaching Event was found to be statistically significant ($\alpha = 0.05$, $F(1, 33) = 29.04$, $p < 0.001$).

Table 20: Summary of Regression Analysis for Reflection Task predicting Assessment Task score in the 2004-2005 PACT Teaching Event (N = 34)

Variable	B Unstandardized Coefficients	$SE\ B$ Standardized Error	β Standardized Coefficients
Reflection	0.68	0.13	0.69

Note: $R = 0.69$, $R^2 = 0.48$, Adjusted $R^2 = 0.46$

Sequential regression was employed to determine if reflection alone contributed to the prediction of the Assessment task performance by preservice teachers. This method was to control for the effects of the Planning and Instruction. Analysis was performed using SPSS REGRESSION and SPSS FREQUENCIES for evaluation assumptions.

Table 21: Summary of Regression Analysis for Reflection Task predicting Assessment Task score in the 2005-2006 PACT Teaching Event (N = 27)

Variable	<i>B</i> Unstandardized Coefficients	SE <i>B</i> Standardized Error	β Standardized Coefficients
Reflection	0.67	0.16	0.63

Note: $R = 0.63$, $R^2 = 0.40$, Adjusted $R^2 = 0.37$

Table 21 shows the unstandardized regression coefficient (B), the standardized regression coefficient (β), and the multiple regression correlation coefficients (R , R^2 , and the adjusted R^2). The effect of reflection on the assessment component in the 2005-2006 PACT Teaching Event was also found to be statistically significant ($\alpha = 0.05$, $F(1, 27) = 16.65$, $p < 0.001$).

Table 22 shows the unstandardized regression coefficient (B), the standardized regression coefficient (β), and the multiple regression correlation coefficients (R , R^2 , and the adjusted R^2) after entry of all three independent variables for the 2004-2005 PACT Teaching Event measures. To control for the effects of planning and instruction on the assessment task, the independent variables were entered in two blocks. Block one contained the measures for planning and instruction. Block 2 contained the measures for reflection. R was significantly different from zero at the end of each step. After step 2, with all independent variables in the equation, $R = 0.81$, $F(3, 33) = 18.72$, $p < 0.001$.

After step 1, with planning and instruction in the equation, $R^2 = 0.45$, $F(2, 33) = 12.58$, $p < 0.001$. After step 2, with reflection added to planning and instruction, R^2

= 0.65, $F(3, 33) = 18.72$, $p < 0.001$. The addition of reflection resulted in a significant increment in R^2 .

Table 22: Summary of Hierarchical Regression Analysis for variables predicting 2004-2005 PACT Teaching Event Assessment Task score (N = 34)

Variable	<i>B</i>	<i>SE B</i>	β
	Unstandardized Coefficients	Standardized Error	Standardized Coefficients
Step 1			
Planning	0.33	0.24	0.21
Instruction	0.73	0.21	0.54
Step 2			
Planning	0.16	0.20	0.10
Instruction	0.54	0.17	0.40
Reflection	0.49	0.12	0.50
Note: Step 1 $R = 0.67$, $R^2 = 0.45$, Adjusted $R^2 = 0.41$ Step 2 $R = 0.81$, $R^2 = 0.65$, Adjusted $R^2 = 0.62$			

Table 23: Summary of Hierarchical Regression Analysis for variables predicting 2005-2006 PACT Teaching Event Assessment Task score (N = 27)

Variable	<i>B</i>	<i>SE B</i>	β
	Unstandardized Coefficients	Standardized Error	Standardized Coefficients
Step 1			
Planning	0.63	0.18	0.64
Instruction	-0.18	0.14	-0.24
Step 2			
Planning	0.40	0.17	0.40
Instruction	-0.002	0.13	-0.03
Reflection	0.53	0.17	0.50
Note: Step 1 $R = 0.58$, $R^2 = 0.34$, Adjusted $R^2 = 0.28$ Step 2 $R = 0.73$, $R^2 = 0.53$, Adjusted $R^2 = 0.47$			

Table 23 showing the results of the hierarchical regression analysis

For the 2005-2006 PACT Teaching Event measures had similar results as the 2004-2005 PACT Teaching Event analysis. The Reflection task has significant predictive power for the Assessment task, after Step 2 of the regression ($R^2 = 0.54$, $F(1, 24) = 9.42$, $p < 0.001$).

The regression analysis suggests that reflection does significantly contribute to the prediction of performance on the assessment task even when the effects of the planning and instruction task are controlled. This relationship between reflection and assessment is strong despite the possible mediating relationships between planning, instruction, and assessment. A preservice teacher's ability to reflect on their own teaching in the PACT Teaching Event may be a predictor of their ability to analyze student work to guide their teaching practice as measured by the PACT Teaching Event Assessment task.

Questionnaire and Interviews

Questionnaire analysis. Responses to the survey were annotated for themes and trends that emerged. Once these themes were identified, a subgroup from the respondents was interviewed to further explore their ideas about teaching, reflection, and professional growth. Table 24 displays the frequency of responses from the participants and the theme clusters that emerged from analysis of the responses.

Table 24: Summary of the responses to the questionnaire and the themes that emerged from those responses

Themes/ Responses	Percentage of responses		
	Cohort 04-05 (N=7)	Cohort 05-06 (N=4)	Total (N=11)
Perspective of teaching cluster			
View of own teaching as a work in progress and continuing growth	85.7%	75.0%	81.8%
Different perspective on teaching events between own view and supervisor	71.4%	100.0%	81.8%
Feedback seen as having a broad perspective while video very narrow or specific perspective	28.6%	25.0%	27.3%
Value-added activities cluster			
Self-reflection seen as a more personal and directed assessment to their professional needs	28.6%	100.0%	54.5%
Resistance to video of self and a desire not to view the video	42.9%	25.0%	36.4%
Value of both self reflection and feedback for professional growth	57.1%	0.0%	36.4%
Preference of feedback over video or self reflection	28.6%	25.0%	27.3%
With use of video helped see details of own teaching	42.9%	0.0%	27.3%
Without use of video focused on student engagement	0.0%	75.0%	27.3%
With use of video focus on student engagement	14.3%	25.0%	18.2%
With use of video focus on teacher and student responses during the lesson	0.0%	50.0%	18.2%
Effect of feedback cluster			
Self-reflection on experiences bring about growth and changes in practice	28.6%	25.0%	27.3%
Feedback from own students effects teaching	0.0%	75.0%	27.3%

In general, the responses to the questionnaire clustered around a few themes. These themes may represent the thoughts and beliefs of the preservice teachers about their own growth, their ability to evaluate their own teaching, and the use of feedback to make changes in their teaching practice. The themes that emerged from the questionnaire can be described as focusing on *perspective of teaching*, *added-value activities*, and *effects of feedback on teaching*.

The *perspective of teaching* theme discusses the differences between what the preservice teacher sees as important in the classroom compared with what their supervisor sees as important. They discuss these perceptions as differing in scope and focus. At times the difference is seen as helpful to their professional growth and at times it is viewed as limiting. The statements around this theme included:

I'm going to have a biased view and I won't see some things that my supervisor will see. Middle School Life Science Intern Teacher

My supervisor sees things that I would not have noticed on my own and provides feedback about teaching techniques that are very helpful. My own feedback is centered on assessment of individual students not on the class as a whole. High School Physics Intern Teacher

Often, supervisors focus on different aspects of the teaching than I do. I feel as though my own reflecting often focuses on only one aspect at a time, but supervisors tend to look more at the whole picture. Middle School Algebra Intern Teacher

[Video] makes me examine my teaching in a different ways. By seeing things that go on that I didn't know about, I am more aware of what I need to improve. High School Algebra Intern Teacher

The second theme of *added-value activities* refers to the value of self-reflection as compared to the value of mentoring. It also concerns the value of technology and video as a support to self-reflection support. Statements in this theme included:

I assess my own teaching skills by reflecting on what worked and by measuring the size of my sighs when I get in my car. Middle School Life Science Teacher

However, I do think that my personal reflections are most beneficial because I can focus on the areas that I think I can change given my circumstances. Middle School Science Intern Teacher

I think they [self-reflection and mentoring] go hand-in-hand. The video allowed me to observe first hand the things that my supervisors have mentioned to me. Middle School Science Intern Teacher

Reflection! Even if it is informal reflection after a lesson, it is helpful for me to think about what I just did, who it benefited (if anyone) and what could be changed next time. Talking to other teachers and observing other teachers is also very helpful for me. Middle School Science and Mathematics Intern Teacher

The final theme of *effects of feedback on teaching* refers to the different sources of feedback; either self-evaluation, mentor coaching, or student feedback, and its effect on the professional growth and teaching decisions of the preservice teacher.

Statements in this theme included:

Supervisors give valuable and more broad feedback. The video helps me look at small details that I hadn't noticed. High School Mathematics Intern Teacher

My students bring about changes in my teaching. They show me that I need to change something, but they don't necessarily tell me how to change it. More specifically, the lack of participation tells me that I need to get them more engaged or change the line of questioning. High School Mathematics Intern Teacher

We can make changes that we feel directly serve our students and improve our teaching. I think that supervisors can't target specific students in the same way. Middle School Mathematics Intern Teacher

The questionnaire responses and the interview comments provide a glimpse at the beliefs about teaching, teacher development, and professional growth activities held by this cohort of Intern teachers. In general, they see their own growth as a 'work in progress'. They tend not to rely on their own perceptions of their teaching ability, but rather focus on the perspective of their mentors. Even with video evidence of their teaching, they express feeling reluctant to view themselves teaching. Seeing themselves teach on video is not a comfortable act.

These Intern teachers also view their perceptions as serving a different function than the perceptions and feedback of their mentors. Self-evaluation seems to fulfill some personal growth needs and tends to be narrowly focused on specific teacher skills or interactions with certain students in their class. Feedback from mentors, on the other hand, is seen as fulfilling broader professional needs and has a broader focus on teaching and learning as it applies to their classroom practice and development as a teacher.

Summary of Results

The reflective writing of the participants in this study was categorized across two dimensions: the type of reflective writing and the focus of the reflective writing. It has been theorized in the literature that changes in both of these dimensions represent growth in expertise (Berliner, 1988; Chi et al., 1988; Dreyfus, 2004; Glaser, 1985b; Kay, 1992; Kennedy, 1987; Smith & Tiberius, 2002). Video of the preservice teacher's classroom practice was also introduced as a support tool for reflective writing. The time frame of this study as well as the use of video had no significant effect on the type of reflective writing produced by these two groups of preservice teachers. The type of reflective writing remained consistent and showed little change, suggesting that the reflective *voice* of these preservice teachers develops slowly and varies from individual to individual. On the other hand, the focus of these preservice teachers' reflective writing was greatly affected by the use of video. The act of viewing one's own classroom teaching practice through the use of video allows the

preservice teacher to balance their focus between pedagogy and classroom interactions, while without video these reflections tended to focus more heavily on pedagogy. In addition, the effects of video on the reflective focus lasts over time even when participants did not use video as a support to reflective writing.

One surprising result occurred when a small subgroup of Interns used DIVER to reflect on their own classroom teaching. The DIVER-supported reflections tended to focus on the classroom interactions and included very few references to more general issues of instructional pedagogy. The use of DIVER, with its powerful video analysis interface, seemed support to the analysis of microteaching¹ (Jensen & et al., 1994; Louw, 1985; Norton, 1997; Pailliotet, 1995; Yeany, 1976) rather than the broader kinds of reflective writing that coordinate Intern knowledge of pedagogy (the *technical* skills of teaching) with their views of classroom interactions (the *practical* observations of teaching).

The PACT Teaching Event assessment results from these participants was used as a common measure of both reflective ability as well as the key pedagogy skill areas of planning, instruction and assessment of students. The results indicate a relationship between all these measures. However, the predictive nature of reflection on the other skill components of PACT scores was less clear. When a preservice teacher's ability to plan a lesson and to deliver that lesson through classroom instruction were considered, as measured by the Planning and Instruction tasks, reflection had less

¹ A method of practice teaching in which a videotape of a small segment of a student's classroom teaching is made and later evaluated. Microteaching was developed in the early and mid 1960's by Dwight Allen and his colleagues at the Stanford Teacher Education Program. The Stanford model emphasized a teach, review and reflect, re-teach approach, using actual school students as authentic audiences.

predictive power over these skills than other measures. However when the preservice teacher's ability to use student assessment to inform his/her teaching was considered, as measured by the Assessment task, reflection was a strong predictor for this particular skill. More research is required to delve further into this area.

When we consider the preservice teacher's views about reflection, mentoring, and the use of video, we see a complex mixture of thoughts and emotions. The preservice teachers in this study value self-reflection and see benefits to the use of video to analyze their own teaching. However, they find greater value in the feedback from their mentors and supervisors. They view the feedback from more experienced teachers and mentors as more beneficial to their growth, even greater than their own reflections or the feedback they receive from peers. They believe that the feedback from perceived experts in teaching serve a different purpose than feedback from peers or from their own self-reflection. Mentor feedback, in the view of these preservice teachers, specifically addresses their professional growth and provides them with direction in the broad areas of classroom practice. Self-reflection and peer feedback is seen as supporting more personal growth needs and providing assistance for narrow, specific, and immediate needs in their classroom practice. They tend to trust more the professional vision of their supervisors rather than their own perceptions of their teaching practice.

Discussion

The Reflective Lens study focused on three main questions:

1. How do Intern teachers use reflection to describe their own practice?
2. How does Intern teacher reflective ability change with the use of video recordings of his or her own classroom teaching as the object of reflection?
3. Is there a relationship between the application of reflective skills and teaching expertise as measured by PACT?

As we look at the results and outcomes of this study, it becomes clear that as programs build the scaffolds to support preservice teacher reflection that they must consider their goals of the reflective exercise and the desired outcomes in their preservice teacher candidates. Reflection is not a generic activity but has multiple dimensions, some of which are effected by outside factors and some are more affected by internal development. With these participants we find that reflective voice resists change to outside factors while reflective focus is greatly influenced by outside factors such as video of one's teaching. The current study also provides compelling evidence that video is a powerful tool to promote increasingly sophisticated levels of reflective focus. By viewing and reflecting on their teaching through video, preservice teachers can support their pedagogical knowledge with examples from their own classroom practice. By better understanding how reflection interacts with beginning teacher performance, teacher educators will be able to design better tools to support the professional development of preservice teacher candidates.

How do Intern teachers use reflection to describe their own practice?

The participants in this study demonstrated the ability to use various reflective writing types and foci in their writing. All of the writing samples exhibited at least some self-reflection. Many interns also used more than one type of reflection within the same sample. Some also varied the focus of their reflection. This ability to use the different reflection types and foci suggest that the progression through the stages of reflection is not a linear process. The preponderance of reflections in this study followed the same hierarchy as described in the literature.

Bryan (1996) found that with preservice science teachers, reflection was a spiral process moving from general to specific foci across the following dimensions: learning to isolate and interpret action; framing and reframing problems of practice; and taking and interpreting action. Similarly, participants in the current study were able to spiral different reflective foci within the reflective writing types. In the descriptive reflection voice, interns were able to use the technical, practical, and critical perspective to analyze and support their thoughts about teaching. As they progressed in the use of dialogic reflection, they once again used various reflective foci in their analysis. This reflective spiral allows the preservice teacher to build on skills they have attained while advancing in their skills in reflection and their teaching performance. With reflection comes both refinement and improvement in teaching skill as well as conceptual changes regarding the art of teaching (Bryan *et al.*, 1996).

The interns in this study also exhibited a preponderance of descriptive self-reflections that focused on the technical aspects of teaching. This finding was consistent with those of sixteen previous studies that found a propensity of descriptive reflection from a technical perspective among beginning teachers (Hatton & Smith, 1995). This makes sense considering that most preservice teacher candidates have little teaching experience and limited opportunity to formally reflect on their own actions. New teachers instead rely on descriptions of newly acquired pedagogy and uncritical summaries of their experiences. However, we see that these new teachers can learn to use more sophisticated forms of reflection to help them improve their practice.

The Reflective Writing Guide (Appendix E) was developed to provide scaffolding for the reflective writing process. The early reflective writing activity was one of the first in-depth writing assignments undertaken by the Intern teachers. While the Guide did support the early use of reflective writing by Interns, the specificity of the guiding questions may have had the unintended effect of limiting the type and the focus of the reflective writing produced. If the guide had more explicitly scaffolded the all three types of reflective writing (descriptive, dialogic, and critical) and the various foci of reflective writing (technical, practical, or critical), Interns may have exhibited a greater variety of reflective writing and a higher incidence of the advanced forms of reflection.

How does intern teacher reflective ability change with the use of video recordings of his or her own classroom teaching as the object of reflection?

Effect of video on self-reflection. Experience and guided practice is the main route to expertise (Chi, 1993; Chi et al., 1988; Glaser, 1985a, 1985b). Self-reflection on the video record of a teaching event can multiply the benefits a teachers memory of a teaching experience (Crotty & Allyn, 2001; Jensen & et al., 1994; Norton, 1997; Sherin, 2003; Wojcik, 1993). Previous studies show that reflection of video-taped lessons allows a novice teacher experience the instructional event multiple times by reviewing and reflecting on the video of their own teaching.

Reflection is generally considered to be a vital component of professional growth (Berliner, 1988; Chi et al., 1994; Dreyfus, 2004; Feiman-Nemser, 2003; Schön, 1991; Van Manen, 1999). It is the vehicle used to analyze, interpret, and make sense of experiences contributing to conceptual changes in how one views one's own teaching. However, it is also recognized that no single series of steps or experiences bring about these changes (Bryan et al., 1996). Some researchers have questioned if it is even possible to accelerate professional growth through reflection (Byra, 1996; Hatton & Smith, 1995). The evidence reported in the current study strongly suggests that reflection on one's own video-taped lessons do support increased sophistication in the reflective focus. However, the reflective writing type, or voice, does not seem to be altered by experience with video analysis, at least during the limited period of time afforded by a typical preservice teacher education program.

Changes in the type of reflective writing. Writing samples analyzed from both the 2004-05 Intern cohort and from the 2005-06 Intern cohort showed very little change in their reflective writing type. The writing was predominately descriptive reflection, as was expected with a novice teacher, with some dialogic reflection and rare instances of critical reflection (Berliner, 1988; Dreyfus, 2004). Previous studies reported that 60-70% of preservice teacher reflective writing was descriptive, 30% was dialogic, and they found 3 instances of critical reflection (Hatton & Smith, 1994, 1995). These studies also noted that almost half of the participants combined descriptive and dialogic reflection in their writing. Figures 1, 2, and 3 show the percentage frequencies of specific reflective writing types used by participants in the current study.

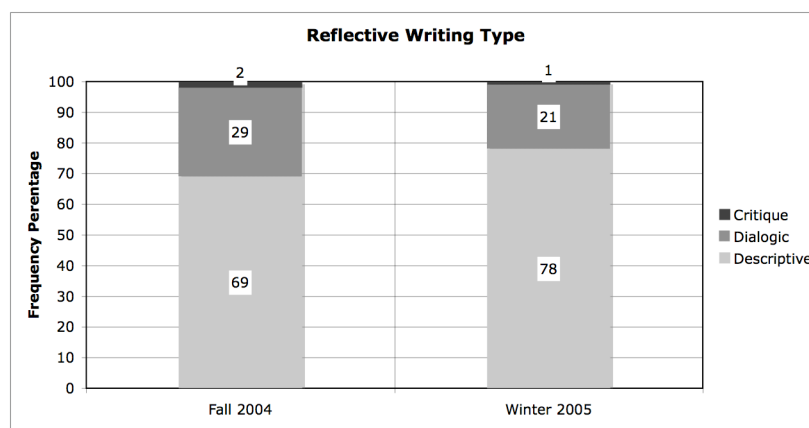


Figure 1: Reflective Writing Type used in 2004-2005 Cohort's Writing Samples

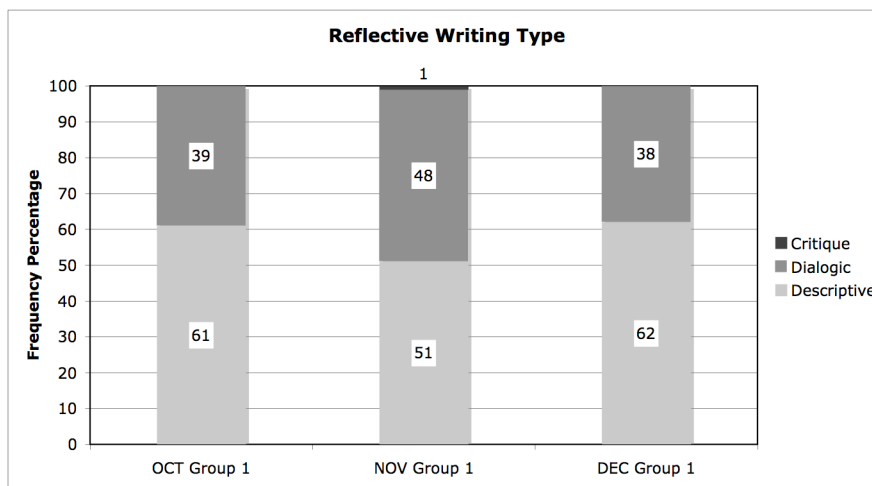


Figure 2: Reflective Writing Type used by in 2005-2006 Group 1 Cohort's Writing Samples

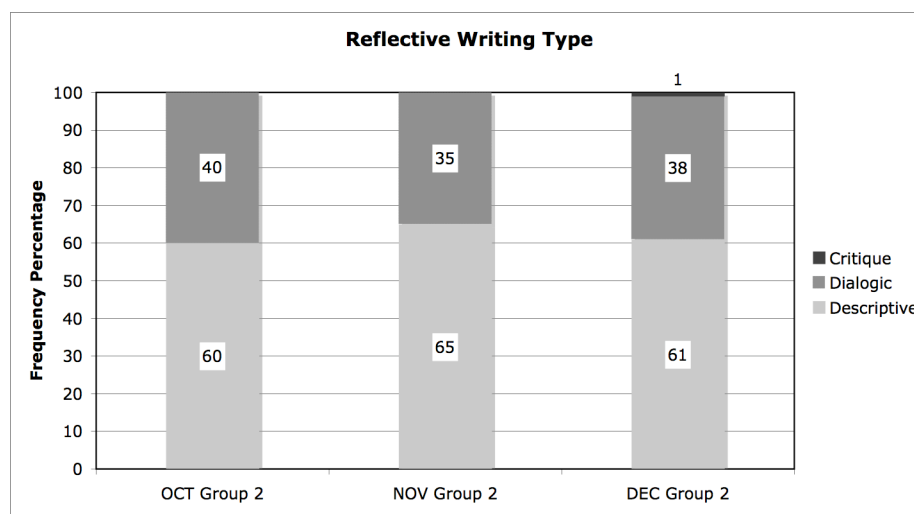


Figure 3: Reflective Writing Type used in 2005-2006 Group 2 Cohort's Writing Samples

We can see from the writing samples of these Intern teachers that the type of reflective writing used corresponds to what is expected of a novice preservice teacher. The writing samples were collected at regular intervals over a four-month period. At each stage of the Intern teacher's development, their reflective voice remained constant. The literature reports that as a teacher gains in expertise they are able to use

more sophisticated types of reflective writing, progressing from primarily descriptive reflection, to dialogic reflection, and finally to incorporating reflective critique (Bauer, 1991; Berliner, 1988; Ferraro, 2000; Freese, 1999; Hatton & Smith, 1995; Rodgers, 2002). However, development across these stages of reflective writing types was not observed within the short four-month time frame of this study.

The 2004-2005 Intern cohort used video to observe their own teaching prior to completing the reflective writing about the experience for both assignments over the four-month period. The 2005-2006 Intern cohort completed three writing assignments over a similar period and alternated the use of video to support their reflective writing with relying only on their recall of the lesson. These variations on the use of video and alternating the use of video and recall had little effect on the type of reflective writing used by the Intern teachers. Their reflections were predominately descriptive in nature and remained descriptive with or without the use of video. Byra (1996) also found that the type of reflection used by preservice teachers remained consistent when they used video or when they conferenced with a more experienced mentor.

The type of task also had little impact on the type of reflective writing employed by these Intern teachers. The 2004-2005 Intern cohort had two writing tasks, the first writing task was to reflect on a single teaching event and the second was to reflect on their overall teaching experience for a lesson series. The type of reflective writing produced for both tasks was predominately descriptive, with some dialogic reflection and more often a combination of the two types. Even when an Intern teacher used multiple types of reflective writing, the majority of their statements

were descriptive. Again this finding is consistent with the literature and previous studies with preservice teachers. Byra (1996) used two very different tasks to promote reflection in preservice teachers: conferencing and video self-reflection. Across these two tasks the type of reflection used by those participants remained consistent. Hatton and Smith (1995) used four tasks to promote reflection in preservice teachers: a written report, a self-evaluation, video reports, and an interview. The type of reflection remained mainly descriptive for all four types of task.

A beginning teacher's reflective voice seems to be quite persistent. It seems largely unaffected by external factors such as the amount of experience (as observed over the four-month period in this study), use of video technology, or type of task. Changes in one's type of reflective writing may be more closely tied to experience and expertise. As a novice teacher progresses through the stages of development described by Dreyfus (2004), their reflective writing type may also develop and advance to more sophisticated types of reflective writing over longer periods of time. However, within the time frame of this study, these changes were not observed.

Changes in the focus of reflective writing. The reflective writing samples for the 2004-2005 Intern cohort and the 2005-2006 Intern cohort were analyzed for the focus of the reflective writing. The Intern's focus was significantly affected by the use of video as a support to their reflective writing. The use of video allowed these preservice teachers to use specific examples and classroom interaction to support their reflection in addition to relying on their knowledge of pedagogy to make sense of their

teaching. The video-supported reflective writing had a balance between statements taking on a more technical perspective and statements with a practical perspective.

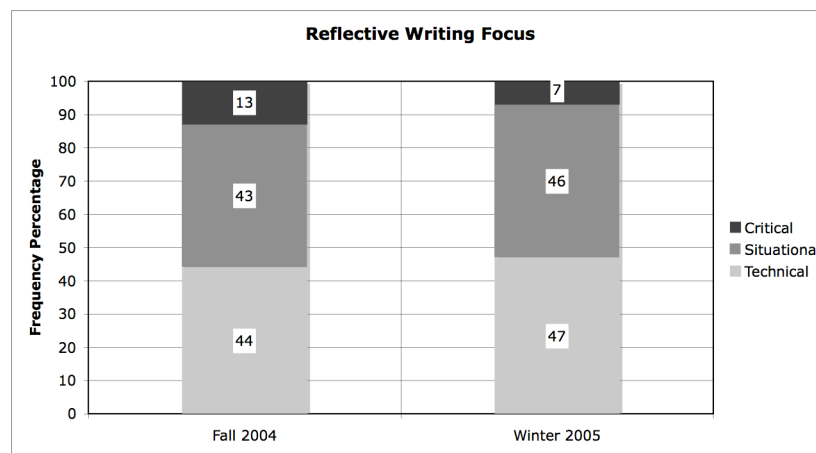


Figure 4: Reflective Writing Focus used in 2004-2005 Cohort's Writing Samples

The 2004-2005 Intern cohort used video during both of the reflective writing tasks of this study. Figure 4 shows the fall and winter writing samples approximately equal amounts of technical and practical focus, and over half of the interns employed a combination of the two foci in their writing.

In an earlier study that used video in as a discussion starter in preservice teacher video clubs², the use of video facilitated the shift from describing events to description of specific classroom events and the use of specific student actions to support the analysis (Sherin, 2000, 2002, 2003; van Es & Sherin, 2002). In the reflective focus dimension of this study, the Interns used specific examples from the video to support their self-reflection statements.

² Video clubs are informal groupings, during which teachers watch and analyze videos of one another in the classroom, designed to contribute to their professional development.

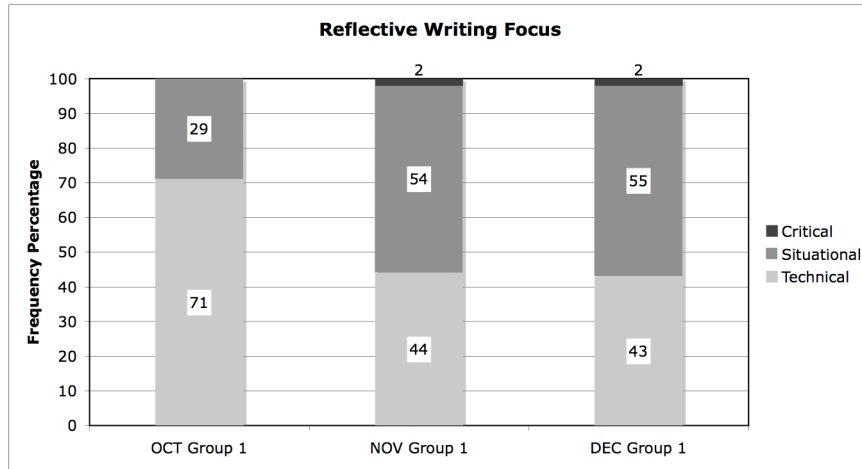


Figure 5: Reflective Writing Focus used by in 2005-2006 Group 1 Cohort's Writing Samples

When the 2005-2006 Intern cohort's reflective writing was analyzed for the reflective focus, the impact of video on their writing was even more evident. The two groups in this cohort alternated using video and recall to support their reflective writing.

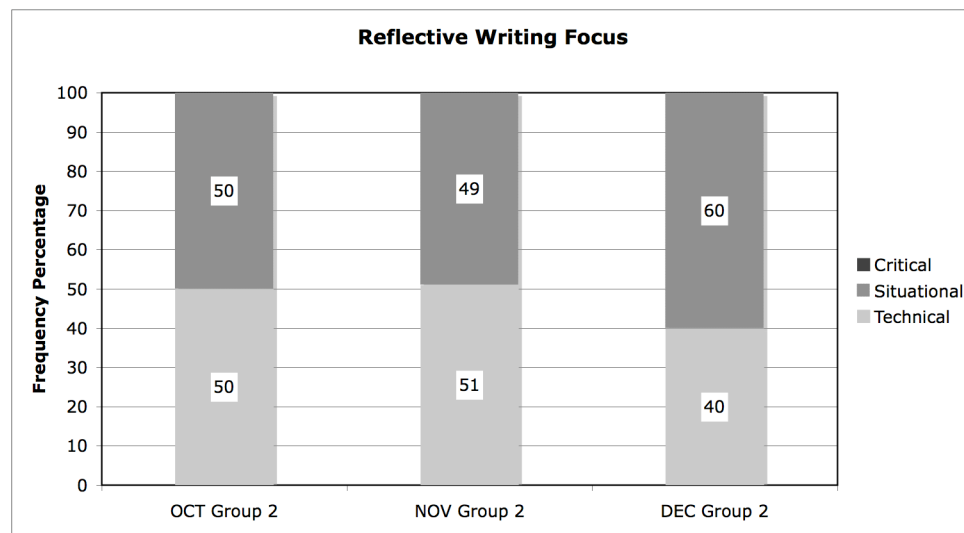


Figure 6: Reflective Writing Focus used by in 2005-2006 Group 2 Cohort's Writing Samples

Again, video supported a balanced use between a technical focus and a practical focus, as seen in Figure 6. The participants using video cited specific classroom examples to support their thoughts and reflections about teaching. The participant group that did not use video, October Group 1 as seen in Figure 5, mainly used a technical focus using their knowledge of pedagogy to support their statements without connecting those statements to specific examples from the focus lesson. One study investigating the differences between the reflections of preservice and in-service teachers found that video aided the preservice teacher's use of evidence to support their reflections (Campoy & Radcliffe, 2002). The video-using group in this study also seemed to be better able to use evidence to support their reflections.

The use of video as a support to reflective writing also has a persistent effect on how these preservice teachers conceptualized their teaching and classroom experiences. The preservice teachers in this study seem to be able to create a visual picture of the classroom interactions to act as a replacement for the video. Bryan (1996) reports a similar reconceptualization by elementary school science teachers. As was previously shown, the 2005-2006 Intern teacher group that did not use video in the first writing sample and then used video in the second writing sample, as shown in Figure 5, had a shift in the focus from mainly a technical focus to a balanced focus that incorporate both technical and practical reflections. In contrast when this order of using video was reversed, when the participant group used video in their reflective writing first and then did not rely on video for the second reflective writing task, their writing samples continued to have a balanced focus between a technical perspective

and a practical perspective, as shown in Figure 6. The effects of video on the reflective writing of these preservice teachers persist over the 4-week period between reflective writing tasks of this study.

Reflection, reflective practice, and reflective writing in teacher education as been described as a method of linking theory with practice (Hoffman-Kipp, 2003; Martinez & Mackay, 2002). In order to make sense of the teaching experience and to gain expertise in the business of teaching, preservice teachers must combine the knowledge they gain about pedagogy with the everyday realities of the classroom and student learning. Too often preservice teachers focus on the technical aspects of teaching and less on the practical (Byra, 1996; Campoy & Radcliffe, 2002; Hatton & Smith, 1994). In the current study, the use of video-taped lessons has been shown to encourage the use of technical and practical aspects of teaching in their reflective writing. This process also seems to help novice teachers move through the growth levels of reflection described by Schön (1991) and Van Manen (1999) as well as advancing along the professional growth continuum described by Dreyfus (2004) and Berliner (1988).

DIVER as a Powerful Tool. Although the DIVER subgroup of participants in the 2004-2005 Intern cohort represents a very small, self-selected group of participants, the study showed some interesting patterns in their self-reflections over the two writing tasks. The results indicated that the reflective writing type used by the DIVER subgroup did not significantly change when using traditional video techniques in the fall or when using the DIVER application in the winter. However, as Figure 7

shows, there was a substantial change in their reflective writing focus when we compare their writing using traditional video applications and DIVER. The analysis of the initial reflections in the fall writing sample shows a balance between the three forms of reflective focus when this subgroup used traditional video techniques. The majority of these reflections were technical with less practical reflections but a noteworthy occurrence of critical reflections. Though this self-selected subgroup was small, they exhibited a much higher incidence of critical reflection in the fall writing sample (21% as shown in Figure 7) than the larger Intern cohort's fall writing sample (13% as shown in Figure 4).

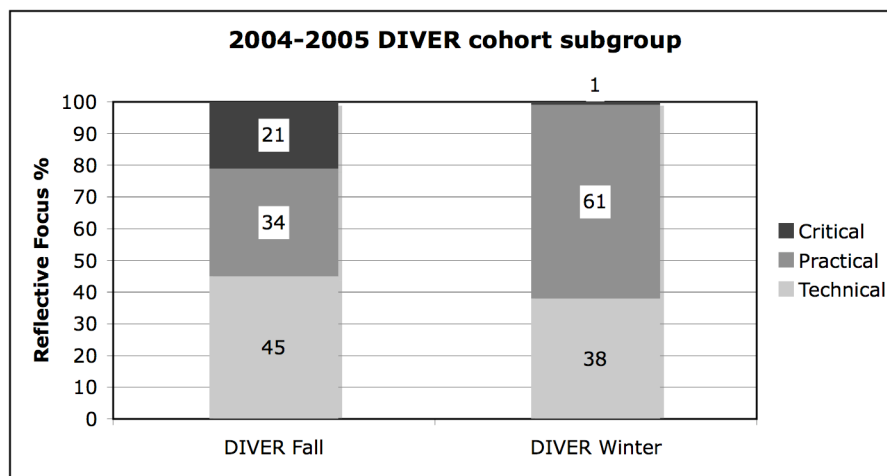


Figure 7: 2004-2005 DIVER cohort subgroup Reflective Writing Focus

When this subgroup used the DIVER application for their video self-reflections in the winter writing task, my analysis shows that they exhibited roughly the same amount of technical focus, increased practical reflection and a proportional decrease in critical reflection. The DIVER group initially exhibited much more critical

reflection than the other participants seemed to decrease in their use of critical reflection after using the DIVER application as a reflective writing tool.

This data may be showing the effects of DIVER guiding and directing the reflections of this group much more than observed using typical reflective methods. In the fall writing task, participants viewed their video on a television monitor. Essentially, they became observers in the back of their classrooms by viewing videotapes of their lessons and classroom interactions. The DIVER application, on the other hand, engages the observer as an active participant in the lesson. DIVER's virtual camera allows one to pan and zoom within the video clip, giving the observer the ability to decide which aspects of the scene they want to analyze. They can select a student or particular group of students in one section of the video and then zoom in to observe that group, temporarily reducing the field of view from the whole class to one or more subgroups in order to isolate a specific classroom interaction.

The interaction between user and DIVER may encourage practical reflections of classroom interactions, thus reducing the amount of critical analysis. DIVER is a powerful interactive tool that can guide a novice in the analysis of action, but it can encourage a particular type of learning that can have both positive and negative impact. Further studies of DIVER are needed to determine more precisely how it influences reflective analysis of classroom lessons and its implications for improving new teacher development.

Is there a relationship between the application of reflective skills and teaching expertise as measured by PACT?

Connections between reflection measure and teacher expertise measures.

Analysis of the PACT Teaching Event score data showed that all of the measures correlated very highly to all the other measures of the Teaching Event. There is a strong relationship between the measures in the Planning Task, Instruction Task, Assessment Task, Reflection Task, and Academic Language. When the Teaching Event scores were analyzed with multiple hierarchical regression analysis, it was found that although reflection had strong correlations with the other measures in the PACT Teaching Event, that by itself reflection had little effect or predictive power in regards to the Planning and Instruction Task measures. However, measures in the Reflection Task had a significant effect and predictive value with the Assessment Task measure. Reflection and Assessment, as measured by the PACT Teaching Event, are closely bound together. A preservice teacher's ability to perform on the Reflection Task has a direct bearing on his/her performance on the Assessment Task.

A factor analysis of the individual measures within each task revealed that they formed two factors along the same clusters suggested by the regression analysis. The Planning Task, Instruction Task, and Academic Language measures formed one factor with the Assessment Task and Reflection Task forming the second factor. The Planning and Instruction tasks might be considered as "skill-based" and the Assessment and Reflection tasks "analysis-based".

These two analysis approaches appear to be in conflict with one another. The factor analysis suggests that the tasks form only two constructs, and that reflection and assessment are in the same construct. The regression analysis suggests that reflection, as measured by the PACT Teaching Event, is a predictive indicator for the Assessment task. To disentangle the relationship between reflection and other teacher skill areas such as planning, instruction, and assessment more data sources and research is needed in this area.

Analysis of the PACT Teaching Event measures from both the 2004-2005 and 2005-2006 Intern cohorts are similar to results of analysis conducted on the larger PACT participant group to over 700 preservice teachers across the state. These results have meaning for what happened during the development of these preservice teachers.

The progression of learning by preservice teacher candidates. The participants in this study engage in learning the core teacher skills in a specific sequence. These skills are developed over a 22-month period for most of these participants, beginning in their senior year and continue through a 15 month graduate credential program. The process begins with the creation of lesson plans based on a theoretical understanding of students and learning. They progress to modifying the lesson plans of veteran teachers as they are placed in the classroom with more experiences cooperating teachers. Next, students create lessons for their Intern teacher assignments several months prior to the beginning of the school year. By now they have some actual classroom experience to provide context for these lesson plans.

Finally, as Intern teachers they create the lesson plans for their day-to-day teaching throughout their year-long internship.

The task of learning about classroom instruction follows a similar pattern and starts shortly after the students have begun learning about lesson planning. These Interns first observed veteran teachers in action over several months. Eventually they practiced the classroom instruction within the established structures of the veteran teacher's classroom. The Interns then begin the process of planning the instruction for their students as they start a year-long process of independent teaching in the classroom.

Learning to use assessment to guide one's teaching occurs late in the teaching experience for these preservice Intern teachers. While they receive guidance on planning for student assessment in their classrooms, they are not given explicit methods to reflect on those assessments to make decisions about their own teaching until late in their Intern teaching placement. Prior to this they simply use the assessment to analyze student understanding of the content. Figure 8 illustrates this progression of learned skills by the Intern teacher participants

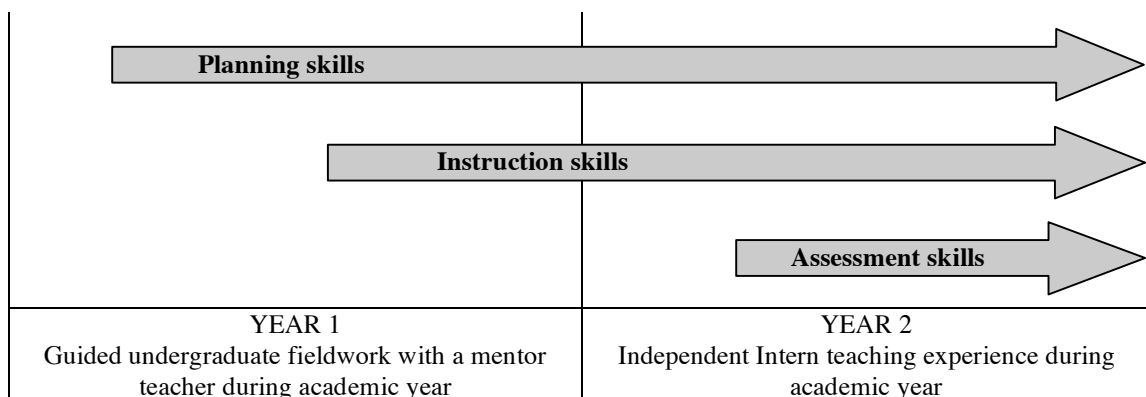


Figure 8: Progression of learned teaching skills by the Intern teachers

Alignment of PACT measures with teacher training progression. The PACT Teaching Events are organized around the major teacher skills. They have been organized around the major, or key, constructs of lesson planning, classroom instruction, student assessment, and reflection of practice (Pechone & Chung, 2004). These key constructs become the Teaching Event tasks of the PACT. The order of the Teaching Event tasks closely follows the order in which most teachers approach the teaching process and the order that most preservice teachers receive direct instruction on attaining these teacher skills. It begins with understanding the context of the learning environment, the sequence of lesson are planned, the instruction occurs with a group of students, followed by considering the student assessment to inform the teacher about student understandings and next steps for their further support of those student understanding.

Because of the progression of instruction for this cohort of Interns, it isn't surprising that they would be more skilled in lesson planning, followed by instruction, and finally by assessment. Table 25 shows the PACT Teaching Event scores for this group and the planning task has the highest average score, followed by the instruction and assessment. The reflection and assessment tasks averages are about the same.

Table 25: Average PACT Teaching Event task scores for the participant cohort groups

	PACT Teaching Event Measures			
	Average Scores			
	Planning Task	Instruction Task	Assessment Task	Reflection Task
2004-2005 Cohort	3.18	2.99	2.66	2.66
2005-2006 Cohort	2.40	2.16	2.14	1.96

PACT measures become a reflection of preservice teacher skills. The data analysis for the PACT Teaching Event show that reflection has an effect on the measures for other teacher skills in this particular assessment of preservice teacher competencies. We also see from the analysis that reflection's role in professional development is much more complicated than we may believe. The various measures being assessed by the PACT Teaching Event seem to be interrelated. The only measure within the PACT Teaching Event that is clearly influenced by reflection alone is the assessment task.

The factor analysis results sheds some light on how the Reflection task is related to the other three tasks in the PACT Teaching Event. As mentioned earlier, the Planning and Instruction tasks can be viewed as measures of teaching skill. The interns demonstrated their ability to plan a cohesive, coherent, connected set of lessons to meet a specific learning objective. The Instruction task documented the implementation of Intern lessons and their interaction with students. The Assessment and Reflection tasks are measures of the Interns ability to analyze student achievement and teaching actions. The teacher candidate examines the entire teaching and learning experience from the PACT Teaching Event to explain the results and suggest how these results will influence and guide their teaching.

The results of the PACT Teaching Event analysis also show the areas of strength for these preservice teachers as well as areas that they are beginning to develop. As Figure 8 illustrates, these Interns had a considerable experience planning and implementing lessons. They developed these skills within a highly defined

structure. They observe planning and instruction by highly skilled mentor teachers and adapted this work for their own teaching in the same classroom setting. They then reflected on these practices from a more theoretical perspective during the summer and finally independently enacted these practices in their own classrooms.

Assessment and reflection are relatively new skills for these Intern teachers. Assessment and reflection skills were introduced later than planning and instruction and were generally not scaffolded in the structured classroom environment. Interns begin analyzing student work samples and the associated assessment of achievement and learning needs only after they are in their independent teaching. They do not have the in-situ support of a mentor teacher to provide guidance for assessment as they did for planning and instruction. At the time the PACT Teaching Event is implemented, Assessment and Reflection tasks are still new areas of professional growth.

The Preservice Teacher's View of Self-Reflection and Professional Growth

The structure and questions posed in the questionnaire were designed to elicit specific themes from the Interns. While it was uncertain how the Interns would actually respond to the survey questions, there was the expectation that the responses would, at a minimum, address peer-mentor relationships and the use of video as a reflective writing tool. Once the Intern responses to these questions were analyzed, these themes as well as others were explored more deeply during the face-to-face interviews. These interviews allowed small, randomly selected subset of Interns to express their thoughts about these pre-determined themes, as well as range of other issues raised during these open-ended interviews.

The perceived value of self-reflection and technology. The participants viewed reflection in general, and self-reflection specifically, as an important activity in their development as teachers. They saw value in being able to analyze and make judgments about their teaching based on the interactions in the classroom and student learning outcomes. They also viewed video of their own teaching as the only way to gain unique perspectives on their teaching practices. They were in fact able to become, or take on the role, of observer in the back of their own classroom.

The Intern teachers in the study seemed to view their perspectives on their own teaching as being narrow and limited. They felt that it was narrow due to their recall of events in the classroom as well as their uncertainty about what was important to focus on and what was of less importance. While the use of video may assist in widening their perspective of the classroom as well as alleviating the need to rely solely on recall of the lesson, these participants still maintained that they did not trust their own eyes to identify the critical interactions that would lead them to a deeper level of expertise. They commented on how their own limited expertise and time in the classroom handicapped their interpretation of their teaching, even when viewed on video. This lack of experience also contributed to the feeling that their perspective was limited in usefulness in their professional growth.

Conversely, the Intern teachers considered the feedback from their mentors and universities supervisors as the most valuable contribution to their professional development. They viewed their mentors as having a broader perspective on the

classroom interactions and a unique ability to guide their growth based on critical skill areas that they could develop. They also indicated that the feedback of their peers had limited usefulness to their broader goals of professional growth; if their own viewpoint was limited due to their lack of experience, then that of their peers must suffer from these same limitation. Their peers were seen primarily as a support network and less as a professional growth resource.

The preservice teachers in this study held a complex mix of views and opinions about their own professional growth and the activities that would support their professional growth goals. They valued self-reflection, the use of technology, and the feedback of their peers. They also valued the mentorship and guidance from veteran teachers and university supervisors. While they seemed to place a higher value on the feedback from mentors over that of their peers or themselves, they viewed these two as serving separate purposes. The support of their mentors served their broader needs to develop and grow as an effective classroom teacher. The input from their peers served a vital support role they struggled to make sense of classroom and the complexities of teaching.

Summary of Findings

Reflective writing. This study explored two dimensions of reflection on teaching practice: 1) the type, or voice, of the writing, and 2) the focus, or perspective, of the writing. It was shown that the type of reflective writing completed by the participants was resistant to change or influence by outside forces such as task and

video within the short four-month time frame of this study. Perhaps over a longer period of time we would be able to observe changes in the reflective writing type as described in several previously cited studies.

The reflective writing focus, or perspective, showed a significant change when these preservice teachers used video-tapes of their own teaching as the object of reflection on their practice. When these Intern teachers used recall alone and reflected on their teaching, they tended to report the pedagogical knowledge attained in their education courses and offered a context-free description of their teaching.

These findings are consistent with description of novice teacher behavior by Dreyfus (2004) and Berliner (Berliner, 2004) and studies concerning the limitations of recall of classroom events by preservice and other novice teachers (Allen, 1998; Allen & Casbergue, 2000; Van Zoest Laura, 1995; Wojcik, 1993).

Most of the reflective writing samples from the group relying on their recall of the lesson to reflect on their teaching contained predominately a technical focus. When videotapes of lessons were introduced, their writing focus shifted from being predominately technical in focus to having an equal balance between the technical and practical perspectives. This shift represented an ability to use specific examples from the classroom interactions as well as pedagogy knowledge about teaching to support their reflections. This shift in focus when video is used as the object of reflections was reported in previous studies as well (McIntyre & Pape, 1993; Sherin, 2000, 2002; van Es & Sherin, 2002). The ability to use specific examples of classroom events in

combination with descriptions of pedagogy seemed to carry over to future reflective writing tasks, even when video was not used.

Connections between measures. When the PACT Teaching Event was examined as a marker for these preservice teachers' skill level in planning, instruction, assessment of students, and reflection, it was found that reflection had a strong relationship with the planning and instruction measures for teaching skills, however reflection alone was not a strong predictive indicator of a preservice teacher's performance on the planning or instruction measures. Further analysis showed that reflection by itself was a strong predictive indicator for assessment.

These findings may reflect the skill levels of the preservice Intern teachers in this study within each domain measured by the PACT Teaching Event. The more skill-based measures of planning and instruction were under development for more than 20-months by these participants, while the analysis-based measure of assessment had been introduced a 3-4 months prior to the implementation of the PACT Teaching Event.

The relationships observed within the PACT Teaching Event tasks may also be a function of the constructs within the overall PACT. As the factor analysis showed, two factors emerge from the scores: 1) Planning and Instruction tasks and 2) Assessment and Reflection tasks. We may be observing the measurement of two skill areas within the PACT Teaching Event. The first factor may represent a skill in structuring lessons and demonstrating some observable instructional skills. The second factor may represent reflective ability. Both the reflection task and the assessment task

require the candidate to reflect on their teaching and make teaching decisions based on the analysis of some student work samples. More study is required to explore further connections between reflection and teacher skills.

The whole teacher. The analysis of questionnaire responses and participant interviews offers a more complex view of the preservice teacher's beliefs about professional development. Preservice teachers have their own beliefs about the kind of scaffold experiences and other support structures will have a positive impact on their growth as a beginning teacher. The Interns valued self-reflection and the use of video-taped lessons as objects of reflection. And while they also valued their collaboration with peers and the feedback from their students, these interactions were viewed more as a support network that they could count on during the credential program. However, it was their interaction with the perceived experts in teaching, their fieldwork supervisors and mentor teachers that they believed were most beneficial to their attaining broader goals of developing as a teacher. As we know from the world of adult learning, each learner comes with different needs, expectations, and experiences (Barton & Tusting, 2003; Merriam & Caffarella, 1991; Tennant & Pogson, 1995; Williams, 2001). All of these differences must be part of the decision process when structuring the learning environment for preservice teachers.

A Researcher's Reflections

Learning to become a teacher is a complex and difficult task. The main skills areas of a teacher are tightly bound together and each one has a profound effect on one's overall teaching and effectiveness in the classroom. Add to these challenges the

fact that each new group of students changes how a teacher goes about teaching and you have a dynamic learning environment in which to attain teaching skills.

The central focus of this study has been the reflections of preservice teachers and the professional growth gains they made using video of their own classroom practice. I have attempted to disentangle the various dimensions of reflection in order to better understand the novice's progression through these dimensions. Now it is time for me to reflect on my own growth as an educational researcher and preservice teacher mentor.

Through this study I have learned as much about these preservice teacher's professional growth as they have learned about becoming an effective classroom teacher. This study has afforded me a glimpse into the very personal world of growth and learning by these Intern cohorts. They have granted me access to a world that is seldom viewed; their own thoughts about becoming a professional.

One thing that struck me about the participants in this study was how they were so very different from one another and yet shared many common attributes. No matter the task, whether it was reflecting on video of themselves teaching, or engaging in the PACT Teaching Event, these preservice teachers willingly fulfilled any task that would enhance their teaching skills. They eagerly pursued and achieved their ultimate goal – to help their own students learn. This goal was evident in everything they did throughout the process of becoming credentialed teachers. At the same time they were all unique in their individual backgrounds, experiences, strengths and weaknesses. This common goal coupled with unique individual qualities becomes both an asset to a

teacher education program and an obstacle to supporting each preservice teacher as a learner.

It has been through this study that I have truly begun to appreciate the preservice teacher as an individual. And with this appreciation comes a renewed desire to ensure that the tasks and activities that they take on during their studies both enables the cohort as well as the individual to meet their full potential as teachers. Each task must be defined specifically enough so that each Intern understands the outcome. The task must also be broad enough to allow for individual strengths to be used in completing the activity to enhance their individual growth. We must be mindful of this balance to support our own preservice teachers in the future.

Implications for Teacher Education

Further Research and Questions

Steps or Spirals? One of the main questions that arise from this study concerns teacher education program design. As the regression analysis suggested, the preservice teacher performance on the PACT Teaching Event is closely aligned with the progression of learning opportunities for lesson planning, classroom instruction, and assessing student performance. Figure 8 displays the timeline for these skills during the two-year period of the teacher education program.

The *time-phased* introduction of these teacher skills, as shown in Figure 8, represents a stepped approach to teacher development. A preservice teacher candidate is introduced to the three main teacher skills in a sequential order: planning, instruction, and then assessment. Interns engage in learning each skill over a period of time and then are asked to coordinate prior understandings with the introduction of the next skill. The teacher candidate must reach the desired level of competency in the current skill area prior to moving on the successive skill. Students *step* from skill to skill, and incorporate prior understandings into the subsequent skill area.

Another model for introducing teaching skills can be visualized as a *spiral* learning process. In a spiral curriculum, the teacher candidate would be introduced to all three skill areas simultaneously. Each Intern would be asked to attain a beginning level of competency in all three skills. As they take on incrementally greater responsibility for instruction, Interns are asked to revisit planning, instruction, and

assessment processes at higher levels of sophistication and independence. In this way, the preservice teacher progresses in competency for all three skill areas at approximately the same rate.

Teacher education programs would have to reconsider their goals of educating new teachers to enter the classroom. Would students be expected to master these teaching skills in a step-like manner, gaining in one foundational area before beginning the next? This approach may be more appropriate for the student teaching model of teacher education where a master teacher is always available to provide scaffolding in skills not attained by the novice teacher. The alternative spiral model would produce PACT Teaching Event measures that were approximately equal in competency. The skill level reached in this model may initially be limited but may be more appropriate for an internship approach to teacher education where the novice teacher is the teacher-of-record and has less consistent mentoring by expert teachers.

The implications of employing a step vs. spiral approach to developing specific teacher skills will differ depending on the type of field experience employed by preservice teacher programs. An Intern program, such as the one described in this study, enjoys the luxury of a two-year field experience, beginning with a variety of undergraduate field experiences and continuing with a yearlong graduate internship where they served as teacher of record. In a more typical credential program, the field experience occurs over a much shorter timeline, often one academic semester and generally secondary student teachers are not expected to participate for the full-school day except for a relatively brief period.

This study showed that for Intern teachers, it might be better for planning, instruction, and assessment to be introduced simultaneously and gradually spiral the level of complexity and independence for the three skills. For example, while under the guidance of a veteran cooperating teacher during early field experiences, these skills could be introduced simultaneously. The established classroom structures of the cooperating teacher would enable the preservice teacher to learn these skills at a slower pace. Once they complete this early experience, Interns would continue to develop sophistication and independence through additional pedagogical coursework and throughout the internship.

Participants in a student teaching program may, on the other hand, benefit by developing these skills sequentially under the ongoing guidance of a master teacher. Student teachers would be initially introduced to lesson planning during their methods courses and the implementation of these lesson would be scaffolded by their Master teacher. As their instructional skills progress, the master teacher would initially provide input on student assessment to inform their teaching and gradually turn over responsibility for assessment to the student teacher.

The development of these fundamental teaching skills needs to work in harmony with the realities of the field experiences of the preservice teacher. The process must be adapted, modified, and structured to increase the preservice teacher's skill within the time frame and professional scaffolding afforded by their program of study.

Long-term effects of video analysis? The Reflective Lens study examined the changes in Intern teachers' reflective writing over a four-month period. The results clearly show that viewing one's own teaching through the use of video significantly affects the focus of their reflective writing. The focus of writing shifted from primarily technical to a more balanced presentation of technical and practical perspectives. It is unclear if the use of video would support further development in the reflective writing of preservice teachers. If more time were allowed for reflective tasks, would the Intern, or teachers in their first two years of teaching, begin to exhibit a critical focus in their reflections, which would indicate a more advanced level of professional growth? In this study, the type of task, duration of the reflective tasks, and the use of video did not increase the incidence of critical reflection or critical perspective in writings about their own teaching.

Advancing professional growth? The primary focus of this study was on the written self-reflection of preservice Intern teachers. The written self-reflection activity is a narrow component to the professional growth of new teachers. What would be the results of a more complete, robust program of support? How would a program that included self-reflection in combination with peer collaboration affect the professional growth of these preservice teachers? How would video evidence of the preservice teacher's classroom practice in combination with systematic mentoring by expert teachers affect their professional growth? While The Reflective Lens study documented the significant effect on the focus of reflective writing by having Interns

analyze and write about video-tapes of their own teaching, many intriguing questions remain that warrant further study.

Limitations of the Study

The participants in this study are part of a specialized course of study that includes a year-long paid internship in lieu of traditional student teaching. These students were fulfilling the requirements for the California Single Subject Teaching Credential in English, Mathematics, Life Science, Chemistry, or Physics, and simultaneously were completing a Masters degree in Education. The participants taught independently in the classroom as Intern teachers and did not experience traditional student teaching under a veteran master teacher.

Caution should be exercised when attempting to generalize the results of this study to other teacher education programs. The program participating in this study credentials approximately 35 secondary teachers annually. The vast majority of the student in this program attended elite, academically rigorous universities whose students typically graduate in the upper 12-15% of all California high school graduates.

Inferences based on the reflective writing samples from the 2004-2005 DIVER participant subgroup must also be viewed cautiously. The first-year DIVER group consisted of 7 members drawn from 2004-2005 Intern cohort. This group self-selected to use the DIVER video analysis tool based on personal interest in new software and their desire to explore the powerful features of this application. DIVER subgroup

participants also had to have access to a computer capable of running Windows 98, 2000, or XP, had a minimum 1GHz P3 processor, and at least 256MB of RAM.

Another limitation of the study was that the types and foci of reflective writing were not specifically defined during the self-reflection writing assignments.

Participants completed the writing tasks using their own understanding of reflection and what they felt was important to include in their written reflections. The only guideline provided to the first-year participants was the number of individual lessons to upon which to base their reflections. They were also not provided with any specific means in which to view and use their videos in the writing process.

Significance of the Research

Support of professional growth. The results of this study indicated that the activities and structures aimed at supporting the professional growth of preservice teachers must target those areas of growth that respond to outside influences. The expected changes must be carefully considered and the activities selected to meet those desired outcomes in professional teacher growth. The type of reflective writing exhibited by the Interns did not change significantly in response to the type of task or the use of video-taped lessons as the object of their reflective writing. It is possible that the four-month time frame was not sufficient to influence the type of reflective writing. However, the focus of the reflective writing was influenced significantly by the use of video-taped lessons, and these experiences had a persistent effect on the writing of the Interns during subsequent writing tasks.

Protocols and guidelines designed to support novice teacher development must be explicit and contextualized to ensure the maximum impact of those activities. The preservice teacher needs to understand the purpose of the reflective analysis, the actions they need to undertake, and the expected outcomes from the experience.

Balance of needs. The Interns in this study had a complex view of professional growth and the activities that would help them achieve their goals of becoming better teachers. Interns expressed a strong desire for both peer collaboration to support their day-to-day practice as well as the expert guidance of more experienced mentors. Interns need structured opportunities to reflect on the teaching of expert veteran teachers (Adler, 1990; Fernandez, 2002; Finn, 2002; Hatton & Smith, 1994; McCurry, 2002; McIntyre & Pape, 1993; van den Berg, 2001). Preservice teacher candidates must also learn to evaluate, critique and reflect on their own teaching to support their growth as teachers (Chi *et al.*, 1994; Lipka *et al.*, 1999; Wojcik, 1993; Yusko, 1997). In addition to the dimensions of self-reflection and reflection on the teaching of others, preservice teacher candidates should also be able to reflect on themselves as learners (Kohler *et al.*, 1997; Manouchehri, 2002; Rogers & Babinski, 2002; Wong & Nicotera, 2003) as well as experiencing the support of mentors (Brimijoin *et al.*, 2002; Daresh, 2003; Gratch, 1998; Jonson, 2002; Kelehear, 2002).

Future Research. The results of this study show that the development of a preservice teacher's reflective focus can be influenced through the use of analysis of video recorded lessons. However, there was little or no change in the reflective voice during the four-month period of this study. The literature suggests that as a

novice gains professional expertise, typically requiring up to six years of teaching experience, both the focus and voice of reflective writing will also advance to more sophisticated forms.

In order to better understand the development of reflective voice, it is clear from the current study that a longer intervention is required. A study of new teacher development might better begin with preservice teacher education and continue through the first two years of teaching and induction into the profession. A more effective study of the process of becoming a professional teacher would follow preservice graduates throughout their induction period.

The PACT Teaching Event offers teacher educators and researchers a unique measure of new teacher performance and reflective skills. However, by design the PACT scores offer a somewhat limited view of the capabilities and strengths of new teachers. Efforts should be made to link the PACT results with other measures of new teacher skills, such as support provider assessments and principal evaluations. PACT measures also facilitate longitudinal studies to investigate the interactions of teaching performance and reflective writing skills during preservice education, the induction period, and National Board Certification, which may have important implications for the design of preservice preparation and new teacher professional development.

Conclusion

Previous studies examining the reflective practices and writing of preservice teachers focused primarily on a snapshot in time of the preservice teacher's reflective abilities. These studies examined one reflective dimension (either the reflective voice

or the reflective focus) and offered limited comparisons of the variables that may influence reflection used to support professional growth. While these studies may have been limited in scope, they did provide a crucial foundation upon which to base further study into the reflective practices of teacher education programs and how those practices affected the growth of preservice teachers. The Reflective Lens study took the next step along this research foundation by examining multiple reflective dimensions over a longer period of time with several variables thought to have an influence on the reflection of preservice teachers.

The results of The Reflective Lens study clearly indicate that teacher education programs need to include carefully scaffolded video analysis activities if they want to help their students attain more sophisticated focus in their reflective writing. The reflective activities should take into account the various dimensions of reflection. The analysis of video-taped lessons is a powerful tool to promote increasingly sophisticated levels of reflective focus. It allows the preservice teacher to assume the outsider's perspective in his or her own classroom. By viewing and reflecting on their teaching through video, the preservice teacher can analyze their pedagogical knowledge by evoking examples from their actual classroom practice. This brings together the theory and practice of teaching. But it is not necessary to use video for every reflective lesson. Video analysis should be used early in a novice teacher's development and be reintroduced periodically throughout the preservice experience.

Intern teachers must be encouraged to reflect on planning, instruction, and assessment skills throughout their learning process. The support and scaffolding to

introduce reflection on practice need to be explicit, and tailored to meet the needs of the preservice teacher.

As the preservice teachers themselves expressed through the questionnaires and interviews of the Reflective Lens study, the structures to support the growth of preservice teachers must be multi-dimensional. These preservice teachers expressed a need for both peer support and mentor support, fulfilling different professional needs in their growth. They also expressed the need to examine their own teaching as well as being exposed to the teaching of exemplary mentors. This multidimensional model of reflective practice has many overlaps between reflection on own practice and reflection on the practice of others, as well as, self-reflection coupled with mentor feedback. This complete model offers supports for the various needs and expectations of preservice teacher professional growth.

Appendices

Appendix A: Review of Foundational Studies

Author	Year	Study	Participants	Data	Outcome
Bryan, Abell, Anderson	1996	Coaching Reflective practice among preservice elementary science teachers	1 preservice group	Observations and interviews	Reflection is non-linear. Spiral. Coached Reflection brings about conceptual changes about teaching.
Hatton, Smith	2006	Reflection in Teacher Education (Review)	Preservice teachers (16 studies)	Drawn from various studies	Very little evidence of critical, but mostly practical and technical types of reflection.
Hatton, Smith	1995	Foster Reflection: The nature of reflection	Preservice cohort over 4-years.	Used written reflections, self-evaluations, video (micro) interview Written reflections became basis for analysis	Written had most evidence of reflection. 60-70% descriptive w/ 50% multiple perspectives. Conclude that it is a question if reflection can be developed or fostered.
Allen, Casbergue	1997	Evolution of Teacher Recall	4 Novice, 5 intermediate and 4 Expert teachers	Classroom observations with video recording. Then interviewed teachers about lesson.	Novice/inter had minimal inaccuracies in recall, but recall own actions more. More experience produced more holistic focus.

Appendix A (cont.)					
Sabers, Cushing, Berliner	1991	Differences between expert, beginning and novice teachers	Pool of teachers at the three levels of expertise	Watch and comment of video of a class	Experts monitor class more broadly answering questions about what they observed. Recall not different, but ability to monitor multiple inputs differs.
Campoy, Radcliffe	2002	Reflective decision making	Undergrads and grads (pre vs. in-service teachers)	Used a reflection model with written reflections about state ed reform. Measured for ideas about knowledge and for justification.	Differ in ability to apply evidence for reflection. Writing is an effective data tool. Knowledge scores similar while justification beliefs differ
Byra	1996	Post lesson Conferencing	14 preservice teachers	Post-lesson conference w/ a follow-up written reflection. First assignment based on memory and second assignment based on video.	Conference had difference between technical and practical focus. Video assignment had little difference between groups with different conference. Type of reflection had little differences either in conference or in video.

Appendix A (cont.)					
Sherin, van Es	2005	Using Video to Support Teachers' Ability to Interpret Classroom Interactions	Preservice Teachers	Video club meetings and narrative essays, observations from the group watching their own video	Changes in what they noticed and how they discussed. Shift from teacher to student for discussions. Shift from describing events to being organized around particular classroom events (shift to practical). Shift to interpreting the events, using specific student actions to support claim.

Appendix B: Hatton-Smith Reflective Writing Level Scale

Criteria for the Recognition of Evidence for Different Types of Reflective Writing

<p><u>Descriptive Writing</u></p>	<ul style="list-style-type: none"> • Not reflective. • Description of events that occurred/report of literature. • No attempt to provide reasons/justification for events.
<p><u>Descriptive Reflection</u></p>	<ul style="list-style-type: none"> • Reflective, not only a description of events but some attempt to provide reason/justification for events or actions but in a reportive or descriptive way. eg, 'I chose this problem solving activity because I believe that students should be active rather than passive learners'. • Recognition of <u>alternate</u> viewpoints in the research and literature which are reported. eg, 'Tyler (1949), because of the assumptions on which his approach rests suggests that the curriculum process should begin with objectives. Yinger (1979), on the other hand argues that the 'task' is the starting point.' <p>Two forms:- (a) Reflection based generally on one perspective/factor as rationale. (b) Reflection is based on the recognition of multiple factors and perspectives.</p>
<p><u>Dialogic Reflection</u></p>	<ul style="list-style-type: none"> • Demonstrates a 'stepping back' from the events/actions leading to a different level of mulling about, discourse with self and exploring the experience, events and actions using qualities of judgment and possible alternatives for explaining and hypothesizing. • Such reflection is analytical or/and integrative of factors and perspectives and may recognize inconsistencies in attempting to provide rationales and critique, eg, 'While I had planned to use mainly written text materials I became aware very quickly that a number of students did not respond to these. Thinking about this now there may have been several reasons for this. A number of the students, while reasonably proficient in English, even though they had been NESB learners, may still have lacked some confidence in handling the level of language in the text. Alternatively a number of students may have been visual and tactile learners. In any case I found that I had to employ more concrete activities in my teaching.' <p>Two forms, as in (a) and (b) above</p>

Appendix B (cont)	
<u>Critical Reflection</u>	<ul style="list-style-type: none">• Demonstrates an awareness that actions and events are not only located in, and explicable by, reference to multiple perspectives but are located in, and influenced by, multiple historical, and socio-political contexts. eg, 'What must be recognized, however, is that the issues of student management experienced with this class can only be understood within the wider structural locations of power relationships established between teachers and students in schools as social institutions based upon the principle of control'.

Appendix C: Performance Assessment of California Teachers (PACT) Overview and Rubric

Overview of PACT Tasks: Mathematics

Teaching Event Task	What to Do	What to submit
1. Context for Learning (TPEs 7,8)	<ul style="list-style-type: none"> ✓ Provide relevant information about your instructional context and your students as learners of mathematics within the learning segment. 	<ul style="list-style-type: none"> <input type="checkbox"/> Context Form <input type="checkbox"/> Context Commentary
2. Planning Instruction & Assessment (TPEs 1,2,3,4,6,7,9,10)	<ul style="list-style-type: none"> ✓ Select a learning segment of 3-5 hours of instruction that develops students' mathematical knowledge by developing a balance of procedural fluency, conceptual understanding, and mathematical reasoning. ✓ Create an instruction and assessment plan for the learning segment. ✓ Write a commentary that explains your thinking in writing the plans. ✓ Record daily reflections. 	<ul style="list-style-type: none"> <input type="checkbox"/> Overview of Plans for Learning Segment Form <input type="checkbox"/> Instructional Materials <input type="checkbox"/> Planning Commentary
3. Instructing Students & Supporting Learning (TPEs 1,2,4,5,6,7,10, 11)	<ul style="list-style-type: none"> ✓ Review your plans and prepare to videotape your class. Identify opportunities for students to understand mathematical concepts, procedures, and reasoning. ✓ Videotape the lesson(s) you have identified. ✓ Review the videotape to identify one or two video clip portraying the required features of your teaching. The total running time should not exceed 20 minutes. ✓ Provide a copy of the plan for the lesson from which the clip(s) were taken. ✓ Write a commentary that analyzes your teaching and your students' learning in the video clip(s). 	<ul style="list-style-type: none"> <input type="checkbox"/> Video Clip(s) <input type="checkbox"/> Video Label Form <input type="checkbox"/> Lesson Plan <input type="checkbox"/> Instruction Commentary

Appendix C (cont.)		
<p>4. Assessing Student Learning (TPEs 2,3)</p>	<ul style="list-style-type: none"> ✓ Select one student assessment from the learning segment and analyze student work. ✓ Identify three student work samples that illustrate class trends in what students did and did not understand. ✓ Write a commentary that analyzes the extent to which the class met the standards/objectives, analyzes the individual learning of two students represented in the work samples, and identifies next steps in instruction. 	<ul style="list-style-type: none"> <input type="checkbox"/> Student Work Samples <input type="checkbox"/> Evaluative Criteria or Rubric <input type="checkbox"/> Assessment Commentary
<p>5. Reflecting on Teaching & Learning (TPEs 12,13)</p>	<ul style="list-style-type: none"> ✓ Provide your daily reflections. ✓ Write a commentary about what you learned from teaching this learning segment. 	<ul style="list-style-type: none"> <input type="checkbox"/> Daily Reflections <input type="checkbox"/> Reflective Commentary

Sample Scoring Rubric

MATHEMATICS RUBRICS
2004-05 PILOT

PLANNING ESTABLISHING AN INSTRUCTIONAL FOCUS			
GQ1: How do the plans structure students' development of conceptual understanding, procedural fluency, and mathematical reasoning skills?			
Level 1	Level 2	Level 3	Level 4
<ul style="list-style-type: none"> The standards, learning objectives, learning tasks, and assessments either have no central focus or a one-dimensional focus (e.g., all procedural or all conceptual). 	<ul style="list-style-type: none"> The standards, learning objectives, learning tasks, and assessments have an overall focus that is primarily one-dimensional (e.g., procedural or conceptual). This focus includes some connections among computations/procedures, concepts, and reasoning/problem solving strategies. 	<ul style="list-style-type: none"> Learning tasks <i>or</i> the set of assessment tasks focus on multiple dimensions of mathematics learning through clear connections among computations/procedures, concepts, and reasoning/problem solving strategies. A progression of learning tasks and assessments is planned to build understanding of the central focus of the learning segment. 	<ul style="list-style-type: none"> Both learning tasks <i>and</i> the set of assessment tasks focus on multiple dimensions of mathematics learning through clear connections among computations/procedures, concepts, and reasoning/problem solving strategies. A progression of learning tasks and assessments guides students to build deep understandings of the central focus of the learning segment.

PLANNING MAKING CONTENT ACCESSIBLE			
GQ2: How do the plans make the curriculum accessible to the students in the class?			
Level 1	Level 2	Level 3	Level 4
<ul style="list-style-type: none"> Plans refer to students' experiential backgrounds³, interests, or prior learning⁴ that have little or no relationship to the learning segment's standards and learning objectives. OR There are significant content inaccuracies in plans that will lead to misunderstandings. 	<ul style="list-style-type: none"> Plans draw on students' experiential backgrounds, interests, or prior learning to help students reach the learning segment's standards and learning objectives. Plans for implementation of learning tasks include some support to help struggling students. 	<ul style="list-style-type: none"> Plans draw on students' prior learning as well as experiential backgrounds or interests to help students reach the learning segment's standards and learning objectives. Plans for learning tasks include scaffolding or other forms of support. 	<p>All components of Level 3 plus:</p> <ul style="list-style-type: none"> Plans include well-integrated instructional strategies that are tailored to address a variety of specific student learning needs.

³ Cultural, linguistic, social, economic

⁴ In or out of school

PLANNING DESIGNING ASSESSMENTS			
GQ3: What opportunities do students have to demonstrate their understanding of the standards and learning objectives?			
Level 1	Level 2	Level 3	Level 4
<ul style="list-style-type: none"> There are limited opportunities provided for students to learn what is measured by one or more assessments. <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> There is a significant mismatch between one or more assessment instruments or methods and the standards and learning objectives being assessed. 	<ul style="list-style-type: none"> Opportunities are provided for students to learn what is assessed. It is not clear that the assessment of one or more standards or objectives go beyond surface-level understandings. 	<ul style="list-style-type: none"> Opportunities are provided for students to learn what is assessed. The assessments allow students to show some depth of understanding or skill with respect to the standards and learning objectives. The assessments access both productive (speaking/writing) and receptive (listening/reading) modalities to monitor student understanding. 	<p>All components of Level 3 plus:</p> <ul style="list-style-type: none"> Assessments are modified and/or adapted to allow students with special needs opportunities to demonstrate understandings and skills relative to the standards and learning objectives.

INSTRUCTION ENGAGING STUDENTS IN LEARNING			
GQ4: How does the candidate actively engage students in their own understanding of mathematical concepts, procedures, and reasoning?			
Level 1	Level 2	Level 3	Level 4
<ul style="list-style-type: none"> There are limited opportunities shown in the clip(s) for students to engage with content in ways likely to improve their understanding of mathematical concepts, procedures, and reasoning. <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> Clip(s) do not focus on mathematical concepts, procedures, and reasoning. <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> Classroom management is problematic and student behavior interferes with learning. 	<ul style="list-style-type: none"> Strategies for intellectual engagement seen in the clip(s) offer some opportunities for students to develop their understanding of mathematical concepts, procedures, and reasoning. 	<ul style="list-style-type: none"> Strategies for intellectual engagement seen in the clip(s) offer opportunities for students to develop their understanding of mathematical concepts, procedures, and reasoning. These strategies reflect some attention to individual student characteristics, learning needs, and language needs. 	<ul style="list-style-type: none"> Strategies for intellectual engagement seen in the clip(s) offer opportunities for students to develop their understanding of mathematical concepts, procedures, and reasoning. These strategies are explicit, and clearly reflect attention to students with diverse characteristics, learning needs, and language needs.

INSTRUCTION MONITORING STUDENT LEARNING DURING INSTRUCTION			
GQ5: How does the candidate monitor student learning during instruction and respond to student questions, comments, and needs?			
Level 1	Level 2	Level 3	Level 4
<ul style="list-style-type: none"> The candidate primarily monitors student understanding by asking surface-level questions and evaluating student responses as correct or incorrect. Candidate responses are not likely to promote student thinking. <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> Materials or candidate responses include one or more significant content inaccuracies that will lead to student misunderstandings. 	<ul style="list-style-type: none"> The candidate monitors student understanding by eliciting student responses that require mathematical reasoning or problem solving strategies in addition to knowledge of facts or procedures. Candidate responses represent reasonable attempts to improve student understanding of mathematical concepts, procedures, and reasoning. 	<ul style="list-style-type: none"> The candidate monitors student understanding by eliciting student responses that require mathematical reasoning or problem solving strategies in addition to knowledge of facts or procedures. Candidate responses build on student input to guide improvement of students' understanding of mathematical concepts, procedures, and reasoning. 	<p>All components of Level 3 plus:</p> <ul style="list-style-type: none"> The candidate elicits explanations of students' mathematical reasoning or problem solving strategies, and uses these explanations to further the understanding of all students.

ASSESSMENT ANALYZING STUDENT WORK FROM AN ASSESSMENT			
GQ6: How does the candidate demonstrate an understanding of student performance with respect to standards and learning objectives?			
Level 1	Level 2	Level 3	Level 4
<ul style="list-style-type: none"> The criteria/rubric and analysis have little connection with the identified standards and learning objectives. <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> Student work samples do not support the conclusions. 	<ul style="list-style-type: none"> The criteria/rubric and analysis focus on understandings/misunderstandings in relationship to identified standards and learning objectives. The analysis of whole class performance describes some differences in levels of student learning for the content assessed. 	<ul style="list-style-type: none"> The criteria/rubric and analysis focus on evidence of understandings, errors, and/or misunderstandings to analyze student learning in relation to standards and learning objectives. Some patterns in understanding or misunderstandings are identified. 	<ul style="list-style-type: none"> The criteria/rubric and analysis focus on evidence of understandings, partial understandings, errors, and/or misunderstandings to analyze student learning in relation to standards and learning objectives. There is a clear and detailed analysis

ASSESSMENT USING ASSESSMENT TO INFORM TEACHING			
GQ7: How does the candidate use analysis of student learning to propose next steps in instruction?			
Level 1	Level 2	Level 3	Level 4
<ul style="list-style-type: none"> Next steps are vaguely related to or not aligned with the analysis of student misunderstandings and needs. <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> Next steps are not described in sufficient detail to understand them. 	<ul style="list-style-type: none"> Next steps focus on improving student performance through support that addresses student misunderstandings or needs. Next steps are based on broad patterns of performance on the assessment. 	<ul style="list-style-type: none"> Next steps focus on improving student performance through targeted support to individuals and groups to address specific misunderstandings or needs. Next steps are based on analysis of whole class patterns of performance, some patterns for individuals and/or subgroups, and general knowledge⁵ of individual students and/or subgroups. 	<p>All components of Level 3 plus:</p> <ul style="list-style-type: none"> Next steps demonstrate a strong understanding of both the identified content and language standards and of individual students and/or subgroups.

REFLECTION MONITORING STUDENT PROGRESS			
GQ8: How does the candidate monitor student learning and make appropriate adjustments in instruction during the learning segment?			
Level 1	Level 2	Level 3	Level 4
<ul style="list-style-type: none"> Daily reflections indicate inconsistent monitoring of student performance. There is limited evidence of adjusting instruction to address student confusion or to challenge students. 	<ul style="list-style-type: none"> Daily reflections indicate monitoring of student understandings and misunderstandings. Adjustments to instruction are focused on improving directions for learning tasks, time management, or reteaching. 	<ul style="list-style-type: none"> Daily reflections indicate monitoring of student progress toward meeting the learning objectives for the learning segment. Adjustments to instruction are focused on addressing individual and collective learning needs. 	<p>All components of Level 3 plus:</p> <ul style="list-style-type: none"> Adjustments to instruction are focused on deepening students' conceptual understanding, computational/procedural fluency, and mathematical reasoning.

⁵ E.g., prior knowledge, language proficiency, language varieties (dialect), out-of-school experiences, social or cognitive development

REFLECTION REFLECTING ON LEARNING			
GQ9: How does the candidate use research, theory, and reflections on teaching and learning to guide practice?			
Level 1	Level 2	Level 3	Level 4
<ul style="list-style-type: none"> • Reflections on teaching practice are erroneously supported through a significant misuse of theory or research principles. OR • Changes in teaching practice are <i>not</i> based on reasonable assumptions about how student learning was affected by planning, instruction, or assessment decisions. 	<ul style="list-style-type: none"> • Reflections on teaching practice are consistent with general principles from theory and research. • Changes in teaching practice are based on reasonable assumptions about how student learning was affected by planning, instruction, or assessment decisions. 	<ul style="list-style-type: none"> • Reflections on teaching practice are based on sound knowledge of research and theory linked to knowledge of students in the class. • Changes in teaching practice are based on reasonable assumptions about how student learning was affected by planning, instruction, or assessment decisions. 	<ul style="list-style-type: none"> • Reflections on teaching practice integrate sound knowledge of research and theory about effective teaching practice, knowledge of students in the class, and knowledge of content. • Changes in teaching practice are specific and strategic to improve individual and collective student understanding of standards and learning objectives.

DEVELOPING ACADEMIC LANGUAGE			
GQ10: How do the candidate's planning, instruction, and assessment support academic language development?			
Level 1	Level 2	Level 3	Level 4
<ul style="list-style-type: none"> • The description of the language demands of learning tasks and assessments is missing or superficial. • The candidate focuses primarily on obvious language errors (e.g., spelling, grammatical structures) without discussing important language demands of the learning tasks and assessments. • The candidate does not attempt to support students to meet the language demands of the learning tasks. OR Language and/or content is oversimplified to the point of denying students access to the central academic content of the curriculum. 	<ul style="list-style-type: none"> • The candidate identifies important language demands of the learning tasks and assessments. • Moving beyond obvious language errors, the candidate describes students' language needs in relation to the language demands of the learning tasks and assessments. • The candidate attempts to use scaffolding or other support to address identified gaps between students' current language abilities and the language demands of the learning tasks and assessments. These supports provide immediate access to content without providing opportunities for students to develop further language proficiency. 	<ul style="list-style-type: none"> • The candidate identifies language demands of the learning tasks and assessments that go beyond vocabulary to include specific text types or other language demands that are challenging for individual students or groups of students. • The candidate discusses students' language strengths as well as needs in relation to the language demands of the learning tasks and assessments. • The candidate's use of scaffolding or other support provides access to core content while also providing models, opportunities for practice, and feedback for students to develop further language proficiency related to the demands of the learning tasks and assessments. 	<ul style="list-style-type: none"> • The candidate identifies language demands of the learning tasks and assessments that go beyond vocabulary to include specific text types or other language demands that are challenging for individual students or groups of students. • The candidate discusses students' strengths and needs in relation to these language demands and articulates what makes those particular text types or other demands challenging for particular individuals or groups of students. • The candidate's use of scaffolding or other support provides access to core content while also providing opportunities for students to develop further language proficiency related to the demands of the learning tasks and assessments. The candidate articulates why the instructional strategies chosen are likely to support specific aspects of students' language development.

Appendix D: Teaching Performance Expectations (TPE)

A. MAKING SUBJECT MATTER COMPREHENSIBLE TO STUDENTS

TPE 1B: Subject-Specific Pedagogical Skills for Single Subject Teaching Assignments

Teaching English-Language Arts in a Single Subject Assignment

- teach the state-adopted academic content standards for students in English-Language Arts (Grades 7-12).
- deliver a comprehensive program of systematic instruction in word analysis, fluency, and systematic vocabulary development; reading comprehension; literary response and analysis; writing strategies and applications; written and oral English Language conventions; and listening and speaking strategies and applications.
- know how to strategically plan and schedule instruction to ensure that students meet or exceed the standards.
- understand how to make language (e.g., vocabulary, forms, uses) comprehensible to students and the need for students to master foundational skills.
- understand how to teach the advanced skills of research-based discourse;
- incorporate technology into the language arts as a tool for conducting research or creating finished manuscripts and multimedia presentations;
- focus on analytical critique of text and of a variety of media; and provide a greater emphasis on the language arts as applied to work and careers.
- teach students how to comprehend and produce complex text,
- how to comprehend the complexity of writing forms, purposes, and organizational patterns, and how to have a command of written and oral English-language conventions.
- know how to determine the skill level of students through the use of meaningful indicators of reading and language arts proficiency prior to instruction,
- how to determine whether students are making adequate progress on skills and concepts taught directly
- how to determine the effectiveness of instruction and students' proficiency after instruction.

Teaching Mathematics in a Single Subject Assignment

- demonstrate the ability to teach the state-adopted academic content standards for students in mathematics (Grades 7-12).
- enable students to understand basic mathematical computations, concepts, and symbols, to use them to solve common problems, and to apply them to novel problems.
- help students understand different mathematical topics and make connections among them.
- help students solve real-world problems using mathematical reasoning and concrete, verbal, symbolic, and graphic representations.
- provide a secure environment for taking intellectual risks and approaching problems in multiple ways.
- model and encourage students to use multiple ways of approaching mathematical problems, and they encourage discussion of different solution strategies.
- foster positive attitudes toward mathematics, and encourage student curiosity, flexibility, and persistence in solving mathematical problems.
- understand mathematics as a logical system that includes definitions, axioms, and theorems, and to understand and use mathematical notation and advanced symbols.
- assign and assess work through progress-monitoring and summative assessments that include illustrations of student thinking such as open-ended questions, investigations, and projects.

Teaching Science in a Single Subject Assignment

- demonstrate the ability to teach the state-adopted academic content standards for students in science (Grades 7-12).
- balance the focus of instruction between science information, concepts, and principles.

- explanations, demonstrations, and class activities serve to illustrate science concepts, and principles, scientific investigation, and experimentation.
- emphasize the importance of accuracy, precision, and estimation.
- encourage students to pursue science interests, especially students from groups underrepresented in science careers.
- When live animals are present in the classroom, candidates teach students to provide ethical care.
- demonstrate sensitivity to students' cultural and ethnic backgrounds in designing science instruction.
- guide, monitor and encourage students during investigations and experiments.
- demonstrate and encourage use of multiple ways to measure and record scientific data, including the use of mathematical symbols.
- structure and sequence science instruction to enhance students' academic knowledge to meet or exceed the state-adopted academic content standards for students.
- establish and monitor procedures for the care, safe use, and storage of equipment and materials, and for the disposal of potentially hazardous materials.

B. ASSESSING STUDENT LEARNING

TPE 2: Monitoring Student Learning During Instruction

- use progress monitoring at key points during instruction to determine whether students are progressing adequately toward achieving the state-adopted academic content standards.
- pace instruction and re-teach content based on evidence gathered using assessment strategies such as questioning students and examining student work and products.
- anticipate, check for, and address common student misconceptions and misunderstandings.

TPE 3: Interpretation and Use of Assessments

- understand and use a variety of informal and formal, as well as formative and summative assessments, to determine students' progress and plan instruction.
- know about and can appropriately implement the state-adopted student assessment program.
- understand the purposes and uses of different types of diagnostic instruments, including entry level, progress-monitoring and summative assessments.
- use multiple measures, including information from families, to assess student knowledge, skills, and behaviors.
- know when and how to use specialized assessments based on students' needs.
- know about and can appropriately use informal classroom assessments and analyze student work.
- teach students how to use self-assessment strategies and provide guidance and time for students to practice these strategies.
- understand how to familiarize students with the format of standardized tests. They know how to appropriately administer standardized tests, including when to make accommodations for students with special needs.
- know how to accurately interpret assessment results of individuals and groups in order to develop and modify instruction.
- interpret assessment data to identify the level of proficiency of English language learners in English as well as in the students' primary language.
- give students specific, timely feedback on their learning, and maintain accurate records summarizing student achievement.
- able to explain, to students and to their families, student academic and behavioral strengths, areas for academic growth, promotion and retention policies, and how a grade or progress report is derived.

C. ENGAGING AND SUPPORTING STUDENTS IN LEARNING

TPE 4: Making Content Accessible

- incorporate specific strategies, teaching/instructional activities, procedures and experiences that address state-adopted academic content standards in order to provide a balanced and comprehensive curriculum.

- use instructional materials to reinforce state-adopted academic content standards for students and they prioritize and sequence essential skills and strategies in a logical, coherent manner relative to students' current level of achievement.
- vary instructional strategies according to purpose and lesson content.
- meet student academic learning needs, candidates explain content clearly and reinforce content in multiple ways, such as the use of written and oral presentation, manipulatives, physical models, visual and performing arts, diagrams, non-verbal communication, and computer technology.
- provide opportunities and adequate time for students to practice and apply what they have learned.
- distinguish between conversational and academic language, and develop student skills in using and understanding academic language.
- teach students strategies to read and comprehend a variety of texts and a variety of information sources, in the subject(s) taught.
- model active listening in the classroom.
- encourage student creativity and imagination.
- motivate students and encourage student effort. When students do not understand content, they take additional steps to foster access and comprehension for all learners.
- balance instruction by adjusting lesson designs relative to students' current level of achievement.

TPE 5: Student Engagement

- clearly communicate instructional objectives to students.
- ensure the active and equitable participation of all students.
- ensure that students understand what they are to do during instruction and monitor student progress toward academic goals.
- If students are struggling and off-task, examine why and use strategies to re-engage them.
- encourage students to share and examine points of view during lessons.
- use community resources, student experiences, and applied learning activities to make instruction relevant.
- extend the intellectual quality of student thinking by asking stimulating questions and challenging student ideas. They teach students to respond to and frame meaningful questions.

TPE 6B: Developmentally Appropriate Practices in Grades 4-8

- build on students' command of basic skills and understandings while providing intensive support for students who lack basic skills as defined in state-adopted academic content standards for students.
- teach from grade-level texts.
- design learning activities to extend students' concrete thinking and foster abstract reasoning and problem-solving skills.
- help students develop learning strategies to cope with increasingly challenging academic curriculum.
- assist students, as needed, in developing and practicing strategies for managing time and completing assignments.
- develop students' skills for working in groups to maximize learning.
- support students' taking of intellectual risks such as sharing ideas that may include errors.
- distinguish between misbehavior and over-enthusiasm, and they respond appropriately to students who are testing limits and students who alternatively assume and reject responsibility.

TPE 6C: Developmentally Appropriate Practices in Grades 9-12

- establish intellectually challenging academic expectations and provide opportunities for students to develop advanced thinking and problem-solving skills.
- frequently communicate course goals, requirements, and grading criteria to students and families.
- help students to understand connections between the curriculum and life beyond high school, and they communicate the consequences of academic choices in terms of future career, school and life options.
- support students in assuming increasing responsibility for learning, and encourage behaviors important for work such as being on time and completing assignments.
- understand adolescence as a period of intense social peer pressure to conform, and they support signs of students' individuality while being sensitive to what being "different" means for high school students.

TPE 7: Teaching English Learners

- know and can apply pedagogical theories, principles, and instructional practices for comprehensive instruction of English learners.
- know and can apply theories, principles, and instructional practices for English Language Development leading to comprehensive literacy in English.
- familiar with the philosophy, design, goals, and characteristics of programs for English language development, including structured English immersion.
- implement an instructional program that facilitates English language development, including reading, writing, listening and speaking skills, that logically progresses to the grade level reading/language arts program for English speakers.
- draw upon information about students' backgrounds and prior learning, including students' assessed levels of literacy in English and their first languages, as well as their proficiency in English, to provide instruction differentiated to students' language abilities.
- understand how and when to collaborate with specialists and para-educators to support English language development.
- Based on appropriate assessment information, they select instructional materials and strategies, including activities in the area of visual and performing arts, to develop students' abilities to comprehend and produce English.
- use English that extends students' current level of development yet is still comprehensible.
- know how to analyze student errors in oral and written language in order to understand how to plan differentiated instruction.
- know and apply pedagogical theories, principles and practices for the development of academic language, comprehension, and knowledge in the subjects of the core curriculum.
- use systematic instructional strategies, including contextualizing key concepts, to make grade-appropriate or advanced curriculum content comprehensible to English learners.
- allow students to express meaning in a variety of ways, including in their first language, and, if available, manage first language support such as para-educators, peers, and books.⁶
- use questioning strategies that model or represent familiar English grammatical constructions.
- understand how cognitive, pedagogical, and individual factors affect students' language acquisition. They take these factors into account in planning lessons for English language development and for academic content.

<h3>D. PLANNING INSTRUCTION AND DESIGNING LEARNING EXPERIENCES FOR STUDENTS</h3>

TPE 8: Learning about Students

- draw upon an understanding of patterns of child and adolescent development to understand their students.
- Using formal and informal methods, they assess students' prior mastery of academic language abilities, content knowledge, and skills, and maximize learning opportunities for all students.
- Through interpersonal interactions, they learn about students' abilities, ideas, interests and aspirations.
- encourage parents to become involved and support their efforts to improve student learning.
- understand how multiple factors, including gender and health, can influence students' behavior, and understand the connections between students' health and their ability to learn.
- Based on assessment data, classroom observation, reflection and consultation, they identify students needing specialized instruction, including students whose physical disabilities, learning disabilities, or health status require instructional adaptations, and students who are gifted.

TPE 9: Instructional Planning

- establish clear long-term and short-term goals for student learning, based on state and local standards for student achievement as well as on students' current levels of achievement.
 - use explicit teaching methods such as direct instruction and inquiry to help students meet or exceed grade level expectations.
 - plan how to explain content clearly and make abstract concepts concrete and meaningful.
-

- understand the purposes, strengths and limitations of a variety of instructional strategies, including examining student work, and they improve their successive uses of the strategies based on experience and reflection.
- sequence instruction so the content to be taught connects to preceding and subsequent content.
- In planning lessons, they select or adapt instructional strategies, grouping strategies, and instructional material to meet student learning goals and needs.
- connect the content to be learned with students' linguistic and cultural backgrounds, experiences, interests, and developmental learning needs to ensure that instruction is comprehensible and meaningful.
- To accommodate varied student needs, they plan differentiated instruction.
- When support personnel, such as aides and volunteers are available, they plan how to use them to help students reach instructional goals.

E. CREATING AND MAINTAINING EFFECTIVE ENVIRONMENTS FOR STUDENT LEARNING

TPE 10: Instructional Time

- allocate instructional time to maximize student achievement in relation to state-adopted academic content standards for students, instructional goals and scheduled academic tasks.
- establish procedures for routine tasks and manage transitions to maximize instructional time.
- Based on reflection and consultation, they adjust the use of instructional time to optimize the learning opportunities and outcomes for all students.

TPE 11: Social Environment

- develop and maintain clear expectations for academic and social behavior.
- promote student effort and engagement and create a positive climate for learning.
- know how to write and implement a student discipline plan.
- know how to establish rapport with all students and their families for supporting academic and personal success through caring, respect, and fairness.
- respond appropriately to sensitive issues and classroom discussions.
- help students learn to work responsibly with others and independently.
- Based on observations of students and consultation with other teachers, they recognize how well the social environment maximizes academic achievement for all students and makes necessary changes.

F. DEVELOPING AS A PROFESSIONAL EDUCATOR

TPE 12: Professional, Legal, and Ethical Obligations

- take responsibility for student academic learning outcomes.
- aware of their own personal values and biases and recognize ways in which these values and biases affect the teaching and learning of students.
- resist racism and acts of intolerance.
- appropriately manage their professional time spent in teaching responsibilities to ensure that academic goals are met.
- understand important elements of California and federal laws and procedures pertaining to the education of English learners, gifted students, and individuals with disabilities, including implications for their placement in classrooms.
- can identify suspected cases of child abuse, neglect, or sexual harassment and carry out laws and district guidelines for reporting such cases.
- maintain a non-hostile classroom environment
- understand and implement school and district policies and state and federal law in responding to inappropriate or violent student behavior.
- understand and honor legal and professional obligations to protect the privacy, health, and safety of students, families, and other school professionals.
- aware of and act in accordance with ethical considerations and they model ethical behaviors for students.
- understand and honor all laws relating to professional misconduct and moral fitness.

TPE 13: Professional Growth

- evaluate their own teaching practices and subject matter knowledge in light of information about the state-adopted academic content standards for students and student learning.
- improve their teaching practices by soliciting feedback and engaging in cycles of planning, teaching, reflecting, discerning problems, and applying new strategies.
- use reflection and feedback to formulate and prioritize goals for increasing their subject matter knowledge and teaching effectiveness.

Appendix E: Reflective Writing Guide

UCSD Reflective Lesson Prompt

Orienting Information

Teacher:		Lesson Date:	
School Site:		Lesson Topic:	
Class/Period:		Video of Lesson: (check one)	<input type="checkbox"/> Yes <input type="checkbox"/> No

Complete the prompts either from your memory of the lesson or after reviewing the video of your lesson. Use as much space as necessary to discuss/reflect on this lesson.

1. Sequence of events - Includes a short list of what happened.

2. Highlights of one or two notable events - Select one or two situations that occurred which were significant during the lesson, and describe what happened. Focus especially on your impact on student learning. Four items to include in your description are: your role as the teacher, the student(s) involved, the subject matter being taught at the time, and the context, such as surroundings.

3. Analysis of the lesson - This is a time for you to interpret what happened, including an assessment of what students learned, your own thoughts and feelings, questions that were raised, and what you learned that will help you be a more effective teacher. This section can be a particularly useful starting point for discussion when meeting with your supervisor.

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