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EXAMINING THE ROLE OF RECIPROCITY WITHIN THE FORMATIVE
ASSESSMENT PROCESS ALONGSIDE PROSPECTIVE TEACHERS

by

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A DISSERTATION

Presented to the Faculty of
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Under the Co-supervision of Professors Margaret Macintyre Latta and Gayle Buck

Lincoln, Nebraska

December, 2007

To My Husband, Hal

EXAMINING THE ROLE OF RECIPROCITY WITHIN THE FORMATIVE
ASSESSMENT PROCESS ALONGSIDE PROSPECTIVE TEACHERS

Juliann M. Kaftan, Ph.D.

University of Nebraska, 2007

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This self-study examines the role of reciprocity within the formative assessment process in order to explore preservice teacher understandings of the complexities of the teaching/learning/assessment process. I study myself in relation to my practice in order to provide an account of how my knowledge of teaching is lived out in practice. Through the various chapters, I give the reader glimpses of my background and the particular situations that draw out theory/practice relations. The conceptual framework gives the reader an idea of the assumptions that frame my thinking. In particular, I articulate knowledge as experiential and perception as multi-layered. Self-study methodology enables a sharing of my professional history in relation to my practice by making the interaction of theory/practice relations transparent. The chapters on formative assessment and the depth of reciprocity share my knowledge in action as seen through the course design, materials used, social interactions, temporality of the daily schedule and pivotal moments. There is a recognition of the importance played by noticing the details and being open to the unexpected during these pivotal moments. Interaction, complexity and growth are seen as pervasive qualities that permeate the reciprocity of formative assessment when it is used to promote embodied understandings.

What emerges by studying the dynamics of reciprocity is the range of depth of understanding that is encountered and allowed by various students. A pedagogy of embodiment is revealed as being connected with the role of reciprocity in formative assessment. When formative assessment is used as a process to expose student thinking and foster interaction, the complexity of the teaching/learning/assessment interaction is

brought to light. Students who actively attempt to give meaning to and make sense of this complexity, through the reciprocity of formative assessment, come to embody a new, lived understanding of the teaching/learning/assessment process. By examining how preservice teachers come to understand and use the formative assessment process, pedagogical thinking is illuminated. These insights gained may lead to a greater responsiveness between instruction and assessment and reposition accountability toward meaning making rather than knowledge accumulation.

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CHAPTER 1: INTRODUCTION

Background

Assessment as an educational practice surfaces multiple competing discourses. Students, parents, educators, and policy makers are among the stakeholders participating in polarizing discussions of assessment purposes and consequences. Accountability to *whom* and to *what* is at the crux of the debate. The trend toward using standardized testing as evidence of teaching effectiveness significantly narrows learning and the purpose of schooling. This narrow lens defines effective teachers by numbers. Effective teachers are considered those who have a majority of students scoring above a certain numeric standard. The consequences of this assumption are underestimated. A sameness is assumed despite student and contextual differences of all kinds. Numbers tell part of a story. Scores may show students who did or did not test well, but it says little regarding the meaning making that may, or may not, have occurred. This research attempts to broaden the conversation regarding what counts as learning and the teacher's responsibility toward this purpose. Accountability to *whom* and to *what* is reconsidered.

Shepard (2000) generalizes that current preservice programs are preparing students for constructivist instruction but still use behaviorist assessments. The research reported in this study is a result of my own transformation as a former behaviorist elementary and middle school teacher to a constructivist university instructor. My previous experiences in public elementary and middle schools provided ample opportunities for me to control, define and separate teaching, learning and assessment. Following step-by-step procedures, using classroom management checklists, and getting

information out of the textbook and into the classroom was teaching. Learning was dependent upon student efforts to retrieve that information. Assessment was more of a measurement of that perceived effort than of my teaching. I was able to define success by the numbers. Part of my growth in the university setting has been confronting these notions of teaching, learning and assessment. Today I see an interrelationship and interdependence among them. When one entity is altered, all are affected. When one is considered, all three must be included in the conversation. Therefore, when teaching from a constructivist perspective, learning and assessment should be taken into account. Constructivist teaching/learning/assessment is about meaning making. My research is an investigation of my personal experiences of attempting to promote this meaning making by examining the complexities of the teaching/learning/assessment process through the inherent reciprocity of formative assessment.

Broad Aims

This research seeks to explore the dynamic and interrelated processes of teaching, learning, and assessment guided by the interaction of theory and practice. Of particular interest to me is the investigation of formative assessment as a way into student understandings of the complexities of the teaching/learning/assessment process. This research is an exploration of what may prompt meaningful ways for preservice teachers to engage in teaching/learning/assessment practices.

The place of the knower in relation to what is perceived is a major theme running throughout my work. The focus of this relationship lies in the depth of connection. If knowing is perceived to be only part of the abstract mind, then the process of coming to

know can be separated from the knower. To know (or accumulate knowledge) can have little or nothing to do with the knower. Meaning is assumed to be inscribed in the information itself. If, however, knowing is seen as lived experience, then the connection between the knower and the process of coming to know is felt. The lived experience draws upon the senses, images, and histories. Here knowing is seen as actively “*giving*” meaning to or “*making*” sense of something (Biesta, 2004). Information is not already inscribed with meaning but requires a personal encounter. Of particular importance, therefore, is an understanding of the effect process/product dualisms have on these connections. “Expert knowledge is often translated into the power of control and domination through accountability measures, tests, and ‘observation’ instruments,” (Garrison & Rud, Jr., 1995, p.7). This translation positions teachers to ignore the dynamic interactions inherent within the teaching/learning process. It focuses on predetermined ends and efficient production. It places value on sameness rather than unique potential.

I believe shaping an experience that arouses curiosity, strengthens initiative, and locates purposes within a student’s realm is the responsibility of the teacher. This responsibility may seem impossible given the traditional environment of learning. However, breaking down traditional boundaries is possible when the purpose of learning becomes transformation and growth rather than production. I believe it is the process of learning that should culminate in and not be separated from the product.

I draw upon John Dewey (1934) and Elliott Eisner (1998) to inform my thinking on experience and process. Dewey (1934) describes this dynamic process as an

emotional interaction that becomes a rhythmic sequence of action, consequence, further actions and consequences until a mutual adaptation of self and object emerges and culminates.

Knowing is now something with which to engage, not master. Knowing becomes related to depth rather than surface recognition. Drawing on past experiences, confronting current conceptions, providing opportunities for new possibilities positions students to be creators. Creating helps to shape personal identities. This new understanding of knowing as creating meaning enables an awareness of the depth that is possible in knowing. It enables a more profound engagement of the learner with the world (Eisner, 1998).

Enticing this emotional interaction of which Dewey and Eisner speak involves noticing the details within the experiences. Noticing details not only requires the seer to plan for events but also to be open to the unexpected. Dewey (1922) describes dramatic rehearsals as ways to deliberate possible courses of action. This emotional interaction facilitates planning for details and may help to reduce anxiety. However, certain emotions may be triggered by a personal encounter with information, events, materials and/or others. Planning for these encounters is nearly impossible because of the variety and fluidity involved in knowing. Noticing these encounters involves cultivating a sense of seeing that is brought to light by details.

My aim is to explore how formative assessment may aid a teacher's ability to notice a connection between a concept and an emotional reaction in an individual by bringing to light the details within a classroom moment. Noticing the details begins a

relationship between the knower and the known and provides a starting point for further inquiry. My aim is to use formative assessment to develop this relationship that helps to experience learning as deep engagement.

Allowing each student to access all that an experience has to offer requires flexibility with an intended direction. This flexibility can be achieved when a teacher sees the purpose of education as personal meaning-making. This seeing is enabled by an openness to the planned and unplanned details within a classroom moment.

A basic aim of this work, then, is to actively inquire about my practice, my personal meaning-making, to experience, first hand, the purpose of education that I propose. Self-study enables an accountability that cannot be found in quantitative research. It is also an avenue that enables me to embody my theories. By looking closely at my practices and how they relate to my beliefs, I continually have access to the integrity with which I practice. Although I feel that anyone who teaches also inquires, in everyday practice it is easy to ignore questions that seem unanswerable and focus on the task (Eisner, 1998). Self-study provokes questions and demands resolutions. It formalizes the inquiry.

The ultimate aim of this work is to contribute to a “more complex and sensitive human perception” (Eisner, 1998) for educational reform.

Structure Overview

In order to begin to understand the teaching/learning/assessment process one must see it holistically. Examining teaching, learning and assessment as separate components

provides a false sense of security in knowing discrete lists and steps toward better education. It is, in fact, the interrelationships among those parts that demand attention.

Major Works Influencing Inquiry

When we acknowledge an interaction, doors open to the complexity and intricacies of the process. Many scholars have understood this holistic approach. Elliott Eisner (1998, 1997, 1991), Tom Barone (1993), Margaret Macintyre Latta (2006, 2001) focus on cultivating the vision necessary to see the complexities within the teaching/learning process. Vicki Kubler LaBoskey (2005, 2004), Mary Lynn Hamilton (2004), and J. John Loughran (2004, 2002, 1998), and Claudia Mitchell with Sandra Weber (2005) use self-study as a methodology to examine the teaching/learning process. D. Jean Clandinin and Michael Connelly (2007, 2000), Melvin Miller (1996), and Maxine Green (1995) use narrative as a form of illuminating this dynamic interaction. These scholars, among many others, have influenced my perception of what it is to know and what it is to see. They have helped to legitimize alternative qualitative methods that broaden the scope of educational reform beyond the scientific.

Narrative Expression

This work is my struggle to let go of the traditionally accepted positivism and focus instead on how to best express the teaching/learning/assessment interaction. This is why you will not see chapters entitled “data collection” or “data analysis.” Although both of those processes do occur, the focus is on reflexivity and expression. Reflexivity is the constant looking and looking again, not just reflectively, but in interaction with research, experiences, others, and new data. Reflexivity enlarges perception by providing

multi-layered support for future decision-making. Expression refers to Dewey's sense of qualities that "come out with startling vigor and freshness because the conventional associations are removed," (1934, p.95). I aspire to express teaching, learning and assessment in a new light.

The Place of Theory

The conventional place of theory in a formalistic dissertation is in the literature review. A literature review is the creation of an independent theory that establishes an interpretive stance for analyzing a study. It serves to establish the need for the inquiry by relating it to the past and current literature on the topic (Creswell, 2005). It structures the inquiry (Clandinin et al, 2000). A conceptual framework is experientially situating my personal philosophy of education as the backdrop for interpretation. The professional literature is then woven throughout the narrative as it is encountered to support ideas, findings, and new working notions. It is seen as interacting with practice, not separate from it.

Professional literature is viewed as a "critical other" involved in the inquiry. Basing a dissertation on experience and allowing that to shape which theories are played out allows new meanings to emerge. It does not minimize the role of theory in a dissertation. Rather it simply reframes its purpose. Theorizing, then, is my ability to draw on multiple theories to explain the significance of an emergent phenomenon and then using that understanding to see anew. It is building new theories based on experiences and the relation of those experiences to existing theories (Clandinin et al,

2000). It is what Schon (1983) calls reflection-in-action. “Stimulated by surprise, they turn thought back on action and on the knowing which is implicit in action,” (p. 50).

Theory can never be directly applied because no two educational situations are ever the same. However, theorizing can be done to highlight and explain certain general features as well as subtleties within an educational situation while attempting gain a new sense of meaning (Clandinin et al, 2000). “Plausible interpretation and convincing insight” build bridges between theories (Eisner, 1998, p. 238). When perception has been refined to see classroom situations through multiple interpretations, theories can be used to guide that which has been perceived (Eisner, 1998). How I account for what I do as a teacher through critical relational analysis is the work of theorizing (Dalmau & Gudjonsdottir, 2002).

Chapter 1: Introduction

This chapter offers a broad overview of this research looking briefly at the background prompting this study, the broad aims, the major influences in literature that help to frame the inquiry, the place of theory in qualitative studies and an overview of each chapter.

Chapter 2: On the Use of a Conceptual Framework

Using a conceptual framework, I identify and characterize the main driving forces influencing my work and suggest direction using two main features: knowledge and perception. These ideas are based on my experiences as a graduate student, a research assistant, a teaching assistant, an elementary and middle school teacher, a wife,

mother, daughter, sister, neighbor, a Caucasian female living in the United States and many other influences too numerous to mention. This negotiation of my experiences with education and how I encounter ideas distinguishes this conceptual framework as part of the knower (myself) and not a distant theory separate from practice. This conceptual framework helps to ensure coherence among my ideas, practices and materials and positions my work as part of who I am and what I do; it is the basis of my educational philosophy.

Chapter 3: On the Use of Self Study as a Methodology

This chapter outlines self-study as an appropriate method for my research. Formative assessment attempts to expose student thinking and use that thinking to guide instruction. Self-study methodology attempts to make transparent the practices of teachers by revealing theory/practice relations. It is by looking within that our professional outlook is better informed. It is not an isolated look at self-understanding but a collective negotiation with trusted others. This notion of knowledge for practice does not reside in theory or practice alone but in the interaction among the theory/practice relations. Self-study methodology seeks this interaction through reflexivity. Formative assessment provides a window for glimpses of the reflexive process. Self study and formative assessment are both concerned with seeing and transforming learning in defensible ways. “Since we cannot teach something we do not know, nor advocate for a practice we do not embrace or emulate, one critical connection between our pedagogies and our research designs is the latter are meant to instantiate the former,” (LaBoskey,

2004, p.839) It is the alliance between what I am studying with how I study it, that makes self-study integral to learning about formative assessment.

Chapter 4: Revealing Data through the Work of Formative Assessment

Since the element of surprise is inherent in qualitative research, gathering more data than seems significant at the time of the investigation is necessary (Creswell, 2005). By acknowledging personal bias, self-study researchers can collect data from multiple sources in order to corroborate their findings. The more evidence that can be used to build a thick, rich description of the investigation, the easier the reader will be able to enter into the investigation. In this study I collected student work samples such as assignments, journals, group work products, and personal correspondences. I collected individual surveys and questionnaires completed as part of the course work. I collected my own daily reflections on each class. I video-taped the class to confirm my interpretations in my daily reflections. I audio taped and transcribed my conferences with my critical friend and advisor, Dr. Margaret Macintyre Latta. A critical friend is a voice considered to be valued in helping to broaden the perspective during ongoing analysis (Hamilton, 2005, Kelchtermans et al, 2004).

Looking back, the three main sources of data came from my daily log, student work samples and conferences with my critical friend. My daily log shows my own interpretations of events. Critical friend transcripts show the interaction of my own theories and practice with the theories and practice of a trusted other. The student work samples chosen are those that confirm or refute my understandings and reveal

unanticipated complexity. Student work samples show the details that provide “modes of interaction.” They are chosen for their ability to capture the dynamic relations between and among the data.

The narrative of Chapter 4 takes the reader through the data collection and ongoing reflexive process revealing the work of formative assessment. It places the data into three broad frames: growth and fluidity, variation and interaction, depth and complexity. It gives the reader a general overview. Stepping back and seeing the data from a distance allows unifying qualities to emerge. Taking a closer look at these qualities offers depth to the unified perception. This depth is explored in Chapter 5.

Chapter 5: A Deeper View of the Encounter with Reciprocity

The narratives in Chapter 5 are used to help the reader see the pervasive qualities of interaction, complexity and growth and to gain glimpses into the depths that reciprocity brings to embodied understandings. Looking across different student experiences of interaction, complexity and growth, I discover similarities and differences regarding the depth each student encountered and allowed. These stories are supported by the data in Chapter 4 and are further refined into one core phenomenon: the encounter with embodied understanding. Because the intent of this chapter is to examine the varying depths experienced by students, three student stories are particularly salient. The narratives are used to help focus attention on the nuances of encounters and express how students allowed or halted the ability of the experience to interact with theories and move thinking. These narratives highlight certain interrelationships across individuals. They illustrate that each of the pervasive qualities that make up this unified perception includes

of a range of embodiment. Understanding how and why students developed in these different ways points to the important role of reciprocity in formative assessment.

Chapter 6: The Pedagogy of Embodiment

This chapter retraces what has been discovered, how my thinking has changed and my practice transformed. It summarizes the findings of this research by returning to my initial conceptions of what I expected to see and what actually emerged. It questions and considers the implications of this work for the professional community by looking at the intersection of “public and private, theory and practice, research and pedagogy, self and other” (LaBoskey, 2004, p. 818), and also about theories on the nature of teaching and learning, the responsibilities teachers have toward students of education and the students they will eventually have. A pedagogy of embodiment is revealed as being intricately connected with the role of reciprocity in formative assessment. When formative assessment is used as a process to expose student thinking and foster interaction, the complexity of the teaching/learning/assessment interaction is brought to light. Students who actively attempt to give meaning to and make sense of this complexity, through the reciprocity of formative assessment, come to embody a new, lived understanding of the teaching/learning/assessment process. This chapter concludes with the broad *lived* terms that provoke questions for further inquiry.

Finally, I hope to express how noticing the particulars (the social influences, and the personal connections) places teachers within interactions enticing them to form and reform their identities as teachers. David Hansen (1995) writes:

Teacher's perceptions of their roles and of their students constitute more than casual, individualized points of view. Those perceptions reside at the heart of what a teacher is about. Teachers can let their perceptions be informed, or possibly even determined, by others. Or, they can influence them through reflection and through their own actions...." p.90

Broadly speaking, this study aims to show how embodied understanding is "not an arbitrary way of regarding things" (Hansen, 1995, p.90). It instills ways of thinking, acting and being a teacher which results not from random choice but from meaningful experience. Such experience focuses accountability to each learner as the task for teaching, learning, and assessment. Teaching is more than implementing techniques (Darling-Hammond, Hammerness, Grossman, Rust & Shulman 2005). By examining how preservice teachers come to understand and use the formative assessment process, pedagogical thinking may be illuminated. These insights gained may lead to greater responsiveness between instruction and assessment and reposition accountability toward meaning making rather than knowledge accumulation.

CHAPTER 2: CONCEPTUAL FRAMEWORK

Introduction

In this self-study I seek to gain insights into prospective teacher's understandings of the complexities of the teaching/learning/assessment process through the reciprocity of formative assessment. I believe the relationship between teaching, learning and assessment is, too often, detached and linear. The teacher tells. The student retells. A numeric score is then produced based on the amount of retelling. There is no relationship between teaching, learning and assessment. The focus is on transmission, not learning to understand. It is detached because it values the accumulation of facts instead of the relationship among those facts and the learner, the environment, and others.

On the surface, this may not seem significant. However, we may be underestimating the consequences of distancing the self from the act of learning. Distancing the self ignores the fact that learners bring different experiences and expertise to the classroom. Distancing the self from the act of learning assumes sameness in the learners' understanding. Rather, differences ought to be viewed as productive for learning. They can be the windows where teachers and peers gain glimpses of different learning ways and connections and enhance the work of learning.

Today there is a clash of worldviews between constructivist pedagogy and behaviorist assessment (Shepard, 2000). From a behaviorist paradigm there is a body of research on best teaching practices. They describe the observable actions of "good" teachers in practice. Validity is established by recording "unbiased," observable behaviors that are specifically stated in advance of the observation. Checklists are used

to measure the frequency of these behaviors. These frequencies are then compared with student achievement which teachers feel can provide impartial information (Shepard, 2000). This seems like a straightforward way to establish the effectiveness of a teacher. The basic problem with this approach is that it assumes that replication of technique is an appropriate way to teach effectively. It fails to recognize what role the context plays (Nuthall, 2004). In order to attend to context, teachers must deliberately and vigilantly assess students throughout instruction in order to inform instruction and respond to student needs with particular attention to process. This is the formative assessment process. Formative assessment should not be viewed as a technique that simply needs to be applied in the same way by all teachers (Shepard, 2005). It is a highly context specific process comprised of multiple techniques and requires a relationship of trust in order to access student thinking. It also requires a teacher to have the capacity to see and further the learning relationship between self, other(s) and subject matter. What does such seeing entail? How can teacher education prompt such seeing?

Seeking Embodiment

When we consider teaching, learning, and assessment as a dynamic interaction each interdependent upon the other, teaching becomes a complex process of scholarly self-questioning, reflection and doubt leading to new inquiries (Munby, Russell, & Martin 2001; Schon, 1987; Schulman, 1998; Zeichner, 1999). The curriculum becomes dynamic and varied, creating spaces for understandings to be negotiated and developed (Biesta, 2004; Grumet, 1993; Hunsberger, 1992; Macintyre Latta & Olafson, 2006; May, 1993). Learning occurs to satisfy curiosities about lived experiences (Dewey, 1934;

Eisner, 1991). Students become individuals with unique stories to be shared and built upon which shape their identities (Barone, 1993; Dewey, 1934; Macintyre Latta et al., 2006, Packer, 2001). The dynamics of this interaction involves teachers positioning students to be creators giving them both the guidance and freedom to explore. Students freely make mistakes along the way and teachers treat those mistakes as opportunities for growth. The teacher does not tell students the *right* way, but draws on students' past experiences so they are able to form personal connections with present learning (Dewey, 1934). The insights gained, the connections made, the trouble spots revisited all inform the direction the teacher takes. Because there is so much emphasis on the process, the students come to recognize what learning for understanding entails. Teachers come to understand how to access and further student thinking. Teachers and students are concerned with the potential a concept may have for sense-making, not only on a score. This focus on process changes the emphasis of knowledge as separated from self to connected, personal, and embodied understanding.

Promoting Embodiment through Formative Assessment

Considering teaching and learning as a dynamic interaction requires assessing student thinking throughout instruction instead of waiting until the end. Formative assessment is defined as “the process used by teachers and students to recognize and respond to student learning in order to enhance that learning, during the learning” (Bell & Cowie, 2001). Recognizing the learning is the first part of formative assessment. This is usually associated with constructivist preassessments (Ogle, 1986), brainstorming techniques (Johnson and Johnson, 1986) observations and oral discussions (Guerin &

Maier, 1983). When used as applied tools, the focus is on the outcome or product rather than the process. How often do teachers use preassessments for more than a score for the grade book? How often are brainstorming lists ever reconsidered? How often are teachers open to things they are not looking for in observations or discussions? What is needed is the understanding of what teacher/student/other(s) reciprocity brings to this recognition of learning and how to act on it to further the work of learning.

Responding to the learning is an essential feature of formative assessment. This can be done in a variety of ways including *scaffolding* (Cobb, Wood, and Yakel, 1993; Hogan and Pressley, 1997; Shepard, 2005; Vygotsky, 1978) and *feedback* (Duschl and Gitomer, 1997; Treagust, 2001; Torrence & Pryor, 1998). A key element in formative assessment is the change in teaching practices based on the assessment of student understanding from a constructivist perspective (Black & Wiliam, 2003; Bell et al., 2001; Tunstall, 1996). When students see the teacher responding to their needs, trust is established and relationships form. The establishment of trust is the beginning of the dynamic interactions that each party commits to within the learning process. Teachers need to respond in ways that continue the learning process. That response may be on an individual or collective level, a personal level, and/or an instructional level. Knowing students involves more than demographics. It includes knowing where students are in their lives of learning. It involves knowing what experiences and influences they bring with them. This involves looking and listening. Looking into the diverse windows and listening with an open mind gives a teacher clues into students' thoughts and experiences. This provides an opportunity for learning connections to be made. Feedback involves

probing at individual and/or collective levels. This probing guides understanding and does not involve grades or other performance measures. Students feel free to express ill-fashioned thoughts and trust that future comments will guide the learning and growing process. Responding to students' thinking rather than focusing on judgments shows the teacher cares about the learning process. Students see this when teachers base instructional decisions on the formative information. These instructional decisions are made to enhance the reciprocity among self, other(s) and subject matter. There is an honoring of both the individual and the collective in the learning process.

Current preservice programs are preparing students for constructivist instruction but not constructivist assessment (Shepard, 2000). My examination of formative assessment use by prospective teachers is intended to seek out insights into the teaching/learning process for greater responsiveness between instruction and assessment. Exploring the reciprocity of formative assessment may suggest ways preservice teachers come to understand the interdependence of teaching, learning and assessment. My commitment as a science methods instructor is that "[t]eachers need to do more than implement techniques; they need to be able to think pedagogically, reason through dilemmas, investigate problems, and analyze student learning to develop appropriate curriculum for a diverse group of learners" (Darling-Hammond, Hammerness, Grossman, Rust & Shulman, 2005, p.392).

The Role of Reciprocity

Darling-Hammond, et al (2005) point out the need for teachers to go beyond performance and management issues. The application of external techniques provided by

outside experts cannot be seen as the way to reform. Many teachers see their role as one of technician trying to manage machinery with great efficiency. They see students at the same level and deemed deficient in the prescribed curriculum. The purpose of school is the efficient memorization of bits of information for some later, unknown function (Senge, 2000).

On the surface, the industrial model is very efficient for educational organization. The *social efficiency curriculum* (Shepard, 2000, p. 4) was meant to apply the same efficiency found in the factory model to educational settings. Separating knowledge into hierarchical bits of tightly sequenced knowledge with limited transfer provides immediate effects. Instituting all of these boundaries makes the complex act of learning seem more visible and therefore, manageable. Memorizing facts is easier when they are broken down into bits of information, put into a rhyming scheme or some other device that makes the nonsense meaningful. Unfortunately this view omits the necessity of interpretation. It omits the role of reciprocity.

What if learning was not viewed as memorizing nonsense? What if the curriculum was seen as useful information to understanding the world and self? What if learning was the “weaving and reweaving of profoundly educational, aesthetic experiences into a narrative or story, of a unique, autonomous, but responsible self” (Barone, 1993, p. 237)?

It is debatable whether the objectivity and rationality proposed by the behaviorists give students a more enlightened view. The accumulation of stimulus and response associations takes from the student the emotional commitment necessary to engage fully

in an intellectual pursuit (Eisner, 1991). Dewey (1934) saw how this stimulus-response neglected the inquiry process.

We undergo mechanical stimuli without a sense of the reality that is in them and behind them. Our different senses do not unite to tell a common, enlarged story. We see without feeling. We use senses to arouse passion but not to fulfill the interest of insight. (p.21)

That emotional commitment provides the intrinsic motivation that gives learning personal meaning. There is no need for an external stimulus to prod students since they are not viewed as machines, but as whole beings with unique stories to be shared and built upon, seeing themselves in the project and taking ownership.

Machines create products. Humans create meaning. Meaning creates self. Dewey (1934) sees the live creature able to attend to the creating process through dialogue. The dialogue creates organization and form for learning. This form emerges through the process. But this process involves drawing students toward the concrete ways in which the world impacts them. In an educative experience, the process cannot be separated from the product. The cognitive and affective, substance and form intermingle in the personal and relational space of learning. There is a mind/body connection. The body and the mind inform each other in a symbiotic relationship where emotions are valued.

The reciprocity inherent in the teaching/learning/assessment process is one vehicle that may hold the potential to connect knowledge and self. Traditional boundaries that kept learning abstract and separate were used to protect, order, and define knowing in a particular way. What holds the potential to redefine, reorder, and open

doors to learning and transforming self? To explore, in depth, the role of reciprocity in the teaching/learning/assessment process, I examine the interrelated and interdependent nature of knowledge and perception. It is not enough to name knowledge and perception. That gives the impression that they are static notions. My attempt to characterize the nature of knowledge and perception helps me to articulate taken for granted assumptions.

The Nature of Knowledge.

The cover of a recent *U.S. News and World Report* (March 12, 2007) asks its readers, “Is college worth it? Besides a degree, are you really getting what you paid for?” The article explains the Collegiate Learning Assessment given to freshman and seniors stating, “It does not measure knowledge itself but, rather, critical thinking, analytical reasoning, and writing.” This statement says a great deal about the reporter’s assumptions about knowledge. We don’t have to look far to see that *knowledge* cannot be confined to one definition. While some take a more Platonic view of knowledge as external from the knower, others see knowledge as passively absorbed from a Lockian view of the blank slate. Still others see knowledge as only possible in linear, hierarchical stages. To me, the nature of knowledge cannot be restricted to the mind in isolation. It makes no sense to “restrict knowledge to what verificationists or fallibilists demand,” (Eisner, 1991, p.40). The nature of knowledge, for me, is experiential.

From this vantage point, knowledge is active, social, relational, transformative, and a continuous process. Knowledge begins with the senses interacting with the mind. The mind does not wait for impressions to be made upon it, but actively seeks out sensory stimulation. This stimulation requires a response. There is a reciprocity

involved whereby the mind enables certain responses and those responses shape the next stimulus. “The brain is the organ for a constant reorganizing of activity so as to maintain its continuity, that is to say, to make such modifications in future action as are required because of what has already been done” (Dewey, 1926, p. 392). The senses are not separated from the intellect but work in concert to realize the activity of knowing. We “*give* meaning to and *make* sense of” things (Biesta, 2004, p.15). The meaning is not already attached to the information received.

I make a distinction between passive reception and active knowing. We can feel something to be hot or taste something to be sour and instinctively react. Our senses are used to stimulate a reaction, not to file the information into an unused category. An action is required for furthering growth. Passive information is separated from the knower and assumes the meaning is somehow attached to the information itself and absorbed (Biesta, 2004). Miscommunications on every day matters show that information carries different meanings based on the activity of the knower. Knowing is connected to action. “Information severed from thoughtful action is dead, a mind-crushing load” (Dewey, 1916, p.179). The action is what Dewey (1934) refers to as “the undergoings and doings” (p. 44). The mind and senses work together reciprocally to direct further experiences that enhance our knowing. There is an action and subsequent consequences. But it is not just a matter of stimulus and response, a beginning and an end. The knowing is what happens between the stimulus and the response. Our senses are used to tell a common, enlarged story and provide insight leading to further action. Our actions do not lead to static conclusions that simply accumulate. They lead to progressive

approximations or culminations and complex relationships. Shulman (1987) supports this view of knowledge as a “vigorous interaction” beginning with the exchange of ideas which are grasped, probed and comprehended, turned about in the mind to expose all angles, then shaped and tailored so it can be grasped by others. This shaping and tailoring, turning and probing denotes an interactive, not linear process.

However, merely grasping ideas is not enough. Akin to the detached view of information, the value lies in seeing the ideas in action. When there is action, judgments are made to the usefulness of the knowledge. Ideas are presented to provoke an active inquiry. Inquiry should not be confined to the scientific method, or accomplished in only a linear manner, but should be viewed as any “controlled or directed transformation of an indeterminate situation into one that is so determinate in its constituent distinctions and relations as to convert the elements of the original situation into a unified whole” (Dewey, 1938, p.104). When knowledge is viewed as active, all beliefs are subject to revision as a consequence of further inquiry. These revisions can be enhanced through social situations.

On the Social Nature of Knowledge

Knowledge is also social in nature. Not only is the mind actively interacting with the senses, but our own interaction with the ideas of others affects our knowing. Biesta (2004) uses an example of knowing the meaning of a traffic light to highlight the social nature of knowledge. He explains how a child cannot know the purpose of a traffic light by physical examination or experimentation of the light itself, as if it were a toy. There is no social meaning in the physical object. But, through participation within the society a

child learns the consequences of walking across the street on a red light. There is a negotiation between the members of the society on the meaning of red, yellow, green. In recent times it seems there has been a renegotiation of what red actually means. This shows that agreeing on a common meaning is not about having identical understandings. Rather it shows attempts at coordinating actions that result in shared understandings within a society. Biesta (2004) elaborates on the social nature of knowledge by using the example of artifacts. When archeologists discover artifacts, they are only able to infer their meaning and significance from the clues left by the society. The social meaning is not attached to the artifact itself. The clues are not only physical objects, but the “tracking of displacements and realignments that are the effects of cultural antagonisms and articulations” (Bhabha, 1994, p. 178). This points out the significance of communication in knowing.

The more widely people are exposed to differences, the more invitations the mind has to doubt, question, and inquire. The more diversity, the more activity, the less likely there will be a static limit to growth. The social aspect of knowledge allows for cooperation, collaboration and community. Schubert (1994) emphasizes the importance of these ideas when he discusses the connection between life and learning. This connection is illuminated through the sharing of interests and concerns uniting people with common purposes. But this collaboration does not seek to divide those who share the same ideas with those who do not. When we limit our interactions with others we become competitive. Knowledge is social to the extent that we grow from our interactions, broaden our perspectives, and refine our perception. This requires being

open to the particulars instead of falling victim to generalized classifications (Eisner, 1991). When everyone shares the same thinking, there is no provocation. All march to the same drummer. The uniformity is debilitating and should not be equated with knowing (Senge, 2000). Knowing is enabled when there is cooperative collaboration among the members of a community with the freedom to interact with other groups. “It is through relation that we gain human consciousness and for the figure/ground discriminations that enable us to share a meaningful world with other people” (Grumet, 1993, p.207). When the knower recognizes these relationships that knowing becomes the seed for growth.

Knowledge as Relational

Knowledge is relational due to its connections with the knower. These connections are made through some medium. The knower is not the medium. A medium is the moderator *between* the knower and others/things in relation to the knower (May, 1993). “What makes material a medium is that it is used to express a meaning which is other than that which it is in virtue of its bare physical existence: the meaning not of what it physically is, but of what it expresses” (Dewey, 1934, p. 201). The knower looks at the relationships between the elements of the medium being used, being open to the emergent ends. These ends define what is perceived as knowledge. The negotiation involved in noticing which ends are emerging is a relational process. Biesta (2004) sees this negotiation taking place in a “gap.” It cannot be objectively represented, overtly controlled, or directly applied. In other words, what is known by one should never be assumed to be received in the same manner by others. Because of this relational gap,

there is space for negotiation between the relations involved. These relations should not be confined to people. Relations include connections between the knower, text, others, context, senses, etc. “It is not about the ‘constituents’ of this relationship but about the ‘relationality’ of the relationship” (Biesta, 2004, p.13). As one aspect is modified, all other aspects change due to the relational nature of knowledge (Grossman, 1995).

These connected relationships are active intersections (Shulman, 1987). Another way to grasp these active intersections is through a reflexive process. A reflexive process deepens the relationship between the knower and the known through a complex negotiation between perceived understandings brought to bear on oneself through the undergoings and doings of further inquiry. The past, present, and future can be simultaneously called upon to bring meaning to the negotiation. We are able to negotiate the present through our past experiences and a future vision. A slow evolution occurs bringing about a more clear understanding (Dewey, 1934). The constant tendency for sense making and unity depends in part on the attention given to the reflexive process and its relation to the big picture. We can know the separate elements of a thing, but the medium gives expression to the unity of the complex relations (Dewey, 1934).

Transformation And Its Role Within Identity

Knowledge is transformative to the extent that it is responsive to our past, links us to our present, and shapes who we will become in the future. What knowing makes a life worth living? Is it knowing that sees the mind as fixed or as developing? Is it knowing that sees standard, predetermined ends or emergent, unique potential? Without getting bogged down in the dualisms, knowledge, for me, has the potential to transform when

we see the connection between what we know and who we are within the world. We give meaning to images and symbols through our experiences. It is our ability to see the connections between these meanings and our lives that shape and transform who we become. When we are able to recognize how these meanings have shaped our perception, we develop sensibilities that enable us to be more fully present in succeeding experiences. These sensibilities help define who we are within the experience. No two people will recognize the same meanings even within the same event because of the complexity involved in the transaction between self and environment (Barone, 1993).

When knowing is experienced as surface recognition, no relationship is required. When it is experienced through depth and complexity, involvement is necessary. We are touched personally when our knowing is exposed or confronted by jarring events. This creates an immediate intrinsic motivation to know more. There is a natural tendency toward wholeness within the rhythm of life. By examining what we know in light of our experiences, we modify and enrich our lives.

Identity In Relation To Knowing

Identity is involved when action is required. When the knower chooses to partake in knowing vicariously, beliefs may not be called into question. When the knower is persuaded by the knowledge or feels the freedom to venture into unfamiliar or uncomfortable spaces, she can integrate knowing to her personal life (Barone, 1993). The ways in which to persuade a person to take action have been a source of great debate. The motivation I refer to involves discomfort and tension triggered by present events calling to mind past experiences. If the knower understands herself as a developing self,

there is great potential for transformation. If the view is one of prescription and replication, the uncertainty signals danger. When action is taken, the knower is unable to accept another's interpretation and insists on integrating and recounting interactions with past events to shape a coherent, personal self. There is always a risk involved in action since it is tied to a personal identity. The risk is often unrecognized or not fully appreciated. Recognizing the difficulty involved in changing a belief enables the knower to proceed cautiously through a struggle with the hope of an enlightened future.

Identity is not merely a label we can give ourselves or others, but a total story continually redefined by interactions with the world and others. We understand that future negotiations will continue to shape us, "gained and modified through a process of moving upon and experiencing a world in which others are simultaneously achieving their own identities" (Barone, 1993, p. 238).

Barone (1993) elaborates on transformation as simultaneously personal and social. "An individual contributes to communal growth whenever she successfully redefines herself; and conversely, an individual is fulfilled only through enlarging the community's sense of what is possible," (p. 239). There is a remaking of self alongside the remaking of society. It is this view of the other, sometimes at a distance, that can safely provide the guidance for the self to venture into the uncomfortable spaces of identity making. It is a continual process always responsive to what is emerging. What emerges is always in response to the interpretation and integration of the knowing with a personal past, present, and future.

Knowledge As A Continuous Process

Knowing can be transformational when there is attention to the process (Dewey, 1934; Senge, 2000; Shulman, 1987). Seeing what is emerging provides the emotional commitment that gives knowing personal meaning. But to know is not to accumulate isolated bits of information. It is a dynamic, continuous process involving whole beings with unique stories to be shared and built upon. It is the attentiveness to the dynamic qualities and relations that guide the knowing (Macintyre Latta & Olafson, 2006). It is being wholly present in an experience and knowing what steps to take to bring the experience to a culmination (Dewey, 1934). When we are able to attend to the process, we will feel safe to lose ourselves and plunge into the inquiry. We become captivated and free to play an active role in generating own understandings through actions, interpretations, reflections, and coordinations which have the ultimate purpose of enriching and expanding our lives (Dewey, 1934; Moshman, 1999).

Attending to process involves acknowledging the dynamic quality of time. Dewey (1934) describes our past situations always pushing forward into our present situations. They can continue to be pushed forward without a specific end. We interpret things based on what has come before; each successive transformation opening certain doors and closing others. Only when we are in touch with the immediate qualitative aspects within an experience are we able to feel this direction. This felt quality should not be dismissed as irrational. For it is precisely through this awareness that we gain insight into the intersubjective relations (O'Loughlin, 2006, p.126). When knowing is seen as something with which to engage rather than something to master, it becomes a

process of personal development. It confronts personal understandings, draws on personal experiences, and comes to a culmination but does not end. Being incomplete is a certainty because the meanings we understand today are tentative. The knower continuously seeks wholeness within life's uncertainties. A bridge is built between what a person knows and who they are becoming.

Seeing new knowledge as continuously changing a person's identity would be terrifying if the substance of knowing and the form it took were seen as unrelated. Substance and form must be examined through a holistic lens. They are interdependent because of the dynamic organization of the sensory qualities bound together in the form. The knowing is what it is because of the process it took. The meaning of the whole enters into the parts to qualify them (Dewey, 1934). When there is a perfect integration between substance and form, we see no distinction. "Only when the constituent parts of a whole have the unique end of contributing to the consummation of a conscious experience, do design and shape lose superimposed character and become form" (Dewey, 1934, p. 117). This dynamic organization is based on a responsiveness which values both the store of knowledge to be shared and the inventiveness that emerges given the imaginative space to play with ideas (May, 1993). By paying attention to the continuous process of knowing, new spaces for knowing open up and new sensitivities develop. A new appreciation of who we are and where we are headed is seen in light of continuous development.

The Nature of Perception

When knowledge is understood as static, individual, and disconnected, perceptions are all predictable, right or wrong, and categorical. When the view of knowledge is active, social, relational, transformative and continuous, the perception is likewise affected. Perception, then, is the ability to see the process of knowing. Seeing, here, is not limited to visual sight, but conveys the ability to understand perception as dynamic, relational, particular, and full of meaning. The focus is not on the end product but on the unanticipated consequences that reveal themselves while traversing the temporal landscape of physical and social contexts (Munby, Russell & Martin, 2001, p. 883). It is as Dewey (1934) describes the meaning of what we sense in the exploration of experience, or an “opening outward” and not merely a matter of recognition or categorization. It is noticing the significance of the subtleties of the experience that helps us refine our perception.

The Dynamic Nature Of Perception

Perception does not occur instantaneously but unfolds and develops over time. There should be interruptions in our perceptions to which we return later. A first impression is simply that, a categorization for the sake of efficiency. Only over time do we return again and again to the perception to find more meaning. Perception, therefore, is dynamic in nature; always changing and growing because the perceiver (and at times the object perceived) is always changing and growing. Perception lives on as a precedent for further experiences, not merely filed away into a category. Meaning gained from

perception links past, present and future to reveal “potential consequences” or “unattained possibilities” (Dewey, 1958, p. 143).

Part of this dynamic quality is its temporality. Meanings change as time passes (Clandinin et al, 2000). Temporality implies past, present and future contextual features influencing perception. When experience is seen as static, it can be taken for granted. Temporality brings to light the affect of perception on the immediate quality of an experience and the enduring value of the object perceived. When the quality is most intense, its value stands at the forefront. Now we are able to perceive a deeper reality (Dewey, 1934). However, we can never fully perceive because our attention turns to something else. We become so eager to finish and produce that we rarely stop to notice the subtleties of an experience. Recognizing perception as temporal opens perception to the particulars of an event. It values the process of personal meaning making.

Potential is another part of perception’s dynamic quality. Classifications can be used to denote tendencies since tendencies do not limit as categories do. Tendencies provide a continuum rather than a sharp demarcation. Perception is active and marked by movement and growth, not by mere recognition. Denying movement and growth imposes false limits and a skewed vision. Perception is also shaped by the limits imposed by the perceiver. When we perceive things as confined to a specific category, there is no movement of perception. We limit our experience to our first impression or instinct. To avoid classification in favor of a spectrum, we provide space for the movement of perception toward a fullness of value. We see transitions, influences, and evolutions instead of separate, static, unrelated impulses (Dewey, 1934).

Perception shows its potential nature when it unites quality and meaning. The mind is not seen as independent from the body. “Whenever anything is undergone in the consequence of a doing, the self is modified. The modification extends beyond acquisition of greater facility and skill. Attitudes and interests are built up which embody in themselves some deposit of the meaning of things done and undergone” (Dewey, 1934, p.259). “These funded and retained meanings become part of the self....Mind as background is formed out of modifications of the self that have occurred in the process of prior interactions with environment” (Dewey, 1934, p. 264). When this background is nurtured by interest, it becomes deep and complex. Imagination takes hold and connects the mind with the world in a new, unified experience.

The Particular Nature Of Perception

When the perceiver recognizes something, it is categorized, and the investigating stops for its own sake. The perceiver stops looking for meaning. Categorization aids the memory in deciphering what is worthy of attention. Dewey (1934) called this efficient use of categorization, *recognition*. Expectations, norms, and the knowledge we bring impacts what we are able to see. Because of our need to be efficient, we see only as much as we think we need to make a judgment. In this way, categorization is used as an end instead of a means to having and understanding an experience. Categorizing keeps an object or event for routine purposes (Jackson, 1998). The perceiver recognizes an object/event as important or not. The perceiver does not take the time to explore qualities outside of her deeply rooted divisions, and the inability to see experiences anew is impaired (Eisner, 1998). These experiences Dewey (1934) refers to as “blind routines”

(p.157). There is no tension or excitement; there is no relation between the many elements within this type of experience.

However, when the knower is open to depth and complexity, even in the most basic of experiences, relations between the elements create opposing forces that are resolved through cooperative interaction among the different elements and the perceiver. The perceiver sees these relations and interacts among them to bring about a fuller understanding. This kind of perception does not rely on repetition, but upon the distinctions within an experience itself. Each experience is unique no matter how similar it may seem because of the uniqueness of the perceiver in relation to that which is perceived. I may categorize people within a classroom as students, but perceive the relations between their individual learning as unique. Actively seeing these unique qualities evokes distinctive responses. If I use rigid classifications to define characteristics of my students, I may be misled when using that information to inform my teaching. Classifications do not always aid perception. Without attending to the relations between the elemental qualities within an experience, our perception may be false. Meaning should not be confused with determining truth/falsity. Perceptions need to be tested to authenticate (Dewey, 1934).

The Relational Nature Of Perception

When the particularities are noticed, so too must the relations of these particularities be noticed. The perceiver does not separate the senses but simultaneously brings together all sensations harmoniously. This takes time. It does not start with ambiguity by seeing a person, smelling, then touching the environment in succession and

finally forming a definite perception (Jackson, 1998). The perceiver does not attend to merely individual qualities. These would be single sensations. Noticing requires a coordination of sensual experiences. No one sense can create a perception (Dewey, 1934). Through these sensual coordinations we gain a felt quality as well as a thought (Dewey, 1958). Attending to the relations within a perception brings about a vulnerability. In connecting with the present relations the perceiver is receptive to personal meaningfulness within an experience. This may be jarring or comforting depending upon the reorganization of thought that may be required. The unity of perception is seen through the relations between the qualities over time with an increasing progression of interactions. Our perception changes each time we encounter a similar experience when we attend to the relations. We see more and more. We see depth and complexity. Nothing is as simple as it first seemed. There is a gradual unfolding of enriched elements with each encounter. Taking notice of how the undergoings and doings affect the relations within the experience is what gives perception meaning. Perception in its active, receptive sense continues to explore all of the relations of the object/event (Jackson, 1998).

Cultivating Perception

In order to see the process of knowing, the subtleties of an experience, sensitivities must be developed and insights gained to be open to the unanticipated. Subtleties are the impressions that impact the knower because of the continued sensitivity and connection with the specifics of a situation. Eisner (1998) uses the example of a wine connoisseur to explain cultivation. Not being a wine connoisseur myself made this

illustration vivid. I enjoy drinking wine but take the subtleties for granted. I know what I like and what I don't like when I taste it, but I am not willing to invest the time to distinguish what qualities I like and dislike about the wine. It is not just about sensing the qualities in isolation, but sensing the relationships between the qualities. The more these relationships are noticed and distinguished, the more sensitive the connoisseur becomes to new differences.

When cultivating perception, then, the knower has made judgments about experiences discriminating significant worth from insignificant distraction. Judgments must be understood and not taken for granted. There should be an awareness of how the present experience is distinguished by past precedents. There should be an awareness of who I am in relation to others involved. Rather than looking for sameness within an experience for the use of categorization, attention should be given to the nuances. Rather than looking to external rules to guide a judgment, the direct experience itself should be scrutinized to gain an appreciation for the perception (Dewey, 1934). "Cultivated taste alone is capable of prolonged appreciation of the same object; and it is capable of it because it has been trained to a discriminating procedure which constantly uncovers in the object new meanings to be perceived and enjoyed" (Dewey, 1958, p. 299).

The key to cultivating perception is remembering. Remembering the subtleties and distinguishing between them requires a person to think back on experience. This is not a simple matter of recalling but is what has come to be referred to as reflection (Dewey, 1933; Schon, 1983). *Reflecting* is actively intersecting the past, present and future. It is bringing to mind conscious and unconscious ideas or thoughts that guide our

actions and shape our perceptions (Dewey, 1933). It is actively seeking out the assumptions brought to an experience that cloud or enhance our perception. It is examining an experience with an open mind and flexibility in order to see the interactions between qualities and the general place they belong on a continuum of experiences.

Reframing (Schon, 1983) allows the qualities of openmindedness and flexibility to bring forth multiple perspectives. Perceiving from multiple lenses provides a more informed appraisal of self. This self-appraisal of what teachers do in practice and why is paramount to the process of cultivating perception and professional growth. By examining taken for granted assumptions through practice, judgments now have a grounding in working theories.

Reflexivity takes reflection a step further. It now recognizes the influence of other's working notions of theory and how that acknowledgment impacts our own perception. "Reflexivity asks us to turn these conflicts back on ourselves so as to uncover, study, analyze our views and assumptions in response to engagements with an 'other' – another text, idea, culture, or person" (Gradin & Carter, 2001, p.3). Not only am I depending on my own interpretation of practice and theory, but I am enlisting critical friends to aid my growth by broadening my perspective. Rather than reflecting on my position and defending it, reflexively I open myself up to clashing worldviews knowing that collaborative negotiation will provide new avenues for sense-making (Bass, Anderson-Patton & Allender, 2002).

Perception Transcends The Technical

External rules should be viewed as general, not specific. So called “best practices” in education are not showcased because the teachers have followed rules or technique without deviation. Rather, these master teachers have developed sensitivities that recognize the relationship between the content and the context which is always changing due to the perceptions and growth of the students and teacher. Teachers are able to draw upon a technique, not as an external force but as an extension of themselves in relation to context. They have made these techniques their own by incorporating and adjusting them to their individual experiences. They have sought out the conditions that enable students to find their own way into learning. These master teachers did not start out as masters. They developed because of their ability to see their mistakes as growing experiences. Their perceptions changed even though they used the same content. Each year they saw new things because of the sensitivity to continuously developing meaning.

A master teacher’s actions are far from mechanical. They are filled with meanings from interactions with the world. They are more qualitative than quantitative. A teacher’s decision to respond in a certain way should have little to do with the number of times it has been done or the time elapsed between responses. It is determined by the qualities perceived as best suited for a particular response. Yet we evaluate student teachers based on their efficient application of technique. A teacher does not stop calling on a particular student because he has reached a standard limit. A teacher is sensitive to the class and may recognize that some students have more to share on a certain topic because of their experiences or their different, enlarged ideas on the topic. But these

judgments are based on perception. A teacher whose perception of good teaching is one of application of technique may allow one student to be called upon only 3 times in a 45 minute period for example. The teacher may use some marking device such as “talking sticks” to moderate domination of conversations. There is nothing wrong with using tools and techniques when they are incorporated as part of the teaching process. The problem is when they become mechanically applied as a standard, external force without regard for the context.

The other difficulty with “best practices” is that it denies the infinite variability of conditions (Eisner, 1998). It is not enough to have one best practice or one mentor. Having a multitude of practices and mentors gives a broad perspective and informs perception more intensely by drawing upon the strengths of each rather than implying there is one right way. Being exposed to precedents should guide judgment but not dictate (Dewey, 1934, p. 311). The same is true for single response answers. Teachers who can use informed perception to find unifying patterns running through individual, distinguished responses can integrate a classroom experience into a cohesive whole, enlightening a student’s own experience. In pointing out relations among ideas instead of looking for a single response, both the students’ and the teacher’s sensibilities are heightened. “The critic, who is not as sensitive to signs of change as to the recurrent and enduring, uses the criterion of tradition without understanding its nature and appeals to the past for patterns and models without being aware that every past was once the imminent future of its past and is now the past, not absolutely, but of the change which constitutes the present” (Dewey, 1934, p. 324).

Do teacher evaluations cultivate sensitive perceptions? Using check off sheets to monitor classroom control does not foster a teacher's attention to noticing what a child understands. What is a teacher's responsibility for enhancing learning? When knowing is viewed as a continuous process and perception is open to depth and complexity, it is more probable to see students as creators of meaning.

Seeing Creators

Unfortunately efficiency has created a perception of deficits (Ayers, 2001). The knower tries to label and categorize which leads to a perception of what is lacking or what doesn't measure up. This perception is usually very linear, incremental, and detached. There is an attempt to define rather than create. There is a "quest for certainty" (Dewey, 1929).

Risk becomes apparent when people are perceived as creators (Dewey, 1934; Greene, 1995). There is a chance for the unexpected when something new is attempted. There are no assurances when traversing across unexplored territory. There are only questions. Questions are not meant to satisfy but stimulate. It is searching out answers for ourselves that identities develop. It is seeing beyond where we have been that keeps us becoming (Greene, 1995). When the present experience does not modify the past, there is only a recurring event. It has no impact. It can be considered automatic or routine (Dewey, 1934). When provoked by interest, perception becomes part of the knower. There is interest because the self is involved. It is no longer routine, but has the capacity to transform.

Seeing the knower as a creator is a continuous, evolving process simply because of the changes that occur within the perceptions of the student, the teacher, the shifts in the situation (Ayers, 2001). The interactions create opportunities for the details of perception to be revealed. Unfortunately, we are only allowed a partial view of the world. Without attention to the details, obscurity flourishes. Generalities provide a false sense of security in sameness. By looking at the unique qualities each knower brings, a clearer sense of perception is revealed. By encountering different perceptions and questioning what we normally take for granted, we can always perceive more (Greene, 1995).

But how difficult is it for teachers to perceive students as creators when they are given a plethora of labels in which to categorize them? It is much easier to group and sort and deal with 4 groups than 25 individuals. Categorization limits perception by focusing on specific deficits. *Learning disabled*, or *LD*, for example, focuses the teacher's attention on what the student cannot do but says nothing about the student's interests or aptitudes. The label alone may invoke a range of perceptions from fear to rescue, neither of which may be correct (Ayers, 2001). Even the *gifted and talented* label fits students into one category that may be interpreted in many ways depending on the one making the interpretation. Are students in this group allowed to fully express their giftedness or is that expression confined to an authority's static perception?

The perception of students as creators allows for change, growth, and transformation so that no one label is ever sufficient. No one label can determine potential. No one label is capable of defining every student. People are multidimensional by nature. Seeing the knower as a creator alleviates a static perception and enables

multiple lenses for perceiving individual qualities in motion. Focusing on individual qualities strengthens and sensitizes our perception to detail, our powers of observation, and our ability to interpret (Ayers, 2001). “Each person mirrors all people, and ...each is also a unique and specific expression of life’s longing for itself” (Ayers, 2001, p. 48). Expanding perception beyond our normal boundaries initiates a quest that keeps our longing from ever being complete. It keeps us becoming (Greene, 1995).

A more concise way of saying that knowledge is active, social, relational, transformative and continuous, is to say that knowledge is experiential. This view affects perception in ways that are dynamic, relational, particular, and full of meaning. In other words, perception is multi-layered. Seeing the process of knowing in this way requires attention to the complexities of the relations involved to what is seen. The formative assessment process attempts to illuminate the dynamic complexities involved in the teaching/learning/assessment process. This self-study focuses on the dynamic reciprocity involved in the formative process. Reciprocity is thought to play a role in how students come to understand the complexities within the teaching/learning/assessment process.

CHAPTER 3: METHODOLOGY

Introduction

This research illuminates my personal experiences of attempting to promote embodied understandings of the complexities of the teaching/learning/assessment process through the reciprocity of formative assessment in the university classroom. One of my concerns as an instructor is that methods courses seem often times far removed from practice in the “real world.” Conventional methods courses supply preservice teachers with technique to be memorized or a “bag of tricks” to be used for entertainment or management. Unfortunately many preservice teachers do not feel prepared for their first teaching position (Zeichner & Liston, 1987). Their vision of who they want to be is linked to their own experiences of “good” and “bad” teachers. They have an expectation that education is about teacher-imposed control (Trumbull, 2004). Unfortunately, assuming such control denies the complexity and uncertainty inherent in teaching. The idea of having enough “stuff” to be prepared for teaching highlights the perception of knowledge as detached, accumulated bits of information. Having enough “bits” (e.g., teaching strategies, methods, and management devices) is not enough. A person with a filled “toolbox” does not necessarily make a good teacher. A teacher can never have enough external “stuff” for true learning to occur because everyday brings a new encounter. Simply implementing skills does not account for the unique context of each classroom. Skills and techniques are important but should be viewed as ever-changing, adapting, and evolving. More important are qualities such as “openmindedness, wholeheartedness, responsibility and reflection” (Hamilton, 2004, p. 395).

When knowledge is seen as active, transformative and continuous, being prepared to lead a classroom means the preservice teacher has personally interacted and grown from the experiences in the university classroom. Being prepared is about finding the rhythm within the midst of growth and movement. It is about assuming the responsibility to engage in and the freedom to be transformed through the learning process. It is about confronting beliefs, assumptions and perceptions when emotional responses are evoked rather than dismissing the experiences as failures. Is this possible in the university methods classroom? Are students able to grasp the variety that the human element brings to a statewide curriculum? Are there enough conditions and contexts to make the complexities more visible?

The best way for me to answer these questions was to examine my own practice. Promoting embodied understandings of the complexities of the teaching/learning/assessment process requires me to make connections to teaching in authentic contexts. Self-study is the best methodology to explore these complexities. By studying my own practice, the possibility exists to engage in and be transformed by the undergoings and doings in the authentic context of a course I teach. There is now the opportunity to see anew the everyday happenings that might otherwise go unnoticed. I can focus more purposefully on the movement and growth of students and my interactions within that process through self-study methodology.

Self-Study Methodology

The theoretical underpinnings of self-study methodology emerge from the study of reflective practice, teacher thinking, and action research (Loughran, 2002). The works

of Dewey (1938), Schon (1987) and Zeichner (1999) point to the importance and untapped resource of teachers defining their practice. Clandinin & Connelly (2000), Eisner (1998) and Greene (1995) show the significance of expression in narrative inquiry and how it enriches the understanding of educational research results.

Self-study research positions teachers to think deeply about their practice creating an interdependence between research and practice. The means and ends are interactive, framing the problem. Learning is not static because the mind and body are integrated and continually shape the learner and the inquiry. Learning is not limited to the 'self' in self-study. Because of the interaction within the teaching/learning process, everything involved is impacted as the teaching changes. The educational community, the curriculum, materials, milieu and ultimately the students all have the potential to transform. Therefore, the learner in self-study is anyone influenced by the self-study.

The instigator of learning in self-study is the teacher. How the teacher thinks about decisions and judgments made is what should make up the "knowledge base" for teaching (Russell, 2004). The learning that comes from this deep thinking becomes transformative rather than imposed (Zeichner, 2001). The significance of teacher thinking was exemplified by Schon's (1983, 1987) work. By contrasting reflection-in-action with the dominant research epistemology of the 1980's, he expressed the unique, complex, and uncertain terrain of the profession and legitimized the place of the individual teacher's thinking and decision making in the development of professional knowledge. One contrast can be seen in simply defining the problem of research. Rather than problem solving, Schon (1983) uses *problem setting*. "Problem setting is a process in which,

interactively, we *name* the things to which we will attend and *frame* the context in which we will attend to them” (1983, p.40). Why teachers choose to attend to certain thoughts and how they attend to them highlight the important missing component of teacher as researcher. Self-study allows the focus of the research to include a teacher’s exploration of perceptions, not on transmitting principles or concepts.

Schon’s work clarified the need for different research methodologies that allowed for teacher interpretation of professional experience. Zeichner (1999) furthered the growth of self-study by recognizing it as part of the “new scholarship in teacher education” (p.4). Unlike the quantitative performance-based, teaching behavior research conducted previously, this new scholarship would focus qualitatively on a teacher’s thought processes, conceptual and philosophical influences, and the nature of teaching. It would look beyond test scores to a broader range of methodologies and research questions. This qualitative approach honored the complexity of the teaching process and the intelligence of the teacher as researcher.

The Nature of Teaching and Self-Study

Another key instigator of self-study research is the growing interest in the nature of teaching itself. To teach about teaching using conventional methods creates many tensions regarding authority, experience, and pedagogy (Loughran, 2002). These tensions are brought to light because of the focus on integrity. To teach meaningfully about teaching requires an insider’s grasp of the complexities involved. Self-study narratives bring to light questions that cannot otherwise be seen through outside, quantitative methods.

In the late 1980s and early 1990s a wave of studies were published questioning the very nature of teaching and challenging the status quo (Loughran, 2002). Basic questions such as “How can I better help my students to learn?” and “How do I live my values more fully in my practice?” were being thought about in completely new ways so that teacher educators would not be “living contradictions” (Whitehead, 1993, p.79). Telling was no longer viewed as an acceptable method of teaching. Trying to understand the complexity of teaching by making the implicit explicit became a central characteristic of self-study (Loughran, 2002). Teaching was no longer reduced to application of skill. The importance and place of experience was being reexamined. “[K]nowledge that comes from experience is learned in context, and is expressed in practice. Teachers’ practice is their knowledge in action” (Clandinin et al, 2004, p. 579.)

However the pervasiveness of teaching as performance of skill and technique made even the act of reflection a technical one. Rather than using reflection to see relationships within the teaching process, steps are identified to fix the teaching problems. People can go through the technical act of recalling their past without involving their beliefs and understandings. The reflection Dewey and Schon describe is a way of being. It is being openminded to encounters that conflict with current beliefs. It is fully engaging beliefs and understandings in inquiry because of the responsibility to integrity. Transformation is no easy endeavor. Reflection as a way of being calls to mind the complexity and relational nature of teaching rather than the competencies (Kelchtermans & Hamilton, 2004). Self-study research shifts the focus from competencies to the relationship between teachers’ life histories and their work including

tensions, and contradictions. Yet this type of research is far from self-promotional. Its depth and interrogation of the personal and social aspects illuminates features of education that would be invisible to an outside researcher.

The purpose of self-study is both practical and theoretical. Self-study researchers are not only interested in the intersection of “public and private, theory and practice, research and pedagogy, self and other” (LaBoskey, 2004, p. 818), but also about theories on the nature of teaching and learning, the responsibilities teachers have toward students of education and the students they will eventually have. In essence, self-study concerns itself with society as a whole. Self-study researchers transform their own practices to create a space for students to question, provoke, or affirm their beliefs, assumptions and perceptions about education.

Self-study research enables educators to formulate, and strengthen their theories as they play out in practice. It facilitates a closer examination of the quality and character of classroom events. This is especially important in teacher education where students and teacher educators are concerned about the teaching/learning/assessment process. Self-study research encourages integrity between what teacher educators talk about and what they actually do. It challenges the origins of educational research by placing the teacher, as self, in the forefront (Zeichner, 1999). But this does not negate the importance of students. “[A] focus on how students learn is a necessary precursor to being curious about one’s own practice” (Clark & Erickson, 2004, p. 57). This close examination necessarily initiates changes in practice. These changes do not play out unless there has been a change in self (Bass et al, 2002). The notion that knowledge and perception are

part of the self, not separate from it, is central to this dissertation. Self-study research allows for the expression of this integrity.

The Significance Of Meaning Through Self-Study

What counts as research “leads to a very deep agenda. It is also an agenda with high stakes for it pertains to matters of legitimacy, authority, and ultimately to who possesses the power to publish and promote” (Eisner, 1997, p. 5). Making comparisons regarding the rigor and scholarship of self-study methodology to quantitative methods is inappropriate when trying to understand its significance and contribution to the educational community. The place of rigor in quantitative studies may focus on statistical procedures and objectivity whereas qualitative studies look for depth of description of a phenomenon with a situated role of the researcher within the investigation. Validity in self-study research is corroborative not definitive. There is not a step-by-step procedure involved in the analysis but a continued negotiation of plotlines as the text is searched and re-searched. The data are not static numbers but rich, three-dimensional text imbued with potential (Clandinin et al, 2000).

Making generalizations is another concern of quantitative research. Generalizations allow for predictions or expectations to be made. In quantitative research, random sampling with large sample sizes enhances statistical reliability. Generalizations are likely to occur when the conditions of the research are the same as the context in which it was applied during experimentation. This is the quandary of educational research. Implanting a new curriculum that showed statistically significant improvement cannot be guaranteed to work because of the formidable number of

variables in the educational setting. Qualitative research is interested in placing, not abstracting, the findings. The term *place* is used to signify the context. There is a history, a present, and a becoming associated with this research. There is a sense of transition, growth, and movement. We anticipate the future in light of the current findings, but we also see the past in a new light because of the connections with what we have now learned. What we learn from qualitative studies are sensitivities to particulars, not necessarily general broad categories in which to place people or practices. “The interpretation of the whole text is successively developed by the interpretations of its parts, and conversely the views of the parts are illuminated by the view of the whole” (Alvesson and Skoldberg, 2000, p.66). There is what Clandinin and Connelly (2000) have termed a three-dimensional space of inquiry where there is “a text that at once looks backward and forward, looks inward and outward, and situates the experiences within place” (p. 140.)

Eisner (1998) vividly explains the use of “generalizations” in qualitative research. He points out how people learn lessons every day using their own nonrandom, N=1 experiences. People generalize from their experiences taking what was learned, reframing it and applying it to similar situations. People also generalize from others, texts, and images refining their perceptions and deepening their insights. Generalizations are shaped in context. They can anticipate the future but also can be retrospective. When one finds significance in prior experiences, not just accumulation of experiences, the generalization is considered retrospective (Eisner, 1998). By looking at the particulars in educational research with insight and perceptivity, generalizations can be made regarding

similar experiences. Rather than use the term “generalization” to express how the findings can be used, authenticity and plausibility (Clandinin et al 2000) may offer better insight into the overall form the results take. Others have discussed this in terms of *vicarious experiences* (Guba & Lincoln, 1994; Stake, 2000). Self-study offers a methodology for teachers to bring to light the relationship between teaching and learning, research and practice (Zeichner, 1999). “The narrative inquirer does not prescribe general applications and uses but rather creates texts that, when well done, offer readers a place to imagine their own uses and applications” (Clandinin et al, 2000). By creating resources through this kind of research, others may be able to refine their perceptivity and gain insight into their own similar experiences.

In quantitative studies it is the researcher who claims a particular generalization. In qualitative research, it is the audience (Eisner, 1998). The assumption is that information learned from research is not top down. Outside researchers do not study, interpret and generalize so that practitioners can transfer that to their practice. Transfer implies a direct replication to a new situation. Rather, qualitative research offers considerations for interpretation. Practitioners with their own expertise are allowed into the debate to shape what is taken from a study. They are allowed to make their own connections. There is a “horizontal” building of knowledge in qualitative research where studies compliment and connect rather than accumulate (Eisner, 1998). Educational research of this kind creates resources for a multitude of perspectives so that determinations may be made based on what is useful for particular ends. It opens the door to seeing situations from different perspectives.

The Place Of The Other In Self-Study

Collaboration is another characteristic of self-study. Although it sounds almost counter-intuitive, collaboration is intrinsic to self-study (Bodone, Gudjonsdottir & Dalmau, 2004, Loughran & Northfield, 1998). The collaboration may be minimal in looking at individual change or on a more grand scale involving the institution itself (Berry & Loughran, 2002). It may also provide a source of personal and/or social significance (Bass et al, 2002; Feldman, Paugh & Mills, 2004). Collaboration can be used throughout the entire self-study process and is particularly useful during ongoing analysis (Bass et al, 2002; Louie, Stackman, Drevdahl & Purdy, 2002; Tidwell, 2002). “Thus, good self-study scholarship involves collaboration not just with the present others, but with those whose opinions and ideas we value (from personal interaction or from texts) and whose voices become part of our system for considering our own analysis, findings, interpretations and ideas” (Kelchtermans et al, 2004, p. 788). These *others* are referred to as “critical friends” (Hamilton, 2005, p. 60). The support of a critical friend is essential to help us see beyond our own narrow scope. My critical friend, Dr. Margaret Macintyre Latta, enables me to see new directions from fresh perspectives. She enlarges my own understanding through her insights. By making private experiences public, rationality is satisfied, conversations deepen, and fresh questions are raised (Eisner, 1998).

The critical friends we carry in our thoughts are as important as those who are physically present. Past research that rouses interest, artistic authors that enlighten, philosophical issues that are calling for resolution all can be considered collaborators in

self-study. The researcher uses these resources to compare ideas, examine assumptions, and validate conclusions (Hamilton, 2005; Kelchtermans et al, 2004).

The participants in self-study research are also more than just inanimate data sources but actively shape the direction the study takes (Loughran, 2004). They will challenge, provoke and bring to light many of my taken-for-granted assumptions as I envision this self-study will do for the education community (Berry & Loughran, 2005; Bullough & Pinnegar, 2001). They are “embodiments of lived stories” (Clandinin, et al 2000, p. 43). They do not fit neatly into predetermined categories but are what makes the inquiry progress, shift, enlarge, and culminate. Each participant has a narrative history which is relevant to understanding the inquiry. Each participant recognizes him/herself within the narrative.

This collaboration also affects the audience. The researcher needs to understand there is a relationship or collaboration with the audience. The written text should make the audience feel free to explore the inquiry without feeling as though they are intruding or, conversely, kept at a distance. The audience is invited to be part of the negotiation of meaning. “The interplay of the inquiry and its value and form of representation inevitably influence whether or not a self-study speaks to those envisaged as its audience” (Loughran, 2002, p. 244). The audience must make connections and extrapolate meanings in order for the results to be useful. Rather than discovering some new technique, the audience uses the information for constructing and reconstructing their ideas of what it means to teach well and what theories are called into question for them, ultimately leading to better practices (Trumbull, 2004). The work of self-study is

not only an individual endeavor but also a long-term collective project (Cochran-Smith & Lytle, 1999).

The Place Of The Researcher In Self-Study

The focus of this self-study is on my practice. My practice is both personal and professional because I see learning as personal sense-making connecting what I do with who I am. My work as an educator embodies the interaction of my beliefs and practices with integrity. I acknowledge the fact that I do not always behave in ways that I value and therefore use this approach to become more self-conscious, vigilant and thoughtful. In order to do this, I am both a researcher and a participant balancing my own transformation with that of the other participants, namely the students.

Although the focus is on self, it also includes other experiences of self (Bullough & Pinnegar, 2004). Collaboration with critical colleagues will be key in pushing “reflection past defensiveness into transformative learning” (Bass, Anderson-Patton & Allender, 2002, p.67). Although this is a personal account, I agree with Dewey (1934), Schon (1983), and Zeichner (1999) that practicing in a profession qualifies me to investigate it. It is in the “outward gaze” that intelligent scholarship can be furthered. But it is because of the inward examination that this new outward gaze is possible. By looking deeply within, our outlook is better informed (Mitchell & Weber, 2005).

This inward gaze is not simple reflection. “Reflection is a personal process of thinking, refining, reframing, and developing actions” (Loughran et al, 1998, p. 15). The inward gaze in self-study is interactive, making it both a personal endeavor and a public activity. The public activity involves a *critical reflection* as defined by LaBoskey (2005).

This includes making public the deliberations of clashing multiple worldviews, the on-going search for evidence of reframed thinking, the instances of changed practice resulting from this transformed thinking, and the examination of how relationships affected the deliberation process. This critical reflection is where meaning is generated (LaBoskey, 2004). Although self is at the forefront of understanding the particulars of a situation and theorizing the learning experience, my view is constrained by my own experiences and by my own understandings of theory. Self-study is a search for authenticity, integrity, and identity making and remaking by continually connecting teaching experiences with personal histories (Clandinin et al, 2000; LaBoskey, 2004; Loughran, 2002). Self-study gives the educator the assurance that change will always be on the horizon and that the status quo will not be preserved. It moves beyond surface action by provoking underlying beliefs and personal theories (Kelchtermans et al, 2004). In other words, self-study honors personal transformation and collective reform.

The Participants

The Researcher/Participant

In this study, I have two main roles. One is that of a self-study researcher and the other is as a participant. As a researcher, my focus is on my own practice. This was the first time I had taught an undergraduate course as an instructor. I had other experiences such as guest lecturer and an internship experience, but this was the first time I was the instructor-of-record for an undergraduate class. I was very self-conscious and critical of my actions knowing these experiences would not all be positive but, in fact, shape the teacher I am becoming. As a researcher, I was collecting and analyzing data

continuously. As a participant, I was personally contributing to the data collection while purposefully trying to gain the perspective of the students. I was putting into action the responses to that continuous analysis. As Bullough (1997) so aptly puts it, I was putting into practice my theories and theorizing about my practice.

The main goal of my research is to be actively inquiring about my practice, beliefs and assumptions while allowing the students to do the same. As mentioned in Chapter 2, I believe knowledge to be experiential and perception multi-layered. This is the interpretive lens for this study. Also introduced in that chapter is the concept of formative assessment as a process. Formative assessment accesses students' thinking in order to inform practice. It is concerned with the process the student takes to understand concepts instead of the product (or score). Rather than using formative assessment as a routine technique, I employed it as a means to access students' ideas of what it means to know and what it is to see. I used it to enable reciprocity, a negotiation of understandings, rather than eliciting a fixed answer. I used formative assessment to enable me to be open to the unanticipated with the view of how it may provide students access to the unanticipated.

On the surface this may seem like a simple process of modeling. (The term *modeling* should not be assumed to mean apprenticeship where students observe and gradually learn how to teach from experienced teachers). Examining what works and why in the apprenticeship model is usually not attempted (Trumbull, 2004). The model I hoped to provide was one of "practicing what [I] preach" (Loughran, 2004, p. 11). I wanted to find out how they learned best by providing varied experiences. I wanted them

to learn from the structured experiences in this course, not from what I was telling them. I wanted them to experience teaching practices that may have been unfamiliar. I wanted them to analyze their classroom experiences in light of their past, personal experiences and present understanding of educational theory. Finally, I wanted them to use their understandings in their own practice to see how difficult it is to practice what we preach about in class discussions. By systematically thinking about my own practice, I hoped to help them systematically think about their practice using formative assessment as a catalyst.

The Students

The fall (2006) semester of Teaching Science in the Elementary School consisted of 18 students; only one was male. All students were seniors in the Teaching, Learning, and Teacher Education Department at the University of Nebraska, Lincoln. All students were in good standing with the university based on previous school records and were expected to be student-teaching in the spring semester.

The Critical Friend

As mentioned previously in the place of other in self-study, a critical friend is essential to enlarging personal understandings. Dr. Margaret Macintyre Latta acted as my critical friend meeting with me twice monthly to offer her perspective on the themes emerging from my ongoing log book. Our meetings were transcribed and used as data. She also enlarged my understanding by offering pertinent professional readings that came to mind as we discussed certain issues. Dr. Margaret Macintyre Latta is an Associate Professor and Graduate Chair in the department of Teaching, Learning and Teacher

Education at the University of Nebraska-Lincoln. She has recently published articles and is actively involved in exploring topics of self-study, inquiry, relational complexity and embodiment. She also collaborated with Dr. Gayle Buck (currently an assistant professor at Indiana University) and others on inquiry using formative assessment.

The Course

TEAC 315 Teaching Science in the Elementary School

Elementary Science Methods (TEAC 315) is a required course for all students pursuing an elementary teaching certification in Nebraska. In this course, students (1) examine the nature of science, (2) develop a personal philosophy and approach to teaching science, (3) explore developmentally appropriate science content for elementary age students, (4) examine the national science standards and explore select content areas, (5) explore what it means to teach science for ALL children, (6) examine the diversity of methods used in science teaching, (7) design science assessments and lessons reflecting current science education standards, and (8) explore community resources and reliable sources of scientific information that enhance the learning of science.

The students conduct a limited self-study which is worth 30% of the grade. It requires the pre-service elementary teachers to identify children's prior scientific knowledge and individual needs by using preassessment strategies discussed and experienced in class. It continues with students coming to understand the difference between an objective and a conceptual understanding focusing on process not product. Students then use a conceptual understanding as a basis for developing an inquiry lesson. They spend time exploring and identifying appropriate educational resources to include

in their plan. They integrate formative assessment throughout their planned lesson and revise their plan after teaching based on that formative information. Students also plan a summative assessment based on examples from lessons experienced in class. Their final analysis of the lesson includes three components: (1) a reflection of the experience based on the readings and experiences of the class, (2) an analysis of how/if they met their goals based on valid assessments, and (3) a projection of how the aspects learned through the limited self-study will affect future practice. An analytic rubric is given in advance as well as student samples to make expectations clear. Feedback is continually given via the Internet using Blackboard (an online discussion board for registered students) or in class discussions based on field observations, student plans and written reflections. Students see their plan as a continuous revision and refinement process.

Another focus of this course is on conceptual change. One fourth of the grade comes from an analysis of how students have grown in their understanding the nature of constructivist science teaching. This analysis is based on students' experiences with the curriculum and coursework. Students begin with an autobiography of their own science learning. They continue to reflect on their ideas about science teaching and how it relates to coursework. This reflection is not simply recalling experiences, but is based on the curriculum interacting with experiences providing support for future decisions. They analyze their growth in their final statement of beliefs. This belief statement is to get students thinking about assumptions they bring with them as well as the assumptions inherent in the materials they use. It is to help them explicitly make a statement for the purpose of integrity.

Research Questions

The impetus for this research comes from my previous involvement in researching the teaching of formative assessment in a preservice science methods classroom (2006). Preservice teachers could express their understandings in writing with great clarity. However, their ability to implement them was mechanical and linear. I wondered how to encourage preservice teachers to implement formative assessment as a process approach. I explored this phenomenon by shifting the focus of my practice from preservice performance to efforts that create, sustain, and illuminate the dynamic reciprocity of formative assessment.

The questions guiding this exploration were designed to be flexible to what may emerge. The purpose was to explore process of promoting embodied understandings of the complexities of the teaching/learning/assessment process through the reciprocity of formative assessment. Originally, the central question was: What are the processes that illuminate the dynamic reciprocity of formative assessment for the instructor?

The subquestions included:

1. How does the reciprocity of formative assessment reveal itself within the teaching/learning process?
2. How do I use those insights gained from the reciprocity revealing itself to further student understanding?
3. What events unfold because of my response?
4. What events unfold because of students' responses?

5. What unexpected events occur due to the reciprocity of formative assessment?
6. What role does reciprocity play in promoting embodied understandings?

What began to emerge was the importance of the last question. By the end of the exploration, this last question became the central question. The reason for this change in emphasis will be discussed in Chapter 5.

Research Procedures

Eisner (1998) reminds us, “ there is no codified body of procedures that will tell someone how to produce a perceptive, insightful, or illuminating study of the educational world” (p.169). He emphasizes the flexibility and responsiveness required in this “distinctive”, “unique”, “context dependent” nature of qualitative inquiry. Although this study has a prefigured focus, I have to be open to the emergence of the unanticipated. This openness does not diminish the scholarship of the study but enhances the depth and breadth of possibility. The flexibility does not weaken the intentional and organized form but ensures that the form is true to the purpose. “The rigor of the methodology is its emphasis on formal or systematic re-visiting, re-questioning, re-writing, re-imaging, and re-thinking” (Weber & Mitchell, 2002, p. 122).

Data Collection

The information collected during the fall (2006) semester was part of my normal teaching responsibilities. The data were identified within the course syllabus as course expectations. These included the following:

- (1) An ongoing logbook of my personal reflections and student artifacts documenting the happenings from class to class looking with a particular eye for moments when the reciprocity of formative assessment revealed itself or student understandings seemed to be growing;
- (2) Observations of my teaching in the science methods classroom during lessons on formative assessment via video recording to ascertain teacher/student theory/practice conjectures that forward the reciprocity of formative assessment;
- (3) Preservice teacher work samples such as an autobiography, a pre/post test on formative assessment, lesson plans and electronic discussions that elucidate theory/practice relationships;
- (4) Field notes taken by students that focus on the tensions of implementing formative assessment;
- (5) Student correspondence;
- (6) Conference notes documenting the reciprocity of formative assessment or instances of transformed thinking;
- (7) Exit Responses documenting key moments when reciprocity played a role in coming to know;
- (8) Audio recordings of bi-monthly collaborative discussions of perceptions with my advisor and myself to initiate tentative analyses.

The chart below outlines the different data collection methods, participants and reasons for their collection. A narrative explaining each method follows.

Method	Participants	When/Where	Why
Ongoing logbook	Juli Kaftan, Instructor	Collected after each class I teach at UNL	Document personal reflections from class to class for moments of reciprocity in FA* and examine personal beliefs, assumptions
Observations (Appendix C)	All Preservice teachers in 10am class (315 Sci Methods) and Instructor	Video recordings transcribed of methods course sessions on FA until final practicum debriefing at UNL	Document happenings by instructor that forward reciprocity in FA*
All Required Work Samples	All Preservice teachers in 10am class (315 Sci Methods)	Collected on due dates stated on syllabus, copied before returning.	Document student understandings of FA and theory/practice relationships**
Student/teacher correspondence	Any preservice teacher in 10am class (315 Sci Methods)	Collected as needed via email or conference notes	Document moments of reciprocity of FA*
Conferences	All Preservice teachers in 10am class (315 Sci Methods)	Collected after initial field placement	Document teacher perceptions regarding the reciprocity of FA*
Exit Responses	All Preservice teachers in 10am class (315 Sci Methods)	Collected as the final exam	Document key moments of personal understanding
Audio taped discussions	Juli Kaftan Dr. Margaret Latta	Bi-Monthly at UNL	To initiate tentative analysis

Figure One: Data Collection Relationships

*Moments of reciprocity include qualities such as:

*the ways in which a teacher establishes a relationship with his/her students,

*the development of trust,

*the ways conceptual understandings are accessed,

*the kinds of ongoing feedback provided and

*the use of insights to inform a caring response to students' individual and collective learning needs.

**Theory/practice relationships refer to instances where I engage in the reciprocity of formative assessment.

These 8 types of data are intended to offer insights to build an in-depth picture of the dynamics involved in the reciprocity of formative process. Specific attention was given to the qualities mentioned above that provide evidence of reciprocity: establishing a relationship, developing trust, accessing understandings, kinds of feedback (verbal, written, bodily), and responsiveness of feedback. Attention is also given to the history of those qualities in order to focus on critical moments. I also had to be open to what else might emerge during this inquiry. What emerged was more than just the dynamics involved but the depth experienced and allowed by individual students, or put more theoretically, their encounter with embodied understanding.

Logbook. I began my logbook by answering the same questions I had the preservice teachers answer in their autobiographical assignment. The purpose was to establish the level of integrity I planned to model with my preservice teachers and as a

starting point for examining beliefs and assumptions I bring to my teaching while uncovering contradictions.

Observations. Observations were made during the semester while preservice teachers were learning about formative assessment. Selected class sessions were video recorded with the camera stationary focused on my teaching efforts. An observation protocol was used when analyzing these tapes (See Appendix A). Preservice teachers were aware of the angle of the camera and which part of the classroom was not in view. They were able to participate in this study without being identifiable on the video-tape. They were also able to give permission to be video taped and not participate in the study. In any case, I was not aware who agreed to participate until after the grades were turned in and consent forms were obtained from my colleague, Jennifer Nelson, who was approved by the Internal Review Board.

Student Work Samples. Preservice teacher work samples that showed an emphasis on or disregard for the reciprocity of formative assessment were collected throughout the semester. These included assignments where students did or did not answer instructor prompts or work that included an interaction between theory, practice and experience. Electronic Blackboard discussions or emails that related to the reciprocity of formative assessment were included in the data collection.

Student/Teacher Correspondence. Correspondence with preservice teachers was conducted when the critical analysis indicated a necessity. The correspondence was most often individual and at times with the whole class, semi-structured, open-ended, and audio recorded (with permission) for the purpose of transcribing for later analysis.

Correspondence could be initiated by the instructor or student(s). They included individual conferences, short meetings after class, or whole class Blackboard clarifications.

Student/Teacher Conferences. The collaborative discussions were open ended with a focus on *reflexivity* (Bass, et al., 2002; LaBoskey, 2005). Reflexivity refers to the ongoing, inductive and deductive interpretation of events in light of the interface between new data, research literature, and inherited traditions (Macintyre Latta, in progress). These discussions revolved usually around negotiations of course assignments or expectations.

Exit Responses. At the end of the course a final exam was given. Students were asked to offer their perspectives of significant instances that helped them to see and act on the reciprocity of formative assessment.

AudioTaped Discussions. Although the meetings with my critical friend were audio-taped and transcribed, their purpose was to initiate tentative analysis. These transcripts serve a dual function of data collection and analysis. The data that initiated analysis may have been used to provide evidence of the reflexive process.

Keeping in mind that no one has “all the answers” and there are no “quick-fixes” enhances the integrity of the inquiry. Self-study focuses on being responsive to the particulars of the situation in practice (Berry, 2005; Eisner, 1998). This focus on the responsive nature makes self-study an ideal methodology for this particular inquiry.

The philosophical assumptions guiding this study are from a constructivist stance. Characteristics of this stance include: qualitative methods, inductive logic, value-bound

inquiry and the notion that all entities simultaneously shape each other (Tashakkori & Teddlie, 1998). This stance allows the research questions to dictate the direction and use of methods (Creswell, 2005; LaBoskey, 2004).

Framework for Analyzing Data

Because qualitative analysis deals with attention to process, it is difficult to address analysis using a step-by-step procedure. There are many different methods that fit the self-study methodology. Currently no consensus exists for analyzing qualitative data (Creswell, 2005; Eisner, 1998). However, through the growing number of exemplars such as Berry (2005) and LaBoskey (2004) offer, data analysis in self-study can be seen occurring with each reflection in order to plan an appropriate response. This is the work of reflexivity. Being open to what the weekly meetings, transcripts, interviews or observations reveal is critical. Having a predetermined direction may blind me to unexpected actions and values expressed by those involved (Griffiths, 2002). LaBoskey's (2004) critical analysis example allows for intervals of analysis. Consciously pausing the collection process allows for reflection on what is being learned during the process of inquiry. Rethinking the focus and identifying responses to critical incidents is an important part of this ongoing, critical analysis. Such ongoing reflexivity was a key purpose of the bimonthly meetings.

In addition to the ongoing analysis, data analysis proceeded in three additional phases. Phase I focused on critical perceptivity or "connoisseurship" (Eisner, 1998) of individual artifacts, labeling all data thematically. This involved Eisner's (1998) commitment to "fine-grained discriminations among complex and subtle qualities" (p.63)

based upon the appreciation of the history that comes with those qualities. During this phase I read and reread data sources looking especially for moments of reframed thinking. I tried to understand the nuances experienced and then make judgments about the worth of those qualities. The history involved not only my understanding of educational theory and personal practice, but also the context of the university classroom, and the backgrounds and philosophies of my students. This influenced what I was able to perceive as well as what was perceived by my students. Especially helpful to this process was having the video tape to help inform my logbook as well as my transcriptions of my meetings with my advisor.

Phase II involved *secondary epistemic seeing* (Eisner, 1998) relating how each individual is part of a larger group and which themes were common across individuals. By being aware of the particularities, I was able to see those particulars as helping to inform a larger whole. In this way, my consciousness was raised to the distinctions and interrelatedness of these qualities. I was able to provide more refined reasons for my distinctions.

Phase III involved a group analysis of the data focusing holistically on interpretations that further the educational community's understanding of the role of formative assessment in a teacher's understanding of the educational process. This holistic view saw distinctions as unfolding rather than static and acknowledged how the relationships affected the deliberations process (LaBoskey, 2004). There were pervasive qualities that unified the issue of formative assessment's role in the teaching process. As Eisner (1998) explains, "...they provide a summary of the essential features" (p.104).

The Use Of The Term Validity. Mishler's (1990) and Eisner's (1998) complimentary articulation of validity in self-study will guide this inquiry. "The essential criterion for such judgments is the degree to which we can rely on the concepts, methods, and inferences of a study or tradition of inquiry, as the basis for our own theorizing and empirical research" (Mishler, 1990, p.419). *Trustworthiness* will be established through bodies of work that have made evident data collection procedures, findings and interpretations, not individual investigations. Mishler (1990) evaluates this clarity based on the answers to these questions: "What are the warrants for my claims? Could other investigators make a reasonable judgment of their adequacy? Would they be able to determine how my findings and interpretations were 'produced' and, on that basis, decide whether they were trustworthy enough to be relied upon for their own work?" (p. 429).

Building a trustworthy or credible case will be shown using Eisner's (1998) *structural corroboration, consensual validation, and referential adequacy* which are supported by Loughran and Northfield's (1998) procedures detailing the complexity and context, triangulating data and linking the study to educational literature.

Structural corroboration is similar to triangulating data. "[It] is a means through which multiple types of data are related to each other to support or contradict the interpretation and evaluation of a state of affairs" (Eisner, 1998, p.110). Eisner explains this in terms of an example drawn from law. Lawyers need to make a coherent, compelling, and credible case. It is rare to have a clear cut case while one that is so ambiguous would never be heard. Likewise, in qualitative analysis, credibility is a matter of judgment. Which evidence I decide to use and which I decide to omit will be

determined by the weight given to support or contradict the interpretation.

Trustworthiness of these judgments will be shown through the convincing relation of data and similar exemplars in literature.

Consensual validation is the agreement between the perceptions of a critical friend(s) that the interpretations are fitting. This should not imply all parties independently code data and then compare looking for matches. Although the coding could be accomplished individually, there is a negotiation among the meanings drawn from each perception regarding the type and weight of evidence. Because each person brings a different history to the analysis, multiple perspectives should be expected. Common themes should be scrutinized in terms of method and assumptions rather than taken at face value as “right.” Trustworthiness will be established through the abundance of data and justification in light of the literature.

Referential adequacy is the ability of the researcher to bring about “more complex and sensitive human perception and understanding” (Eisner, 1998, p. 113). When the audience can see the qualities illuminated by the research and appraise it in a new light, the researcher’s work is referentially adequate.

Ethical Considerations

Ethical issues involved with this research included making sure participants believed they were free to withdraw from the study at any time. They were fully aware of the purpose and procedures, risks and benefits and the right to ask questions, obtain results, and ensure anonymity (Creswell, 2005). There were no known risks associated with this study. The expected benefits associated with participation included the

information about the dynamic reciprocity of formative assessment. These issues were addressed in the informed consent letter (See Appendix B). The projected timeline for data collection was approximately one semester.

Ethical matters are ever present in self-study. They shift and change as the study takes shape. Besides the consent from the institutional review board, each phase of the data collection and analysis is marked by ethical considerations of my responsibility as a researcher in a participatory relationship (Clandinin, et al, 2000). Questions about my role as a researcher and a participant (teacher) surfaced throughout data collection. How did my role as a researcher influence my role as a teacher? How did the students see my dual roles affecting the course? Did students want to reveal their ownership to their stories? Can I tell their stories anonymously enough? These were the questions that came to mind as I considered my responsibility as a researcher in relation to participants throughout the inquiry process.

The Form of Presentation

A narrative is a story of lived experience told from the perspective of the writer. There is a selectivity involved in this perception. However, this selectivity points to things that may have not been visible to others. What is written and how it is written gives rise to meanings made by the reader (Clandinin et al, 2000). I believe the data I have gathered fits the form of a narrative dissertation. There is “a match between the research design...and the structure of its presentation” (LaBoskey, 2004, p.856).

The data I collected told multiple tales. The themes of growth, interaction and complexity emerged through the work of formative assessment. The evidence that vividly

illustrates these themes are presented. Much of the evidence is taken from student work samples. These work samples use pseudonyms not only to maintain the anonymity of students but also to distinguish when different student voices are heard. Using identifiers such as: student one, student two, student three, etc., diminishes the narrative style in my particular case (Eisner, 1998, p.169). The histories of particular students play an active role in writing this narrative when depth is explored in Chapter 5. When I examine the differences in depth experienced, three student stories are particularly striking. I present their accounts to situate the depth encountered and allowed by students along a range. Adam, Karly and Agnes are pseudonyms for three students whose stories offer insights into the varying degrees of tension and relief experienced by students in this course.

Some exemplars in literature show themes or assertions as common ways of organizing a self-study narrative (Berry & Loughran, 2002; Berry, 2004; Weber, 2005). Others highlight the search for identity (Bass, Anderson-Patton & Allender, 2002; Diamond & Van Halen-Faber, 2005; Tidwell, 2002). In this narrative there is a look to the past with what has shaped my perceptions and a search for what I am becoming. I take an inward gaze at the personal grounds for conducting this study as well as an outward gaze to its significance to the educational community (Clandinin et al, 2000). It is a story of movement, transition, and growth. It is a struggle to define who I think am and who my actions say I am. It is a focus on the beginnings and arousing the imaginations of teachers to what education might mean for them using a structure that seems natural to the act of teaching itself (Greene, 1995).

Narrative is a form that gives voice to wholeness and new possibility to the ordinary. It focuses on moments instead of discrete data. It seeks contexts and connections while perceiving openings that vividly move the reader through the plotlines of actual living people. Narrative is a way of understanding life (Greene, 1995). Self-study is a means to understanding the practices of teachers. Expressing this understanding through narrative form connects theory and practice in a holistic way. It is through seeing and expressing this interdependence that the complexity of teaching can be better understood.

CHAPTER 4: REVEALING DATA THROUGH THE WORK OF FORMATIVE ASSESSMENT

Introduction

The qualities I see most inherent in the teaching/learning/assessment process entail the dynamic relationship of knowledge and perception and their role in the process of becoming. The backdrop provided in Chapter 2 is intended to provide some clarity as the reader advances through this unconventional text. It is my hope that this text contributes to stimulating the reader to consciously characterize education for him/herself, to come out of the silence and into the search (Greene, 1995).

The progression of this dissertation developed as a result of my participation in two research projects, one with a sixth grade teacher and another with a science teacher educator. Dr. Gayle Buck, formerly an assistant professor at the University of Nebraska-Lincoln, led both projects. These projects focused on formative assessment as a process rather than a mechanical tool. The specific research questions emerged from my experiences as an elementary science methods instructor striving to use formative assessment as a vehicle for students to access the teaching/learning/assessment process. I wanted to explore the dynamics involved in the reciprocity of formative assessment.

An Inward Gaze at the Past

When I was an undergraduate student, I focused on teaching in isolation. Teaching was broken down into a series of steps. Professors and, later, principals often judged my ability to teach based on these steps. The assumption was that if these steps

were repeated and applied correctly, student learning would follow. Student learning was only perceived as a product or a score. Students churned out test scores with little focus on the process the learning took. Teaching was based on a polished performance. The better it was polished, the better students were expected to score.

As a teacher, my students' scores usually fell within the Bell curve. I was satisfied that few were excelling, most were achieving, some were struggling and failure was rare. My focus was on covering the expected curriculum while working with those who were struggling individually. Teaching, for me, was always about trying harder to transmit the information or to make it more exciting. I didn't understand teaching to be entangled with learning. I saw it linearly, not interactively.

What I recognize today is a real disconnect in the teaching/learning process by trying to oversimplify and deny the interdependence. The teaching process cannot be discussed without knowledge of student learning. Teaching and learning are entangled. Denying this entanglement makes teaching a performance and leaves learning to chance. Acknowledging this connection involves noticing the details and relations (Greene, 1995). Details and relations help to bring general theory into practice. Details provide relationship and connection. They become "modes of interaction" (Dewey, 1934, p. 134). By showing the uniqueness of a situation, details have the potential to incite interaction. However, it is easy to dismiss the complexity or ignore the details if the focus is not on the process and, specifically, the reciprocity within the process. Details enable teachers access into another life different from their own when they acknowledge the dynamics involved in the teaching/learning process. This makes teaching personal. It makes

learning personal. It is much safer to be at a distance, to separate yourself from the entanglement, to keep *teaching* and *learning* an abstraction. But eventually this façade is revealed when teachers start noticing the details and how those details relate to the teaching/learning process.

I recall two research experiences that foreground this process of noticing details as modes of interaction. Retracing important events situates my ability to attend to and interact with details of particular moments. The first excerpt is taken from a draft of a paper I wrote in conjunction with Dr. Gayle Buck and Alys Haack that was later published in *The Middle School Journal* (2006). Alys Haack is a middle school teacher in the Lincoln, Nebraska Public School system who agreed to participate in an inquiry research project during the 2005-2006 academic calendar year. It details the qualitative research process along with the implementation of formative assessment in a sixth grade science classroom. It seeks to express both the frustrations, successes, and transformation involved in one teacher's understanding of the formative assessment process.

A need to better assess student understanding was identified by a middle level science teacher. Through action research and collaboration, incorporating formative assessment was explored. The process began with evaluating the validity of existing products, the definition of student learning, and the expression of scientific understanding. Student interviews were conducted and comparisons were made between what the teacher perceived the students understood and what came out in the

interviews. A reflexive process of planning, action, and reflection continued until a valid product was created. Once understanding was accurately measured, a written dialogue was used to probe students individually. This interaction between students, teacher, and content helped the teacher know what students did or did not understand in order to inform practice. This process empowered a middle level science teacher to redefine student learning, measure that learning, and use that information to guide instruction. (MTWTA Draft, p.1, 2006)

For this teacher, habits that formerly went unnoticed were now being recognized as modes of interaction. Teaching was no longer a static transmission of information but a process of noticing how interactions mutually modify and move thinking (Dewey, p. 134). Getting the details of the teaching/learning/assessment interaction helped Alysa to see teaching and learning as connected, personal, and fulfilling.

Another influential experience that enables my ability to attend to the modes of interaction in the university setting comes from teaming with an Elementary Science Methods instructor in the spring of 2006. I was able to broaden my perception of formative assessment to a new context.

In the spring semester of 2006, I assisted the instructor of TEAC 315 (Elementary Science Methods) by team-teaching sections that focused on formative assessment. Our focus was on having preservice students explore and experience formative assessment themselves in order to

understand how it relates to the teaching/learning process. By using formative assessment, we were able to see how students were interpreting our instruction. Their discussions on blackboard, exit card comments, assignments and field experiences provided avenues for analysis. Having them come to understand formative assessment as a process and then use it in their field experiences was our goal. Accessing that understanding was not as difficult as changing their worldview of what teaching is.

Formative assessment challenged students' understanding of the teaching process. I see this as a necessary first step as well as a benefit of the formative assessment process. This self-study process allowed me to look closely at my experiences and relate them to relevant literature. I was able to redefine and revise my own conceptions of teaching in higher education. (Portfolio, 2006, p.74)

Both of these research experiences reveal how formative assessment could be used as a window into the dynamic teaching/learning process. Focusing on what students need shifts the emphasis from performance to process. This focusing provides details that create relationships. Developing relationships require an ongoing commitment to dynamic interactions. Acknowledging and experiencing the reciprocity involved in interactions through formative assessment is worth pursuing.

An Outward Gaze Toward The Professional Community

When teachers allow their perception to be informed through a synthesis of seeing, thinking, feeling, and acting (Merleau-Ponty, 1962), they bring themselves into participation within the teaching/learning process. Understanding the details of individual learning is time consuming. Providing learning opportunities that challenge without shutting down growth is a careful balance easily tipped. Formative assessment can provide the details for teachers to connect the teaching/learning/assessment interaction. It helps to clarify the interaction for the teacher and the learner. Deciding what to do with those details places the teacher within or outside of the interaction. It is using those details to participate within the teaching/learning process that teachers may be able to understand the complex dynamics involved. How can we prepare teachers to implement formative assessment with an inside view? LaBoskey (2004) calls for strategies that help to expose the teaching/learning/assessment dynamics:

Since the purpose of teaching is the facilitation of learning, we can only understand and evaluate our efforts and monitor the improvement of our practice, by attending to the cognitive, emotional, physical, social, and moral/ethical development of our students. We need to employ strategies, therefore, that will make transparent to us, as well as to our students, their learning processes and outcomes, in all of its variation, complexity, and fluidity. Simultaneously, we need to use methods that will provide evidence to us, to our students, and to our colleagues that we are learning

from what we are discovering; that we are reframing our thinking and transforming our practice in defensible ways. (p.828)

Formative Assessment Exposing Process

Formative assessment is a potential vehicle for exposing process. I have resisted calling formative assessment a tool or a strategy because of the mechanics involved with the conventional use of teaching tools. When a tool is mechanically applied, the focus is on getting the job done. The focus of formative assessment is on the process. It provides access to details about student learning that cannot always be revealed through summative assessments. It gives the teacher details for examining a lesson's focus. It creates an avenue for dialogue and interaction. It is the means to uncovering the process. However, it can be reduced to a mechanical tool. This is the danger to connecting it to *informal assessment* or other terms that have become, in practice, miniature summative assessments. Summative assessments can stop learning. They attempt to measure what a student has learned. Formative assessment continues the learning process by scaffolding and providing feedback based on valid knowledge of the student's learning. This was one of the aims of my data collection: To capture data that revealed the reciprocity involved in the learning process "in all of its variation, complexity, and fluidity" (Laboskey, 2004, p. 828) by using formative assessment to inform practice, student growth, and theory/practice relations. Most importantly I expected the data to reveal the importance of reciprocity to the formative process by bringing me into the teaching/learning interactions.

The Reflexive Role of the Researcher

The inward and outward gaze I provided the reader is an example of the constant “back and forth” (Clandinin et al, 2000) that is involved in qualitative data collection. It provides an example of the influences involved in my perception. It positions me within the research process rather than outside of it. However, it is not merely me, alone, collecting data, but me in relation to data sources, literature, participants, and the research process. The reflexivity involved focuses attention on the process and the relations, not just a procedure or an end pile of artifacts. There is a certain *aliveness* to the data collection process involving an interplay among and within the data sources, theory and practice, and researcher and participants. Reflexivity involves questioning these relations regarding their impact, their direction, and their intersubjectivity. There is a recognition of values brought by the researcher and participant and how this influences the gaze from a narrow and a wide lens (Usher, 1996). There is a constant repositioning to gain different perspectives regarding the intersubjectivity. There are moments of looking up-close and moments of pulling away with each moment informed from a personal perspective and challenged by others. Reflexivity “pushes reflection past defensiveness into transformative learning” (Bass et al, 2002, p. 67).

Intersubjectivity allows for information to be cocreated. “After all, information is not transmitted between researcher and individuals; ...data are coproduced intersubjectively in a manner that preserves the existential nature of the information” (Esposito & Murphy, 2000, p.182). Intersubjectivity uses dialogue and different sources of information to interpret meaning between and among ideas. Intersubjectivity is not

objective or subjective but “a different kind of relationship where understanding emerges from dialogical engagement between representation and explanation which can assist judgment, interpretation and understanding” (Usher, 1996, p. 134). Ideas and meanings are compared and verified against other similar claims.

Formative Assessment as Data Collection

The data collection process was an ever present reality during the semester. Because I was so intent on getting thick, rich, descriptive details, I tried to collect every aspect of the course from observations, classroom interactions, and student work to conversations, emails and personal reflections. I also recognized that the “*experience of the setting may afford reflection and critical analysis that is not possible when acting in the setting*” (Putnam & Borko, 2000, p. 8). I wanted enough evidence to be able to document the unexpected.

Being able to step back and relive this experience though hindsight, I can see how transparent formative assessment made the teaching/learning process. I employed formative assessment as a means to access students’ ideas of what it means to know and what it is to see (student growth and fluidity). I used it to enable reciprocity, a negotiation of understandings (through variation and interaction), rather than eliciting a fixed answer. I used formative assessment to facilitate my openness to the unanticipated with the view of how it may provide students access to the unanticipated (complexity).

In Chapter 3, I explained the different sources of data. To remind the reader of the different sources and to show the interaction between the sources, I have identified the three main data sources as follows: daily log, critical friend meetings, and student

work samples. Each is further delineated with dates. For easy reference the following structure will be used:

Personal daily log: (Log, date, page)

Critical friend meetings: (Meeting, date, page from transcript)

Student work sample: (Artifact #1.3, date). The first number refers to the assignment and the second number refers to the student. In this case, the excerpt was taken from the first assignment and the student designated as three, followed by the date the work was due.

The excerpts included in this section are those that best express the meaning behind the themes. Pseudonyms are used to highlight the expression of different voices. My intent, however, is not to introduce each student participant but rather build a case for the themes I saw emerge.

Data Revealing Growth And Fluidity

The data collection process began with my ongoing log-book. Each day after class I would reflect on what I thought happened and use that as the basis for planning the next class. Most of the time it was not just my own thoughts informing my planning. I used readings, looked back upon student work, had informal conversations with colleagues or students and referred to the videotape to confirm my interpretations of class interactions. For example, this excerpt from my daily log shows the connections I was making between a student's personal understanding and experiences with science and current theory. I then use that information to help guide my planning:

While responding to Maura's autobiography, I found myself referring to the NSES. A piece on assessment caught my attention. I want to make sure I read that again before doing the assessment piece tomorrow to make sure I emphasize in my actions what I want to teach.

(Log, 09.05.06, p. 9)

This conscious search for connections enabled interactions between practice, theory, and personal experience. There was nothing static about the student's work, my practice, or my schedule for the semester. There was also a conscious effort for integrity between my own actions and my expectations for their learning. For example, after using a fourth grade science activity which included constructing a concept map, I learned that only three students knew what a concept map was.

Instead of beginning with NSES, I began with the themes I gleaned from the last assignment. I had labeled them A-H and had each group pick a card that corresponded to one of the themes to discuss. I had them think of one word that would sum up their small group discussion. These words then could be grouped into a concept map. The words were spilling over with constructivism.

(Log, 09.12.06, p.13)

Although I continuously planned based on what I had learned from the previous class session along with assignment responses, this lesson seemed especially effective at connecting what they had learned about theory with what they were learning about practice. We were using the tool of a concept map to understand constructivist theory in

an interactive experience. The only reason I chose to provide this opportunity was because of the sensitivity to the previous learning situation. What could have been a typical lecture over a chapter or even a large group discussion was instead a lively, encounter with the text, practice, theory, and others.

Another influential data source is the transcripts from the meetings with my critical friend. These transcripts show the interaction between all of my sources of information most clearly. They show my emotions, my perceptions, and my theories all interacting with experience and guided by a trusted other. They contextualize what happened to me (Greene, 1995). It was not a matter of collecting separate data pieces to be analyzed at a later date. It was a process of seeing how each data source informed the other and how that information played out in practice and shaped my theories. It showed how temporal and fluid understanding is. It documented how I was brought into the interactions.

One example from my personal data log and an excerpt from my CF transcript shows this interaction between emotions, perceptions, theory and practice regarding the issue of authority. The first excerpt is a reflection of the second day of class. My notion of authority was already being challenged. I did not have access to my working theories at the time of the confrontation perhaps due to my own defenses. Working through this in my daily log enabled a more clear definition to emerge. Although I had a working notion of my authority as an instructor, this challenge brought to light the intersubjectivity involved in negotiating understandings in practice:

This reminds me of the authority issue that occurred after that first class with Agnes. I was so put off by her arrogance, I couldn't think of what I know. I wished I could have just told her what all of my theory and goals for this class were in relation to her question: that the changes in the assignments would be reflected depending on the needs of the class.

(Log, 09.07.06, p.10)

This student was in need of a clear, linear structure. She was frustrated by my tentativeness. She saw learning as a detached progression of steps that leads to an endpoint. I was presenting our course more fluidly like a river flowing and becoming entangled in and around many obstacles changing the landscape as it flowed. This student saw the entanglement of certain assignments as redundant since they were already implied in other assignments. Our different philosophies of coming to know provoked the issue of authority.

Through conversing with my critical friend, I was able to gain another perspective on authority and further grapple with my theories playing out in practice. The following excerpt was taken from a transcript from a meeting with my critical friend:

M: One thing I remember thinking about reading your journal is that notion of control and authority and you are struggling with renegotiating those as Dewey's notion of social control and relational authority and you want to um...think about what is given. What are the students giving to the situation?

J: We talked about that in class today. One of the themes [from their work] was authority and we talked about how we just can't assume we have that authority just by being there and how we go about negotiating that without it being seen as a weakness.

M: And think about authority as the etymology of authoring. You're asking your students to author their own learning. To be the authors of their learning. You, as a teacher, are positioning them to be inquirers themselves, right? So that's something you are constantly grappling with as their teacher. That's part of the work of teaching, you never have it. You are always negotiating that relationship because you can't relinquish your responsibility. So it's that sort of thinking, doing, responsibility weaving, continually. Those issues of responsibility and authority are related and you are asking your students to take it up very deliberately. And they are not quite there yet. Some closer than others. But constantly positioning them to take charge of this. To self organize what they are learning. (Meeting, 09.21.06, p. 6)

This entanglement between knowing, coming to know, and personal transformation became a recurring frustration for some students. Growth and fluidity were revealed when students were confronted with the details and variations of their own understandings. In this course, I attempted to give students opportunities to access their ideas of what it is to know. I gave them occasions to use those ideas to show how their

perception of what they see was affected. This positioned students to confront long held beliefs they may have never verbalized or realized they had.

Student work samples became the main focus for revealing this growth and fluidity as well as the focus for my daily planning. Although I had a syllabus with goals and direction, I looked to student work to show how I could best enable student growth and show them how active and transformative learning can be. I read through each assignment responding to students' thoughts with probing questions and/or further references. This was formative assessment in practice. Grading of formative work was a struggle. Because it was done at the beginning of the year, students could not understand why they should do any "work" without getting points. Their assumptions about their own learning provided much stimulus for class discussions. The purpose of these formative reflections would guide their summative papers. However they were not used to building up ideas in writing to then create an assignment. They just wanted to write the assignment that "counted" and move on. This could be seen by the number of formative reflections I received on the first due date (eleven out of seventeen). The focus of class discussions turned to process/product perspectives, what counts as knowledge, and teacher responsibility. Class discussions helped students confront their beliefs and assumptions about teaching and learning. By the time the second reflection was due, I received reflections from all students.

Codes from student work samples provided the emergence of themes. One student, Adam, talks about the growth and fluidity of his own learning. He enters the course with the experiences of past education courses envisioning nothing new. It takes

approximately one month for him to let go of his previous ideas of what he should expect from education courses and himself and realize this course may be different. This seems to be triggered by the topic of assessment which holds personal interest.

When I reflect on what we have done in this class so far, I realize it's not what I thought it was going to be on the first day. I thought the primary focus was going to be specifically science, yet it is much broader and in-depth than that. The first three weeks of class gave me the impression that this was going to be like so many of the other education classes I've taken to date. This last week however, has introduced new and thought provoking ideas that I feel will benefit me in the classroom.... Like assessment, the concept of creating self-directed learners has been a focus of some class time and in chapter five of NSES. I think this is essential to a good classroom. Students will feel a sense of responsibility for their own education. It provides students that reward of meeting personal education goals. Having students feel like they are doing more than just being "taught to" is very important. The motivation for these students is intrinsic, which is important when trying to create life-long learners, which is the goal of most teachers.... Assessment is probably one of the more interesting and important issues for me right now... The ideas in recent chapters are complex, interweaving, and as we discussed in class, sometimes controversial. Even the issue getting through material vs.

going in-depth is controversial. (By the way, I think that was the best discussion we have had in class to date!) (Artifact #2.17, 09.15.06)

Agnes, another student, describes her growth and fluidity relating past experiences with new understandings:

Before this course, I never wanted to think about how I'd teach science. In my last practicum, the 1st grades did a soil unit, and I thought it was neat—all laid out in worksheets and ready to be taught. But now, I realize that the students probably didn't take any understanding away from that. What good was their adding water to clay and rolling it into a ball? They were pushed to write their findings on worksheets instead of free thinking. What was so appealing before because it offered ease to me is no longer appealing because I see that I could give students some soil and let *them* come up with questions and answers about it.

(Artifact #2.12, 09.15.06)

Anya, another student, reveals growth and fluidity by questioning theory with her experiences of practice.

A quiz question from chapter three really caught my eye. It presented a situation in which a disabled student brought in a praying mantis, not knowing what it was, and asked the teacher about it. The answer was to set aside the lesson plans and teach the students about the praying mantis. Although I selected the correct choice, this was somewhat surprising to me. I found myself wondering if that is what would have

really happened in an actual classroom. I think it is important to do things like this because it shows the students that their wonders and questions are truly important and valued by the teacher. Students who believe their teacher is only focused on test results may feel too pressured to perform and may not have the opportunity to really comprehend the lessons. I really wish my practicum teacher could have taken the time to step back and consider what is more important: keeping up with other classes or truly making sure that students grasp the concepts without feeling pressured? Our discussion on Tuesday brought me to the conclusion that it is much more important to focus on the needs of the students and how I can best reach them. That is where constructivism and assessment come into play, as I previously discussed.... Overall, I feel that I have come a long way in the few weeks that I have been in this class. At the very beginning of the semester I was aware of the various aspects of teaching but had not really taken the time to consider how these factors affect the students' ability to truly learn.... (Artifact #2.8, 09.15.06).

These reflections attempt to reveal students' thinking. They seek to uncover past experiences to help students confront what they believe using experiences and theory. These beliefs, when made transparent, help me to monitor and facilitate their growth by providing direction for planning.

Adam's growth and fluidity can be seen in how he moves from expecting the class to focus on the technique of teaching to his openness to depth and complexity. He

seems surprised that the class could offer something thought provoking. This provides an encounter where his personal interest in self-directed learning and assessment could be explored.

Agnes begins with a sense that teaching is about efficiency and scripts. She doesn't need to think about how she will teach because publishers have already done that for her. But as she is confronted with this belief, she sees the connection between teaching and learning. When individual student learning is considered, she becomes open to accepting variety.

Anya also is beginning to see the connection between teaching, learning and relationship through process. Her belief in the importance of process is revealed in the fact that she is contemplating a quiz question she had correct. The quiz questions are not for a grade, but for learning through scenarios. The concept of process is further developed in her expression of student needs. Meeting student needs is no longer focused only on their products, but also on valuing their thinking.

Each of these excerpts attempts to make thinking transparent not only for the teacher but also for the learner. One key feature of formative assessment is that it begins with an analysis of what students know and don't know. This interpretation has much to do with a teacher's perception of knowledge. If knowledge is seen as a static acquiring of *correct* answers, understanding what students know is a matter of checking worksheets to see if they can recall exact answers. If knowledge is seen as actively making connections among concepts, then understanding student learning is a matter of seeing their thought processes.

Having them analyze their thinking was difficult using reflection. I believe this was due to the overuse and misuse of reflection as a summative product in education classes. It is a common practice for students to reflect on their academic work usually citing excerpts from the readings. I was not looking for written evidence that they had read. I was looking for an interaction between their beliefs, their experiences, and their growth through their encounter with the text, class discussions and activities. However, when students see reflections as mere assignments to be completed, it becomes a static task rather than an engaged encounter. One student even commented about the validity of reflections during a class discussion saying it is easy to just put down something to get it done:

I also thought that the point about a student simply giving a teacher the comment or answer that he or she wants to hear was great. I wouldn't have thought of this, but students generally just want to appease a teacher and will not veer too far from what the teacher wants to hear.

(Artifact #1.1, 09.07.06)

This comment spurred a class discussion on process/product and valuing student thinking. We made connections between how students feel when they get grades and when they received written comments on their reflections. The dialogic interplay of responding to reflections provided another basis for reciprocity and relationship.

These experiences of growth and fluidity by students have a mutually modifying affect. My own personal growth and transformation can be seen throughout my daily log. For example, in trying to provide multiple resources that express constructivist methods,

I noticed a change in my selectiveness toward resources. I no longer wanted just anything that claimed to be constructivist.

There are a lot of nonconstructivist resources out there. Even the constructivist resources don't always have the focus I am looking for. I am starting to feel more confident in what I have to offer.

(Log, 09.12.07, p.15)

I realized that I had developed a deeper understanding of constructivism and was not willing to settle for just anything that was ready to use. I recognized this deeper understanding while I was searching through various constructivist resources. This search brought forth a range of constructivist methods, and I was now able to discriminate between the ones that I felt best expressed this deeper understanding.

Another example of my own growth through teaching was seen when I was conversing with my critical friend about a preservice teacher's ideas of surface and depth and seeing the complexities within the teaching/learning process:

J: when I think back on the years I taught, I'm sure I didn't see what I see now. And if I never got to this point, if I stayed in the classroom, who knows [if I would have ever seen depth and complexity]. How do you expand their vision to more than surface [knowledge]? (Meeting, 10.24.06, p.11)

Through this conversation, spurred by student responses to the purpose of teaching, I had explicitly realized a lived sense of my growth. It gave me an opportunity to look back at where I was when I was a preservice teacher and compare it to where I am today. Understanding what it means to know and what it is to see is a continuous

evolution. Growth in our understandings is a fluid process that, when made explicit, can reveal the process.

Data Revealing Variation And Interaction

Variation was constant and at times overwhelming. While I was intent on planning with a focus on what students were learning, I was at the same time learning the balance between structure and variation. Variation and interaction for students involved accessing and expressing their interactions with the curriculum, their experiences, and each other. Variation and interaction for me was about planning for this by seeing variation in each student and attending to how they interacted with different forms.

Treating all students the same way by providing only one mode of interaction leaves many students out. Lecture, for example, is considered an efficient way to transmit information. However, it is not efficient in understanding how students have interpreted or synthesized the information. “Social constructivist learning theory requires interactive/collaborative pedagogy...” (LaBoskey, 2004, p.847). Teachers need to be able to provide opportunities for genuine reframing through alternative perspectives. By providing many points of reference, students are challenged to question their own beliefs and thoughts.

Reiterating the social nature of knowledge examined in Chapter 2, Biesta (2004) explains the importance of acknowledging a relational gap. What is known by one should never be assumed to be received in the same manner by others. Therefore, the more interaction and dialogue teachers can provide, the greater potential for reframed thinking. Dialogue provides a window into another’s point of reference. It allows for exploration

of self and other. It provides the opportunity for reciprocity and relationship. (Miller, 1996).

Using a variety of experiences, I provided opportunities for students to explore their personal perceptions of knowledge and its relation to the teaching/learning process. Experiences included class discussions based on readings, interactions with small groups, personal inquiries, group comparisons, experimentation, conferencing and teaching. I planned with the idea of providing multiple ways into learning through variety, flexibility and open-ended questioning.

For example, Anya's ideas about assessment were broadened through group negotiation and presentation of one type of assessment:

Through our small group presentations about the various types of assessments I learned how to assess in the most appropriate way for different lessons....I have truly learned how important it is to veer away from traditional hand written tests that only require rote memorization. I have come to the conclusion that it is crucial for teachers to require students to demonstrate their understanding rather than simply recall facts.
(Artifact #2.8, 09.15.06)

Adam is moved by a video presentation of a constructivist science classroom:

When discussing this video with my classmates, it seemed as though we had all just watched a magic show. Either my classmates didn't believe this could work for them, or that this was staged. I think everyone wants to aspire to this level of instruction,

but I think we all have doubts in our own abilities. I don't believe I could run a class just like this at the moment, or even within the first few years of teaching. However, I will definitely try, and that's at least a start. This type of classroom environment is just so different from anything we have experienced.

(Artifact #3.17, 09.29.06)

Another student, Karen, expresses the benefits of group discussions:

I found Tuesday's class discussion to be quite helpful. I had some unanswered questions after reading the chapter and hearing my peers talk about the different types of assessments really helped me understand some of the concepts better. I found it beneficial to hear their thoughts and ideas, because I feel like it helped me develop my own even further.

(Artifact #1.4, 09.07.06)

This same student is excited later at the thought of how inclusion is promoted in her own teaching experience:

These are the reasons I have enjoyed this type of teaching so well is because it does truly involve all the students in one way or another. It also gives the teacher a chance to watch a child in action, witness their thought process, and really see their ideas on paper. (Artifact #4.4, 10.27.06)

Karly feels encouraged by the value placed on openness:

The way we have gone about doing things so far this semester that has made me feel much more comfortable with science. In the past I got the feeling of anxiety whenever asked to do anything science related. Now, I feel like we are being encouraged to use our curiosity to our benefit and explore the answers to things we *want* to know—which you in turn make the things we *need* to know... I really enjoy the journals we have been keeping because it's such a great way for you to track our learning as well as self-assessment. (Artifact #2.6, 09.15.06).

Cara extends this same appreciation to openness when she reflects on showing this value in her own teaching experience:

If a child is able to see that their thoughts are valued, they won't be as afraid of taking chances and really connecting concepts to other thoughts and experiences—a critical factor in learning. During my preassessment, I had students draw pictures of what students thought that pumpkins needed in order to live and grow. One student said lightning. Although this took me by surprise, I told her it was a wonderful thought. As I continued to probe her, I realized that she was right on track. Pumpkins need water; water comes from the rain; lightning comes with rain. Once I was able to determine her understanding, I told her it was a fabulous thought and she was engaged the rest of the time. (Artifact #4.15, 10.27.06)

Cara is excited to have been instrumental in keeping her student open to learning. She sees how easy it would be to shut down learning. Formative assessment provided an avenue for probing to make student thinking transparent. It enabled her to encountering an odd answer and not dismiss it as incorrect but use it as an opportunity to reveal and value thinking.

Finally, Anya explained how variety and interaction has impacted her in a conference we had:

Anya sees teaching as identity formation. “This class lets me find my own rhythm. It makes me think, not like other classes. It’s not like this is what the book says. I can experiment and make it my own” (Log, 11.07.06, p.33).

Providing multiple opportunities into learning is important when knowledge is seen as social, relational and interactive. Each student is intrinsically moved through a different medium: the first through a group presentation, the second through a video, the third through a class discussion and then her own teaching, lastly through a conference. Using multiple media is nothing new to teaching, however negotiating what was interpreted extends the encounter and provides for deeper meanings to be explored. Karly, Cara and Anya each experience openness as growth. It is through this openness that trust is established and dialogue occur. “Dialogue by means of language unites people in relationship. It is the medium through which our differences and intersubjective distance may be resolved” (Miller, 1996, p.137).

One of the best ways for me to resolve Miller’s (1996) intersubjective distance was by conferencing. These conferences were scheduled in conjunction with their field

experiences. I needed four class periods to schedule everyone to teach their lessons. However, because most were working in pairs, they would only be using two of those periods to actually teach. The other two were for observing and assisting. I had students sign up for a conference during a time they would be observing. This was a critical time for students. Some had just finished teaching their lesson and others were just about to begin. Their comfort level with teaching science was at the forefront.

To prepare for each conference, I had coded each students assignments looking for themes in their learning. These themes provided a starting point for discussions about my perceptions of where they were in their learning and if their expectations were being met. They also provided students with a possible outline for their final exam.

I felt a conflict in recording these interviews so I chose instead to write notes after each conference. I did not want students to perceive this conference as a research interview. I wanted students to feel as open as possible to expressing themselves and know I valued my work as an instructor.

Experiencing and learning from each conference, I found a rhythm:

Finally I had this conference thing down. My first conference I explained everything to Cara. How I saw her. Then my second conference, I had Anya explain it all to me. Now I found the balance. I read through a few then asked Sophie to explain what she meant by a couple. It was a good interaction. One thing she mentioned with regards to constructivism is what a hard switch for students it was. She mentioned when she taught her lesson, her CT said her lesson plan helped him to see

how he could be a better teacher. She said the kids weren't ready for open questions. They didn't know what to do when she asked them. She was very concerned with meeting individual needs when most of the class got it. (Log,11.09.06, p. 34)

I was astounded by the difference in access to their thinking between written assignments and one-on-one conferencing. There was certainly an alignment between the two sources of information, but the depth of real concern, emotion, struggles, successes, and growth became apparent after each conference. It is difficult to capture that depth in writing. Through the interaction, a new bond was forged with each student. I experienced the full range of expression from timid to open, from anger to excitement, from stagnation to transformation. I wanted to reach everyone. The work of formative assessment helped me to realize that reaching everyone does not mean everyone leaves with the same understandings. Each student was at a different place in their learning. Conferencing gave me the opportunity to interact with each individually. This excerpt from my daily log points out this taken for granted notion of sameness.

Today I had 2 conferences out of 6 that I would call negative. The interesting thing was that both of these students [having difficult experiences] are paired with students claiming a very positive experience. It is amazing how similar these two cases are. Both 6th grade classrooms, both paired with classmates, one having a good experience, one having a bad experience within the same [elementary] room. (Log,11.14.06, p.35)

I am surprised to find that two students experiencing the same elementary classroom can have completely different experiences. I am glad I had the conferences to reveal this. Otherwise my taken for granted assumptions may have led me to teach differently.

What began as a fear of not using the class time traditionally became one of my most meaningful sources of direction for instruction and interaction for developing relations. This was a real source of growth for me, to attempt something nontraditional and have it be met with such success. It was also a source of revealing great depth and complexity.

Data Revealing Complexity

The more we know, the more we realize how much we don't know. When we fail to see depth and complexity, we do not realize there is depth and complexity. For many people teaching is about doing, technique, and products. By slowing down and examining the process, depth is revealed. Details and interactions inform direction. Relationship and reciprocity blur preconceived divisions. Dewey (1934) and Eisner (1998) help me to see how changes caused by these provocations, when noticed, reveal the interdependence and processes of teaching and learning.

Gaining a glimpse of the complexity involved in teaching and learning is captured by examining the purpose of teaching. This first example is a journal entry that occurred after an assigned reading but before class discussion. The entry that follows is after the class discussion from the same person. It not only reveals the importance of our perceptions based on our own understandings compared with group discussions but also what happens when we take time to notice and search for depth.

I think it is very important for teachers to strive for the high quality lessons. I find it very hard to believe that 59% of lessons that were sampled were to be of low quality. (Artifact #0.9, 08.24.06)

After looking over everything a high quality lesson involves, it seems kind of exhausting. There are many components that have to come together to form a high quality lesson. This type of lesson can take a great deal of time and effort to put together. I would think that they are very time consuming. With only 15% of the lessons being of high quality, I assume that this happens very minimally. For a teacher, it could seem overwhelming. Looking over it again, it doesn't seem as easy as it looks. (Artifact #1.9, 09.07.06)

Sophie's reflection also occurred after a class discussion on the same topic. In this case there is an articulation of purpose.

All of these reflection notes as a whole make me realize in general just how difficult teaching is. It is not just cutting papers and gluing on sparkles (which is what many non-ed majors believe). We are in charge of lives. (Artifact #1.13, 09.07.06)

Both of these reflections are examples of the realization felt by most students. There was a struggle to see teaching in a new way. I had to continually remind students of the purposes behind assignments and explicitly state my thinking about my own teaching. I was struggling against the *teaching toolbox* to impress upon them there is more to teaching than implementing tools.

The following excerpt taken from my daily log is an example of what I wanted to point out during a class discussion when student assumptions about what counts as learning became apparent:

By jumping [through hoops] you miss what's going on, your ability to grow your ideas. You want 'stuff' to put into your file of things for some day. That will come. But a lesson plan is only the skeleton of what happens in the classroom. It's the learning that goes on in and around the plan [that matters]. (Log, 8.25.06, p.6)

While I do not negate the importance of teaching tools, I wanted to move beyond what you could download from the Internet and focus on the learning. I did not want the students to feel prepared because they had a pile of ready-made lesson plans.

Another part of the complexity of the interdependent teaching/learning relationship is not being able to plan for everything. There is an element of the unexpected. This can unnerve teachers and many times will go unexplored. The earlier comment regarding the praying mantis tangent speaks to this kind of complexity. If a teacher is uncomfortable with addressing the topic in question, it may be purposely ignored. Tammy experienced this and, through reflection, found a way to deal with the common fear of not knowing:

During this discussion, a student raised his hand and said the term for what we are discussing is electromagnetic repulsion. I was blown away that the student even knew a term such as that. So, I stood there with a blank stare of my face and then responded with sure. I know this

wasn't the response that I should have had. I really underestimated the knowledge of some sixth graders... I should have probably asked the student more about the term and told him to find the class some more information on the material so that we could learn more about it.

(Artifact #7.9, 11.30.06)

Eva experienced this tension and was able to face it rather than trying to bypass it:

While teaching this lesson, I did not anticipate that the students would say that there were atoms inside of the nail. They were correct in saying this, but I was completely not prepared for their questions about atoms. Even with all of my science background, their questions through me off a little. I answered the students' questions to the best of my ability and then also explained that all things are made of atoms. In the future, I will hopefully be more prepared to answer the students' questions about related topics. (Artifact #7.1, 11.30.06)

Tammy and Eva, both confident in their abilities, acknowledged their surprise at student thinking. They still had the idea that questioning is about one question/one answer rather than a reciprocal dialogue. Tammy sought resolution through the inclusion of student research whereas Eva intended to try and learn more.

But just being able to notice what is not planned can be difficult for some. Agnes struggled with control and held an authoritative view of her position as teacher. She

commented, “There wasn’t much that came up that I was not expecting” (Artifact #7.12, 11.30.06).

She later acknowledged the importance of noticing the unexpected while realizing how difficult it will be for her to stray from her agenda:

Dealing with the unanticipated is complex. It would definitely depend on the component that was unanticipated and the goals in sight. In some ways I am not flexible and get agitated if something isn’t working. Other things would spur me to want to go down a different road than I had intended. It might just depend on the day! (Artifact #7.12, 11.30.06)

Others felt very comfortable with the movement and interaction the unexpected creates.

Adam, for example, found it helpful to accept there would be changes to his plans:

I found that it wasn’t too difficult to deal with unexpected events. I found that if I had the mind set that the unanticipated will occur, then I was better able to deal with it. Formative assessment is one way in which I was able to see these unexpected thought processes. (Artifact #7.17, 11.30.06).

Karly was also able to respond to the movement established by the students rather than go forward with her prepared questions.

I was surprised that I did not have to lead the discussion as much as I expected; the students are very willing to participate and discuss with each other. I think this is why discussion was such an effective tool for me. (Artifact #7.6, 11.30.06)

Agnes had difficulty seeing beyond what she had planned. Her lack of confidence was evident in her admission that addressing deviations from the plan “would depend on the day” and the concept. Adam and Karly had previous experience with the fluidity of a lesson and appreciated it being acknowledged in the assignment. They understood that complexity was inherent in the teaching/learning process.

Each of these students began to recognize that there was more to teaching than they realized and that their education courses would not produce ready-made teachers. They experienced teaching as more than a set plan and actively looked for ways to notice what was not anticipated. By having to acknowledge the unanticipated, students saw I valued learning from mistakes rather than performance. They were able to express their weaknesses and vulnerabilities.

My own experiences of the complexity in the teaching/learning process is captured in my daily log. Each day experiences I had not foreseen or directions I had not intended to take were thought through and recorded in my daily log. They were further analyzed with my critical friend. Here a discussion regarding the issue of complexity is revealed in assignment expectations. A few students were intrigued that I valued their seeing and documenting occurrences that were unanticipated:

But Tammy, Elise and Anya discussed how important the [teaching/learning] interaction was. That you can't teach without knowing assessment results. They talked about how some other classes made them write out scripted lesson plans. They even stayed after class to continue the conversation. (Log, 9.12.06, p. 13)

This continuation of the conversation after class showed intrinsic interest about this topic of seeing more than the teacher's agenda. There was an appreciation and a push toward a recognition that they experience more in a classroom than can be revealed in a scripted lesson plan.

Another example of this complexity comes from a discussion with my critical friend asking about the connections self-study is enabling:

I was thinking about the FA sheet and why perhaps it is seen as a mechanical tool, what came to me was, that although FA is supposed to be getting into the interaction and what we were measuring, students document what they are looking for but we are never asking them what they aren't looking for. We're always asking them what they are looking for in their planning. We're asking them to look at the implications for their practice and how their practice changed because of what they were looking for but we never ask what they aren't looking for and how that changed their practice. And so that's the element I have been trying to focus on at least for now. (Meeting, 10.05.06, p.2)

To me, this was a real discovery. Previously I had made attempts to cultivate an understanding of seeing and responding to interactions in the classroom. But I feel this went a step further and validated it in an assignment. No matter how well a lesson is planned, the teacher should always question: What didn't I notice? What should I have attended to? These then became questions I asked myself.

A pivotal experience combining this struggle to view of teaching differently and respond to the unanticipated was captured in my daily log. I had been noticing students' frustration with my changes to the syllabus. I had been focusing on having them experience what happens when the unanticipated is noticed.

What I have been thinking about in my continuous changes to the syllabus was that students are seeing it as a product, not the process. I'm seeing it as a process. It would be much easier if I didn't change it, but I'm trying to be responsive. First it changed slowly but now it's changing too much. I need to try to cut back on the changes. Every time I make a change I think it will be the last, then something else comes up and I change it again. Trying to be responsive to their tolerance level. Trying to balance the frustration to see the schedule change. I'm trying to lessen the load, but the frustration of the changes might be more than they can handle. They have to trust that I won't make things harder for them or throw something in the mix. I think they are so used to not trusting teachers and only relying on the written schedule and so when there are changes they feel cheated. I want to bring that discussion up – the process versus product. Trust, experience in trusting the syllabus as a product. How the dynamics of that play out.

The next day I reflect on my explanation:

My other purpose was to explain the tentative schedule in terms of the process. I had understood their frustration every time I changed it. I had to change it again, but realized (in the middle of the night) that they saw this schedule as a product. They have trusted this product in their classes as their way of getting through. I began with a summary of the themes from their last reflective paper (4). Many mentioned how the 4E was new and they were lost. Also about the discomfort of science content. So I made a list [Things that make this class different]... Then I showed them an overhead of NSES teaching standards – more emphasis on responsiveness, etc. Then I showed them the altered schedule. No moans or groans. I felt like they understood my perspective (or at least were respectful enough not to moan and groan). It all flowed so well. I had realized I was assuming too much. [My critical friend] had mentioned that before. I need to explicitly state the reasons I do things and not just do them. I really emphasized how plans should change based on what they see. (Log.11.02.06, p.32)

The reason I call this a pivotal experience is because of the tension that was released after this class discussion. Previously there was anxiety created each time I started class with an overhead of the revised schedule. After explicitly explaining the reasons behind the changes and how it aligned with constructivist theory, they saw validity in the actions. There was definitely a negotiation involved in the syllabus.

Although they felt the reasons behind the changes were valid, I also decided to make fewer changes.

When teaching is viewed as a performance, there is an expectation that everything is controlled and can be known. When teaching is viewed as a complex relationship between ideas, experiences, identities, perspectives and new concepts, it is clear that knowing everything is impossible but learning from each other is key. The reciprocity involved in this kind of learning is complex. This complexity is difficult to reveal unless there is attention to the movement and growth, variation and interactions, and depth of the teaching/learning process. Formative assessment is a possible window into this complexity.

Ethical Considerations Involved in Reflexive Data Collection

Although typical ethical considerations were considered previously in Chapter 3, I believe it necessary to take up the topic of ethics here to remind the reader of the vigilance involved in reflexive work. Issues of consent, access, trustworthiness of interpretation and the researcher as participant are typically called for in qualitative research. However, certain questions of power did arise during the project that I would consider ethical. Do reflections demand a change in the participant? Have I, the researcher, put pressure on the participant to be different? Would I have the same expectations for students if I were not doing this research? There is great power in this type of research. I wanted to make sure I was using that power ethically.

Miller (1996) discusses these issues and looks at value and benefits coming from the research as gauges for ethics. He concludes that it is ethical to use research to do the

work people would be less likely to do own their own as long as it is beneficial to them. People should grow and change from education. They should be affected in beneficial ways. For example, when students wanted specifics on how to get a grade of “A,” I told them I was looking for transformed thinking, not specific answers. I wanted to see how they encountered the course while examining and confronting their beliefs about teaching. This was new to them and provided a source of frustration and confusion. Examining their beliefs required a look at personal identity. It may require “reauthoring” their life’s story. Students do not typically have to engage to this degree in coursework. However, this is the way I teach, not because I am doing research, but because I believe that education should be transformative.

This reauthoring was not one sided but to be experienced by me, as well. The work of self-study creates an opportunity to be attentive to my own developing awareness. The anxiety it produced to live up to my own beliefs while providing myself as an example was often times distressing. Miller’s (2006) words upon encountering this reciprocity affirmed my feelings when instances of change came forth. My students’ courage gave me courage. Their efforts made mine more meaningful. I was both humbled and enriched throughout the semester. What began as a fear of collecting the right kind of data evolved into greater attunement to the complexities involved in the intersubjective encounters between identity, experience, context and relations.

Examining the value and benefits of this research is actually examining the value and benefits of my teaching. I see that students were introspective. Exploring self enhances identity. This exploration was at times made public during class discussions by

students themselves. The dialogue it created is the center of ethical perspective and decision-making (Miller, 2006). In general, we all gained empathy, attunement, a sense of responsibility and commitment, and an appreciation of how difficult growth and development is. The power of this research to move the participants and the researcher through difficult places and to go farther and deeper is an issue that remains an ethical one to researchers. Teachers, however, see transformation through learning as a purpose of education (Mitchell, 2004). How far we go and where we chose to go can most ethically be determined through dialogue.

Underneath all of these data is me, the instructor. This self study is not so much about telling the story of others as it is about learning what others' stories say about my role as an instructor. Discerning the relationships underneath this data and my role in making growth and fluidity, variation and interaction, depth and complexity transparent is my work of learning. Going back to Laboskey's (2004) call to expose the teaching/learning/assessment dynamics:

We need to employ strategies, therefore, that will make transparent to us, well as to our students, their learning processes and outcomes, in all of its variation, complexity, and fluidity. Simultaneously, we need to use methods that will provide evidence to us, to our students, and to our colleagues that we are learning from what we are discovering; that we are reframing our thinking and transforming our practice in defensible ways.

(p.828)

Each piece of data provides an opportunity for me to reframe my thinking. However, each piece is not separate from the whole experience. Each piece plays a part in how my reframed thinking plays out in my practice. It is a simultaneous process even though I must write about it linearly. My method is always coming into being, never given, but achieved through the reciprocity of dynamic interactions. Different qualities of a situation bring to light certain aspects while other aspects remain hidden. There is value in specificity and its relation to the larger picture. It is a constant experiencing up close, then stepping back in order to get a lived sense of the patterns emerging.

It is this lived sense that becomes important and meaningful. I may read about “best practices” and discuss with colleagues what works, but “knowing ‘about’, even in the most formal academic manner, is entirely different from constituting an fictive world imaginatively and entering it perceptually, affectively, and cognitively” (Greene, 1995, p.125). It becomes difficult, then, to standardize when students’ growth is fluid, when variation and interaction are dependent upon the participation of individual imaginations and where depth and complexity are seen by those who are not “trapped in predictability” (Greene, 1995, p. 124). It is in the freedom to explore and imagine that we find the source of learning. Students and teachers who discover this also gain a lived sense of their learning and possibilities.

CHAPTER 5: A DEEPER VIEW OF THE ENCOUNTER WITH RECIPROCITY

Introduction

Throughout this self-study investigation, I continually searched for processes that illuminated the dynamic reciprocity of formative assessment in order to reveal the complexities of the teaching/learning/assessment interaction. Ongoing analysis showed how formative assessment made student thinking transparent by giving me access into the teaching/learning interaction. Chapter 4 discussed how the reciprocity reveals itself through attention to the movement and growth, variation and interactions, depth and complexity of the teaching/learning process. This chapter focuses on the depth of reciprocity revealed which emerged as a major focus. This depth of reciprocity was informed by the nexus of intersubjective relations in student artifacts, class discussions, the text and personal experiences as well as the teacher/researcher seeing and responding to the complexity.

Stepping back and analyzing all of the data as a whole, it is evident how acknowledging and understanding the context which brought forth these complexities led to embodied understandings for both the students and the teacher/researcher. I cannot embody an understanding of formative assessment without involving the students' encounter with it. Students gain a thicker understanding of themselves and formative assessment based on the depth of reciprocity they encounter and allow. Self-understanding, here, is dependent upon the other. The key component in that

understanding is the reciprocity of formative assessment. This chapter focuses on the core phenomenon of embodied understanding by examining the depth of reciprocity encountered and allowed among different student experiences.

Analysis Procedure Revisited

Ongoing data analysis was a necessity for the conduct of the study fitting with the reciprocity integral to formative assessment. This ongoing analysis centers on the reflexivity discussed in Chapters 3 and 4. The interrelations among data, literature, participants and the research process created intersections for reframing. This constant looking and questioning of these interrelations from multiple perspectives provided direction for future decision-making and analysis.

In addition to ongoing analysis, a final three-phase process is used in this project. The first two phases are taken from Eisner's (1998) ideas of *connoisseurship* and *secondary epistemic seeing*. As mentioned in Chapter 3, connoisseurship involves attention to "fine-grained discriminations among complex and subtle qualities" (Eisner, 1998, p.63) based upon the appreciation of the history that comes with those qualities. During this phase artifacts are coded. The codes are noted for their instances of reframed thinking. Judgments are made regarding the worthiness of the codes by trying to understand the nuances of the experience.

For example, looking at the student artifacts in Chapter 4 (pages 90-91), Adam, Agnes, and Anya all pulled different things from the same assignment (the second reflective paper). Adam's codes included *self-directed learner* which became a theme for him throughout the semester. He focused on intrinsic motivation, student responsibility,

and coverage versus understanding. He felt all of these factors were important in helping students to become self-directed learners. Agnes' codes included *scripts* and *variation* which opened the door to the complexity inherent in teaching for her. These are worthy codes because of Agnes' previous ideas of teaching as telling. Anya's codes included *nurture*, *individual needs* and *student learning*. Anya's struggled with understanding what she may be working against.

Each student's individuality showed by what she or he felt was important to discuss. Each individual's histories were also revealed by the way they chose to discuss different issues. Using formative assessment, I was allowed access to student thinking in individual ways. It raised my consciousness to the particulars of situations and the variation each human element brought to the same situation. The coding procedure provided a three-dimensional view, always looking for potential for learning.

Secondary epistemic seeing is looking again at the codes but seeing how they interrelate across individuals. I asked myself how these codes informed the larger whole. This helped further refine my distinctions based on how individual qualities related to the larger group. Although the interrelationships are too numerous to mention here, an example of this process can be seen by taking Adam's, Agnes', and Anya's second reflective assignment. The theme of *purpose* is appropriate. This theme informs the ideas of self-directed learners, variation, and individual needs.

Finally, I grouped all of the themes to look at how they inform the educational community. These were the pervasive qualities that unified the work of formative assessment with specific attention to the reciprocity involved. These unifying qualities

included interaction, complexity and growth which provide connections for theory/practice relations. These qualities became the organizing framework for the analysis of this study after careful deliberation over the relationships among the various themes and their connection to the reciprocity of formative assessment. Although each theme is inextricably tied to the other, they were presented individually in Chapter 4. In this chapter, I compare differences among students in order to explore the core phenomenon of embodied understandings as seen through the depth of reciprocity students encountered and allowed. Themes that informed each quality are noted as underlined headings.

Three students were selected to represent the spectrum of experiences across all participating students. These narratives situate the experiences within the place of learning. They represent “embodiments of lived stories” (Clandinin et al, 2000, p.43). The first student, Adam, was chosen because he is representative of those students who left the course with a new embodied understanding of formative assessment. Another student, Karly, represents those students who left with a developing sense of formative assessment. This developing sense encompasses a wide range of degrees to which each student came to embody formative assessment. The last student, Agnes, left with a disembodied view of formative assessment. Although I would consider Agnes to be an extreme outlier from others in the course, she does represent the far end of the spectrum for comparison. The range of understanding was based upon the depth of reciprocity each student allowed him/herself to encounter by means of interaction, contextual complexity and growth.

Interaction and the Sense of Place

The aim of education, for me, is the construction of meaning and coming to know is based upon experience. In order for me to provide learning experiences where students will construct meaning, I need access to their histories, theories, actions and interactions: in other words, their place of learning. In order for students to embody this meaning they are constructing, (or to see their process of coming to know and how it informs their actions), they must not only have access to the learning experience but also have access to their own and others' histories, theories, actions and interactions. Without this basic element, coming to know becomes a passive, detached, inscription of information. Some of the recurring themes informing this quality of interaction include valuing curiosity, knowing/valuing student thinking, connecting/empowering students, honoring individuals, giving voice to students, dialogue and trust. The relationship among these themes involves the importance each has regarding access into interactions.

Formative assessment was an avenue into interactions. It allowed students to explore, articulate, and share their thinking during individual and classroom activities and assignments. It allowed me into the thinking and interactions. I was not just an outside authority figure but an active participant in the construction of meaning. It allowed us all to actively see (perceive) the process of knowing.

Formative assessment is a process used by teachers to access what students know and do not know in order to inform instruction and support learning (Black & Wiliam, 2003). Because summative assessments focus on the end product of what is learned, it becomes difficult for a teacher to know if students are understanding until the end of the

teaching unit. Unfortunately by the end of a teaching unit, there is not much room for reframing thinking. More time may be spent on blame. Either the teacher did not teach it appropriately or the students were not paying attention. Although both may be true, this becomes more of a matter of perception of purpose. When teachers view their job as telling, learning becomes defined as listening and parroting back. On the other hand, just because students can listen and parrot back does not necessarily mean they understand the concept (National Reading Council, 2000, Nuthall, 2004). Accessing what students know and do not know is a matter of validly recognizing learning.

Validity of measurement is based on perception. If teachers' perceptions are influenced by a behaviorist perspective, they will likely be concerned with observable behaviors. The behaviorist paradigm sees teaching as a set of behaviors or methods and student learning is based on the frequency of behaviors or methods used by the teacher (Nuthall, 2004; Posner, 2004). However, this ignores the contextual nature of teaching. Constructivists recognize that each student has different experiences within the same classroom. Recording frequencies of interactions does not take into account these different experiences, the different types of interactions, or the interactions among peers.

How we come to perceive became the focus of the beginning of the course. This was integrated with ways to enable perception based on experiences. Students reflected on what experiences inform their perceptions and shared through discussions and writings how these perceptions may affect their teaching practice. It was during these discussions and written dialogue that the intersubjective space for negotiation of meaning, the reciprocity of meaning making, was created. Had these class discussions

been question/answer sessions, there would be only one answer accepted. Once accepted, a move toward the next question without integrating ideas or perspectives would most likely occur. Using formative assessment, I was able to probe more deeply, use open-ended questions, and encourage differences in perspectives to be explored. These differences, once acknowledged, became sources for personal reflection and transformation. New ideas were encountered and students were being asked to determine how these ideas would or would not fit within their personal philosophies. This made learning an issue of identity.

Simultaneously, I was also trying to determine how the reciprocity of formative assessment would fit with my own constructivist philosophy. In theory it should open doors to new perspectives, bring to light complexities and confront and/or transform identities. The reality was that this was a slow process and occurred on many levels for each student as well as myself. This access that formative assessment enabled was not simply a key unlocking a door, but a continual negotiation of trust dependent upon responsiveness and integrity.

From two surveys that were used at the beginning of the year, it seemed evident that most students claimed to at least want to see themselves as constructivist teachers (See Appendix C). However, during the course of the semester, it became clear how difficult it would be to know what constructivism means in practice and how strongly other non-constructivist experiences would influence actions. Examples of this include Adam's reaction to a video presentation of a constructivist classroom: "This type of classroom environment is just so different from anything we have experienced"

(Artifact#3.17, 09.29.06), even though he rated himself on the constructivist end of the continuum. There was a push toward integrity between what each person said s/he believed with how they wanted to practice. Looking back over the surveys it is clear how much misinterpretation could occur. I assumed one thing regarding a survey question but cannot be certain it is what the student intended because negotiation (classroom discussion) around the survey was general and vague. However, looking across the data from any one student, there is an individual rhythm of growth and movement organized in relation to personal encounters with different events. This individual rhythm became the determining ground for the depth of reciprocity students encountered and allowed.

Valuing Student Thinking

Adam was not open to new perspectives for the first month. He was late to class so often that I had to talk with him briefly concerning his tardiness. He did not turn in his first assignment and he didn't have his text for 3 weeks. My first impression was that this student would not pass the course. However, something happened after that third week that was triggered by the concept of assessment and its relation to self-directed learners. He used phrases such as *a sense of responsibility*, *personal education goals*, and *intrinsic motivation*. The concept of assessment touched a nerve that opened him to growth for the rest of the semester. Although Adam made a bad first impression, I had a good handle on his thinking when he decided to participate. I enjoyed playing the "devil's advocate" during class discussions, and I knew he liked that kind of interaction. When he encountered the topic of assessment so personally, I saw that as an opportunity to push

his thinking through encouragement and questioning. It was when we trusted each other's commitment to the learning situation that the reciprocity was most effective.

Honoring Individuals

Karly was more difficult to understand. Her growth fluctuated from being open to new perspectives at the beginning, withdrawing when realizing this was not what she expected, then muddling through and finally feeling a sense of resolution toward the end. She entered the course with an openness because her past summer experience teaching in the Chicago Public School system gave her confidence to share ideas openly. She felt she had something to offer her peers. Her personal experiences were compared with constructivist experiences during class discussions. I took the details she offered and used them as examples for class discussion. I had interpreted my actions as showing her experiences were valuable not understanding the vulnerability with which she offered these. I realized how one sided the conversation became and had to rethink my approach. She felt her past experiences were being tapped as problems and withdraws in frustration. I realized (too late) that the confidence the past experience gave her was pulled out from under her. I was trying to open the door to new thinking rather than allowing the reciprocity to do the work.

Knowing that teaching was what she wanted to do, she sought help. She was one of the few people who used my office hours. She had a willingness to be open to new perspectives. With a new perspective on how I was forcing the learning, I reminded myself of my position of providing multiple opportunities for connections to be made. This reframing on both our parts mutually modified and moved our thinking. It

positioned her to take ownership of her learning and growth. It positioned me to ensure a space for continued negotiation. This continuous repositioning was one of the benefits of the reciprocity of formative assessment. For her, formative assessment revealed her thinking but the reciprocity was key to further meaning making.

Giving Students a Voice

At the other end of the spectrum was Agnes who was not as open to new perspectives as some because of her past experiences with teaching as telling. She was opinionated but seemed respectful enough to engage in conversations with others who held opposing views. Her genuine concerns that were expressed in the journals were impressive. She was one who felt compelled to put on appearances of knowing all. She repeatedly mentioned in writings that although she was identified as gifted and talented, she never felt like she could live up to that “gift.”

Formative assessment allowed her to express what she wanted her learning to look like. The assignments were open-ended, the individual probing provided a sense of personal investment. But the continuity of the assignments were a source of frustration for her. She wanted to be done with things and move on. The course focused on connecting ideas and seeing the big picture. Her lack of science background became a major obstacle (or excuse). She was looking for quick answers to various scientific questions. She continued to withdraw and finally shut down when she realized she would not be getting the answers she was looking for. She failed a major assignment in the middle of the semester and did not attempt to recover.

For her, formative assessment could only reveal thought processes when she felt her voice was being heard. When the reciprocity of negotiating understandings broke down, all of the undergoings and doings became externally imposed products. By the end of the semester her written assignments were mechanical, and she requested a multiple-choice test for the final exam.

For me as the instructor, formative assessment provided access to student thinking on an individual level. It heightened my awareness to the differences each student brought to the same situation. Knowing about these nuances, I was able to plan accordingly. However my planning was not only dependent upon my accurate interpretation of these nuances, but also my ability to allow reciprocity to do the work of interpretation. I had to understand the student's place of learning as well as my own.

Finding the Place of Learning

It was easy enough to find themes in the students' writings and point out connections they were making with concepts being introduced. The difficulty arose when assumptions were made on both the student's and my part. Students who felt valued or given a voice would speak to me individually about my incorrect assumptions. Others would just shut down. This defensiveness made formative assessment mechanical. In these cases, there was no negotiation of meaning involved, so I had to interpret the answers for myself. It was clear how detached their writing was from their personal understanding. When there was no connection between their assignments, their practice, and their personal philosophies, it did not matter to them what was written. But those who encountered the connection felt responsible for showing that integrity in their

work. Those who encountered that connection could “push reflection past defensiveness into transformative learning” (Bass et al, 2002, p.67). I still continued to make comments on work that seemed detached even though I anticipated they would not be answered. I tried to regain that reciprocity. For some I succeeded, but the timing, for others, was too close to the end of the semester.

Before beginning this study I had in mind how I would gain access to student thinking and promote reciprocity. In Chapter 3, I outline moments of reciprocity as ways of knowing students, developing trust, accessing understanding, providing ongoing feedback and using insights to inform a caring response. I felt the formative tools of open-ended questions, classroom discussions, observations, personal reflections and experiential activities would provide sufficient access to student thinking. My role in reciprocity was to be attentive to the moments of meaning-making and responding in ways that furthered that growth. What I did not anticipate was the importance of the student in negotiating these moments. I had falsely assumed that if I implemented formative assessment, if I saw and interacted with student thinking, I would have little problems furthering student learning. I did not anticipate the depth to which reciprocity would affect the formative process.

Contextual Complexity

One of the most impressive aspects of formative assessment is that it focuses a teacher’s attention on the thinking process, not a particular answer. When a teacher probes student thinking, the student is pushed to analyze how s/he arrived at an answer or express the connections s/he has with this concept. This activity in itself helps students

see both depth and the complexity of learning. It shows students the attachment concepts and ideas have with other ideas, experiences and the curriculum. One-word *right* answers do not explicitly show connections in this way and have the tendency to make learning seem like a sequential list of external facts to be memorized. This is usually accompanied by an external system of rewards and punishments since there is little sense of intrinsic purpose. Seeing process, promoting connections, being open to the unexpected, collaboration, variety, adapting and dynamic interaction were some of the themes that informed the quality of contextual complexity. The interrelationships among these themes focuses attention on the variety of ways individuals encounter reciprocity because of their personal, historical, social and educational contexts.

Seeing Process Enables Connections

Adam saw little purpose in reading the text or completing a written assignment. His past courses gave him the impression that theory had little to do with practice and learning course content was not tied to who he was as a teacher. However, in time, he began to notice the connections being made between what he was experiencing in class and how he could use it in his teaching. He experienced concepts from a constructivist perspective as a fourth grade learner as well as a senior in college. The reciprocity in formative assessment, in the form of class discussions and elementary journals, surveys, or anything done during class time engaged his thinking. By probing students in class discussions and using their comments as discussion starters for the next class session, he began to see connections between theory and practice. He began to see connections between how he thought about things and how he responded in word and action. What

used to be regarded as manageable through separation now became so interconnected that separating teaching from learning was impossible for him. Focusing attention on the process of learning through reciprocity brought forth the connections that illuminated just how complex and dynamic the teaching/learning/assessment process is.

Allowing Variety Necessitates Adaptations

Karly was well aware of the difficulty of juggling classroom management, teaching, learning, assessment, motivation, curriculum, supplies, strategies and tools. Her previous experience as a summer intern in an inner-city elementary Chicago school made it concrete. Formative assessment, in the form of reflections on experience and conferencing, brought forth the interaction within each of these teaching/learning aspects. Previously, she saw them as separate entities needing to be tightly organized. Through small group discussions and individual conferencing, the need for flexibility became a recurrent theme for her. Linear planning and structure gave her confidence to begin the teaching process, but by acknowledging the connection between past experience and new understanding, the road map became less clear. This led to frustration.

Karly felt that organization was the key to successful teaching. She thought that by allowing student experiences to get in the way, chaos would ensue. Considering individual contexts distorts clear lesson plans and invites unanticipated events. This source of anxiety could easily be ignored. However, reciprocity enabled her to confront the importance of tapping into the backgrounds of students. She was having difficulty negotiating how this could be managed in practice. Using formative assessment in her practice provided the connection she needed to allow students into curriculum making.

Forcing my solution on her failed. *Flexibility* became her resolution to enable her to see the dynamic interaction between all of the aforementioned aspects. Formative assessment became her structure to manage the unanticipated created by acknowledging individual contexts.

Difficulties In Being Open To The Unexpected

Agnes had great difficulty acknowledging the complexities within the teaching/learning/assessment process. She could say it in writing, but her actions both within the classroom and finally in practice proved to be a source of unresolved conflict. Teaching for Agnes was linear, organized, and planned in advance. It was not so complex because there was little interaction between teaching and learning.

The conflict occurred when she began to acknowledge another way of teaching. Her reflections at the beginning of the semester were quite revealing regarding the flaws in her own education. She acknowledged missing out on connections between concepts and being rewarded by her disciplined, discrete memorization. She felt betrayed that she never knew how deep learning could be. Yet, when asked to use formative assessment to plan for depth, she was not only unable but also unwilling. She did not resolve the conflict between the flaws she pointed out in her own background and the kind of teaching she wanted to do. The reciprocity began to break down because it continued to ask for a resolution. Her formative plan was turned in incomplete. I responded to each incomplete section with questions to guide her thinking about each aspect of the plan. She did not respond. She accepted the failing grade and completely shut down. Formative assessment showed Agnes the interactions and complexities of the

teaching/learning/assessment process. Agnes expressed the importance of these connections. The reciprocity pointed out inconsistencies. Unfortunately, she was “trapped in predictability” (Greene, 1995) and not ready to accept complexity as part of her definition of teaching.

As one student reflected, “There are many components that have to come together to form a high quality lesson” (Artifact #1.9, 09.07.06). Most students recognized the many facets that play a role in education. What was new to them was seeing the interrelationship between and among those facets. Reciprocity enabled these interrelationships by bringing forth assumptions regarding the complexities inherent in teaching/learning/assessment process. Grappling with these assumptions, the unanticipated events, and the importance of individual context shed light on just how complex quality can be. This grappling was a function of the reciprocity of formative assessment enabling new insights into process. These relationships were expressed in the student text. They were encountered in class activities. However, it was when students were provided opportunities to make the connections for themselves through reciprocity in the form of their discussions, reflections, and especially in their formative planning that personal transformation became apparent.

Confronting the Movement of Growth

Being confronted with new ideas provides a catalyst for change. Students who were open to change handled this confrontation by transforming or sustaining their personal theories through the acceptance or rejection of the new idea. Those who were not open to change ignored the confrontation. Each student was confronted by different

issues based upon their personal theories and experiences. The reciprocity of formative assessment became my avenue into the interactions. It enabled me to see the issues students were grappling with, to help students use theory as a source of negotiation, and to confront inconsistent thinking. It enabled students to confront and articulate their teaching identity. It allowed students to be guided through the growth process. Some of the themes informing this quality of identity include purpose, integrity, ownership of learning, life long impact, responsibility, discovering self, revealing assumptions and true/real/deep learning.

Reciprocity Enables Integrity

Adam was confronted by the topic of *assessment*. He knew that learning was more than recited answers, but he did not know what he could do about it. The reciprocity of formative assessment provided a way to access that depth for him and his students. It allowed him to accommodate unanticipated events that would further learning. It enabled him to question what learning could be and then see how it worked in practice. It enabled a connection between what he thought and what he did. It enabled a connection between what he did and who he was. The reciprocity he encountered and enabled brought forth these deep connections. This connection provided the intrinsic motivation to excel in a course he may have failed if success had been based on jumping through hoops. Instead he wrote:

I had almost no idea of what assessment was coming into this semester. I leave a changed student. Formative assessment is probably the most important concept I've learned this semester. Out of all my classes, and in regards to every

topic, I feel this is the most important thing I've learned in the past three months.

(Artifact #8.17, 12.08.06)

The strength of this statement gives the sense of just how deep and personal this topic became to Adam. It did not become important to him because he got it correct on a test or because he saw it as a way to increase his grade in the course. It was important to him because he viewed it as consistent with his new theories of the teaching/learning dynamic. He continued:

I cannot stress how important I feel this concept was for me to learn. I don't think I will have any trouble using formative assessment because all of my lessons will be centered on it. I can't even imagine how I would be able to teach without using formative assessments. My teaching style will demand that I respond to the needs of my students. (Artifact #8.17, 12.08.06)

Formative assessment resonated with Adam. He saw it as a key force involved in motivation, responsibility, deep learning, direction, and management. It was so consistent with how he viewed the teaching/learning process that his integrity *demanded* he use it. It became part of how he saw himself as a teacher because of the reciprocity he encountered and allowed.

A New Sense of True Learning

Karly is also confronted by the topic of assessment through the analysis of an actual fourth grade science test. At first glance she is convinced it shows what the student knows. After the class analysis, she is struck by her lack of awareness:

At first, I saw it as a typical assessment for an elementary classroom; something that I might use during my first years of teaching. It was after we assessed the assessment that I realized it was not a beneficial assessment to give students. It does not *truly* assess student learning...[Emphasis added]

(Artifact #8.6, 12.08.06)

Karly used this example in her final exam as a jarring event that made an impact on her thinking. She connected it as something she would have used until now. She had a new awareness of what learning looked like and how to expose student thinking. In using the word *truly*, Karly was beginning to distinguish learning as a lived sense of being.

Karly's confidence was beginning to be pulled out from under her with the recognition of a traditional test not being a valid measurement of student thinking. She struggled to make sense of what learning looked like. There was a span of time between this class activity and the time she used formative assessment in her own planning where she stopped participating in class. Reciprocity revealed her sense of place: lost in the renegotiations of the dynamic interaction of what it meant to teach and learn. This issue was being pursued because of her commitment to wanting to be a good teacher and the upcoming practicum experience. She connected what she was learning with what she was trying to do in practice. She could have rejected the ideas and gone through the motions. But the reciprocity of the formative process enabled a personal connection to be made which required a resolution to be sought.

Karly, who no longer felt comfortable sharing in class, came to me during office hours to negotiate her understandings. It was here that the reciprocity within the formative process was reestablished. Although I continued to encourage her by my written comments, it was her willingness to visit me that enabled me to see her place of learning. The ensuing negotiations within this renewed gap provided an avenue for Karly to gain new insight into theory/practice relations. She explored this new way of thinking in her practice and further recognized the importance of reciprocity after giving a written preassessment:

I asked them open-ended questions to gain understanding of any preconceptions the students had. After I went home to look over the preassessment and prepare for my lesson, I realized that what the students had written did not give me full understanding of their knowledge. Instead, I would have like to ask students to complete the written preassessment in small groups and then held a discussion. (Artifact #8.6, 12.08.07)

The fact that Karly recognized there could be more depth revealed through reciprocity was important in the formative process. She began the negotiation between her confronted ideas and these new practices to make it her own. She saw it was not enough to use the tools of individual preassessments even when the questions were open-ended. She based coming-to-know on a negotiation of understandings. She saw this negotiation as not only important to student understanding but also to her interpretation of student thinking. She was beginning to notice that understanding the process of thinking led to

particular actions. She was beginning to embody formative assessment as part of her teaching identity.

One of the things she valued most was the relationship she could build with students and their learning (Artifact #7.6, 12.01.06). Her conclusions revealed her regained confidence. Although she was not at the same level as Adam, she came to articulate a connection between constructivist teaching and her personal practice through the formative process:

We don't want to teach students so they can succeed on a test; we want to teach them so the information is stuck with them for time and can use it to make more meaningful experiences in the future.

(Artifact #7.6, 12.01.06)

Taking Ownership of Learning

Agnes' experience was an example of a student who rejected the embodiment of formative assessment as part of her identity as a teacher. As mentioned previously, the formative process did open her thinking to the potential depth of learning. However, she resisted assimilating this idea into her own thinking when trying to write a formative plan for practice. There were many occasions that conflicted with Agnes' ideas of teaching and learning and her identity closely linked to a *gifted and talented* student. When her *gift* to memorize was not honored in this course, she struggled to find a new way to identify herself as successful. Although her progress at the beginning of the course showed she would likely get the "A" grade, her inability to accept guidance through reciprocity began the downward spiral. She wanted clear, quick, surface answers. I was

trying to promote depth and embodied thinking. I believe this conflict of purpose was what caused her to be the student in most need. I found myself struggling to accommodate her. It became personally exhaustive and unsustainable. With advice from others, I decided to remove myself from the entanglement and wait to see if she could take responsibility for her learning.

There were many events that conflicted with Agnes' ideas of teaching and learning. She showed her rejection of the ideas presented in this course in a variety of ways. She was the only student to opt out of a photo opportunity in which the university invited this class to take part. She threw objects she was working with in frustration. She decided to skip class even when she knew it would affect her grade. She was unsatisfied with three different practicum placements. But the most surprising rejection, to me, was in the form of her incomplete formative assessment planning assignment (worth 10% of the course grade). She claimed to not understand it and only inquired if the score would cause her to fail the course. She attempted to implement formative assessment in her placement even without a plan:

Formative assessment revealed a lot, but I did not use it to alter the lesson. Since the lesson was split between two days, using the formative results from the first day could have changed the second day completely.

(Artifact #7.12, 12.01.06)

She acknowledged the results of the formative assessments would change her agenda and clearly rejected its function. For now, she rejected confronting her ideas that she expressed at the beginning of the semester because the intersubjective distance was

too great. I did not know how to close that distance once the reciprocity broke down. Because grades seemed so important to her, I assumed I could use that context to encourage attempts at reciprocity. However, when she did not attempt to redo the incomplete assignment, I saw there was something deeper. It was no longer about the grade. It was about who she was as a student and a future teacher. Her ideas of successful teaching were incompatible with the theories presented in the course. When she rejected implementing those theories in practice she chose to ignore the conflicts in her thinking.

These three different experiences represent how varied and complex the teaching/learning/assessment process is. The data, scrutinized for assumptions, can be justified by its corroborating abundance, literature focusing on intersubjectivity, formative assessment and embodiment and most importantly by its ability to bring about a more complex and sensitive understanding of reciprocity's role in formative assessment.

Enabling Reciprocity

I was confident at the beginning of the course that I could reach each student. As an instructor and a researcher, my responsibility to inquire about my practice was more fully scrutinized. Although the research process held me to a higher level of accountability than a personal inquiry of my practice would, it helped me to see this as an opportunity for growth. Even so, it was difficult for me to let go of the feeling of failure with Agnes. I saw how difficult it was to work with individuals instead of a group. I focused on the comforting comments such as, "This class lets me find my own rhythm. It

makes me think, not like other classes...I can experiment and make it my own” (Log,11.07.06). I felt assured by the teaching award I received for “making a significant difference in a student’s life.” Yet, as a researcher, I am obliged to look closely at the events that trigger such pain and comfort to see specific qualities that enabled reciprocity. The most striking qualities were valuing the other, explicitly stating intentions, and practicing with integrity.

Valuing The Other

Being open to new perspectives requires a certain comfort level. Using formative assessment to reveal student thinking helped to establish that comfort level. Students experienced their thinking within the curriculum. The reciprocity involved in this kind of negotiation requires an openness to what may be learned from the students and attention to the broad goals of the course. It is not a matter of imposing my ideas through lecture and recall, but a willingness for students to expose their thinking, knowing full well that this thinking is seen as incomplete. There is a real risk for students who are used to being correct with one answer. There is also a risk to the teacher’s authority when learning is seen as ongoing. Valuing the student is shown through a teacher’s respectful openness and flexibility. Students experience this by answering open-ended questions, sharing related personal experiences, and expressing understandings throughout the scaffolding and feedback process. It is not simply a matter of implementing these tools.

I have expressed how fragile this scaffolding and feedback process is when the teacher considers the intersubjective encounters between experience, contextual complexity and personal growth. When students encountered this space as a valued place

for growth, they gave more and more. Some were more hesitant than others, but once they came to trust that this space, and my place in that space, was to encourage potential, they became more willing. This willingness and openness could be seen in the increased number of assignments I received as time progressed, the willingness of students to stay after class to continue conversations, the comments I received regarding the level of commitment I had to this class, my deferring to students for assistance, and their understanding of changes to the daily schedule.

What encouraged or discouraged different students to encounter that space was based on a meeting of needs, an ownership of learning, and a trust in the process. When students felt their needs were no longer being addressed, if they felt little responsibility toward their own learning, or my actions showed inconsistencies which made them suspicious, they were more hesitant to enter into the interactions. These qualities informing the value students felt were continuously measured as a gauge for the depth of reciprocity each student allowed. Each student experienced this value at different levels. It was dependent upon my attentiveness to the nuances of a student's expression as well as their interpretation of my actions. These interpretations were aided by explicitly stating my intentions.

Being Explicit

It is easy to make assumptions about what students understand. Many times through the course of the semester my critical friend would point out the importance of being explicit (See Ch 4, pages 108, 110). Much of my frustration came about due to my misinterpretation of events due to my assumptions. I felt as though I was making things

clear, but when I would take into account student perspectives, it became obvious how much I was assuming they understood. Assumptions regarding purpose and place of learning were most noteworthy. When I look back at any topic we discussed, I see how many places assumptions were made. One example mentioned previously involves surveys regarding constructivist beliefs. These were filled out by students and compiled. I would have ranked the students differently based on their other work. However, we did not take the time to discuss our intersubjective distance. This led to misinterpretations of individual places of learning on my part and misinterpretations of assignment purposes on students' parts.

Vygotsky's (1978) sociocultural theory points out the importance of our social and cultural backgrounds in determining what is learned. Constructivists are concerned with authentic connections between the school and the world to encourage transfer of knowledge outside of the classroom. Clandinin & Connelly (2007) refine the context by focusing on the interactions of commonplaces in learning. How teachers respond and how students interpret that response will vary depending on the interactions of temporality, sociality and place. In essence these refer to the contextual complexity of regarding past, present and future as influencing change (temporality), seeing the influences of personal and social conditions (sociality), and taking into account the physical place of learning. When these factors are considered, there are so many spaces for misinterpretation. The importance of explicitly stating intentions, connections, and theory/practice relations cannot be underestimated.

Integrity

Having worked with formative assessment, constructivist ideas and teachers, I felt confident in the integrity with which I demonstrate my practice. Yet, I did not anticipate two students working in the same classroom having completely opposite experiences. This was just one instance of questioning my integrity. Seeing the individual is such a prominent characteristic of constructivism. Yet, my practice reveals how temporal my understanding is. I believe to embody a concept or theory there is a need for continuous revisiting, experiencing, and connecting theory/practice relations again and again.

Formative assessment enables these kinds of connections. The reciprocity of formative assessment brings to light individual differences in student experiences. It enables practicing with integrity simply because it does bring to light theory/practice inconsistencies. Integrity is important when learning is tied to identity. In order to enable students to question personal beliefs and assumptions, they have to be able to trust that their thinking will be valued. Allowing reciprocity to mediate meaning-making while the learning process unfolds places value on student thinking. It is a new sensitivity I bring to my practice. The extent to which I do this will be another measure of integrity for practice.

Formative assessment helps to break down barriers that preconceived ideas build by questioning the connections the students make. It encourages students to think more openly and deeply about issues. These connections are often times individually situated and require the instructor to accurately interpret student thinking with minimal assumptions. What became clear was the accuracy of interpretation be based on the

continuous negotiation of meaning occurring through reciprocity so that formative assessment would not become a mechanical tool. When there was an agreement in purpose, namely education is an ongoing process of complexity, interaction and growth, the reciprocity flourished. When the student and teacher's purposes were not in agreement, when the intersubjective distance was too great, there was a breakdown in reciprocity. Determining the best way to minimize that intersubjective distance is the role of reciprocity.

For Adam, there was little intersubjective distance. He and I had the same purpose for educating. Accessing his understanding was the most difficult part of the formative process. Once he understood his thinking would be valued, his place of learning was honored, and he was given a voice within the curriculum, he allowed reciprocity to further the work of learning.

Karly's intersubjective distance was greater and required more effort on both our parts to understand the complexities involved. Inaccurate assumptions and confrontations with theories played a role in the depth of reciprocity she allowed. However, through personal encounters with different events, the integrity with which she wanted to practice forced her to come to a resolution. The reciprocity within the formative process fostered that resolution.

Agnes' intersubjective distance was too great for reciprocity to close. The view of what education could be was too distant from her reality. Formative assessment opened the door to this new view but the reciprocity was halted by how valued she felt, inaccurate assumptions and the lack of integrity by us both.

When access to thinking is allowed, contextual complexities are revealed enabling confrontations with personal theory/practice relations. The reciprocity of formative assessment facilitates these confrontations by providing the medium for reframed thinking and transformation. A teacher's responsibility for valuing student thinking, being explicit and practicing with integrity impacts how deeply students engage in reciprocity. Students share in the responsibility for learning by expressing their needs, taking responsibility for their learning and learning with integrity. The depth of reciprocity encountered and allowed by students is a key factor in promoting embodied understandings.

CHAPTER 6: A PEDEGOGY OF EMBODIMENT

Introduction

Throughout this self-study I have investigated the role of reciprocity in prospective teachers' understandings of the formative assessment process. What has emerged is the range of depth of understandings which are encountered and allowed by different students based on a meeting of needs, a recognition of personal responsibility, and practicing and learning with integrity. It was clear that when I tried to force a *right way* of practicing formative assessment, reciprocity broke down and practice became mechanical. By providing meaningful experiences for students to encounter, the dynamics of formative assessment enabled students to see their process of coming to know and how it informed their actions. I was able to see how my actions revealed what kinds of learning I valued.

An embodied understanding emerged in varying degrees across students and myself. Most students were able to embody formative assessment, to some degree, as part of their teaching identity. Self-study enabled me to examine my embodied teaching identity and suggest areas for change. Some students experienced an awakening, and embodiment was an enlightening experience. Others experienced painful challenges to their belief systems. All of the senses, including felt emotions, were valued here not as sentiments or irrational outbursts, but as windows into students' growth and reasons for their commitment to learning. In attempting to broaden the conversation regarding assessment and accountability, to save these terms from the heap of *bad words* in

educational circles, I feel a responsibility to provide meaningful experiences that enable students to redefine knowing, reorder experience and open doors to learning and transforming selves through a lived engagement with the teaching/learning/assessment process.

Qualities That Permeate A Pedagogy Of Embodiment

This study emphasized the *process* of coming to know. It questioned how I viewed knowledge, teaching, learning and assessment. Formative assessment was the tool I used to enable encounters with the kind of knowledge I value. It enabled an interaction between and among the teaching/learning/assessment process. It promoted personal involvement with students and the text, materials, past experiences, present actions and other people. However, this tool was not meant to be mechanically applied but used as an extension of myself.

An example may help to clarify this distinction between a mechanical application and an extension of self. A hearing aid is a tool that enables us to hear sounds more clearly. One cannot imply, though, that the person who can hear will listen better (O'Loughlin, 2007). Listening requires personal involvement with the other. There is an engagement whereby each is accounting for particular contexts in relation to his/her own. Hearing a sound only requires a recognition of sound waves. Recognition ignores depth and complexity. When depth and complexity are perceived, knowing becomes redefined, experience is reordered and new doors open for learning and growth.

Redefine Knowing as Experiential

The kind of knowing that is currently valued in standardized tests can be very distant from the learner. It is possible to have a high score on the ACT and not grasp the connections between and among the various concepts that this test measured. Just the notion of offering test taking skills courses should clarify the quality we value in our society. What can we infer from a score? How much of that information will the student embody throughout his/her lifetime? What impact will that information have on his/her understanding of the world or self?

These questions help me rethink the value I place on different kinds of knowing. Certainly there are facts that students need to understand, but more importantly are the relationships around those facts. I suggest that knowing should be viewed in terms of a process since it is by seeing the process that we can determine the quality of a product. An example that comes to mind is a comparison of my mom's homemade pies to the frozen ones in grocery stores. There was a process each took. My mother's recipe is dependent upon the relation of the ingredients to each other. The frozen pie is made from a preset formula that produces the same product every time. There is nothing wrong with the frozen pie until you taste my mom's. Although my mom's pies never taste exactly the same, once you've experienced that quality, it is difficult to settle for frozen again.

Knowing can be regarded the same way. Knowing facts is a good thing. There is a process to memorizing. Usually it is very prescriptive and straightforward avoiding any depth or connections. But once a student has experienced an embodied understanding, memorizing seems hollow. Meanings seem hollow. Knowing *about* something is completely different from encountering it. An encounter transforms knowledge. "...[I]t

becomes something more than knowledge because it is merged with non-intellectual elements to form an experience worth while as an experience” (Dewey, 1934, p.290). By noticing the process the learning takes, the emphasis is changed from separation to relation. Noticing the process enables a student to give meaning to things rather than have someone else inscribe the meaning for them.

Formative assessment enables sensitivity to the process of learning. There are certain planned aspects of formative assessment such as eliciting evidence of student thinking through the use of predetermined tools like concept maps and journals (Bell, et al, 2001; Black, et al, 2003; Duschl & Gittomer, 1997). Teachers plan to interpret what students learn and plan to take action regarding the direction the lesson should take based on this information. The parts that may go ignored are the unplanned aspects of formative assessment. A teacher can plan to be attentive to the details of a situation, but cannot plan for what those details will be or where they may lead. A teacher can plan to observe students but cannot plan how they may react to certain concepts and the direction the interaction takes.

Recognizing the significance of a comment requires an understanding of a student’s previous experience with a concept. Responding to students will depend on how well a teacher understands the perspectives of the students and the nuances of the experience. It is not about labeling and categorizing observations. It is about receptivity and sensitivity to the context. The role of the student within reciprocity cannot be underestimated.

Being sensitive “to the consequences that flow from specific events” (Frisia, 2002, p. 113) enables this meaning making. Being sensitive to the details of a situation and their relations establishes meaning. Frisia (2002) sums up Dewey’s (1958) idea of meaning making:

As Dewey defines it, thought is the act of reconstructing the meaning system that regulates our interactions. Thus thought is always an activity, and ‘knowledge’ is always a way of describing a successful ongoing relationship with the things that constitute our environment. (p.119)

When events are in contrast to our current organization, there is an attempt to restructure those relationships to provide a level of satisfaction. Therefore, genuine interactions within the world help to provide those contrasts needed to provoke tensions.

Emotions are involved in these tensions. There is a deliberate feeling that aids our awareness. “How an idea can turn the stomach, a claim can shut the eyes, or a thought can make the head ache reminds us that the body knows how words feel when they speak” (Pelias, 2004, p. 163). “Yes, emotion must operate. But it works to effect continuity of movement and directive of its order and arrangement” (Dewey, 1934, p.69). There are problems when a person is mastered by emotion. However, when there is a balanced relationship between emotion and response, the body becomes an integrated part (the medium) of the inquiry process. The emotion valued in embodiment is not raw, but reworked, transformed and acted upon in relation to ideas (Dewey, 1934).

The body does play a role in perception and inquiry furthering movement and growth. Inquiry is an ongoing process continually shaped by the interactions with our

world. Learning becomes a quest dependent upon the relationships we form to create a future, not a cultivation of the abstract mind (Dewey, 1934; Greene, 1995, O'Loughlin, 2007). This weaving of relationships is ever changing depending on our encounters.

“Mind, denotes the whole system of meanings as they are embodied in the workings of organic life” (Dewey, 1958, p303). How can we enable more encounters for students to question the relationships they have woven together? How can we position students to “take an evaluative position with respect to the things we confront in our world” (Frisia, 2002, p.17)? Providing opportunities for genuine interactions are what Dewey refers to as experiences.

Reorder Experience From Linear To Dynamic

Conventional education places learning activities in a linear pattern. Scope and sequence charts provide structure to curriculum. These predetermined ends omit the variety and complexity inherent in human interaction. Categories and classifications confine and impede the exploration of qualities outside of these divisions. This limits the relationships that may excite tensions. It clouds perception. Reordering experience from being imposed by the state, curriculum or teacher to emerging from the learning experience itself, changes the *what* for which teachers should be held accountable. Rather than holding teachers accountable for students' accumulation of knowledge, it holds teachers responsible for positioning students to embody meaning.

Dewey sees experience as the transition from equilibrium, to tension, to equilibrium again, and “inquiry is the instance of the quest by an organism to restore harmonic integration (equilibrium) with its environment” (Frisia, 2002, p.118).

Information, therefore, is not neutral but charged with meaning. This meaning provokes interest and experimentation which are considered inseparable from knowing. It places the learner in an interpretive web of relations. No longer is there an interest in only accumulating. In an experience, the focus is on culminating. The interaction of these relations brings about a new, meaningful understanding that “implaces” (O’Loughlin, 2006, p.63) the learner. “An implaced body is neither subject or object but always seeking connections with its surroundings, perceiving and receiving” (Macintyre Latta, draft, 2007).

What orients teaching toward implacement? Abstraction and representation attempt to control teaching by keeping it distant and known. However, the action within an experience, when allowed to play with ideas, becomes the medium for embodied engagement. “[T]he expression of the self in and through a medium...is itself a prolonged interaction of something issuing from the self...a process in which both of them acquire a form and order they did not first possess” (Dewey, 1934, p.65). This expression is not just a transfer of ideas, but an encounter with a concept that has stirred something inside the learner because past experiences are called to mind. It positions the learner to modify the concept and be modified by it. There is always a forward momentum which is spurred by participatory engagement. Students are necessary participants in the teaching/learning/assessment process. They are often times ignored or placed in passive roles. Whether they remain in the silence, are resistant or collaborative, they should always be viewed as active (May, 1993).

Learning is a social endeavor that intersects the personal, cultural, historical and political realms (Clandinin et al, 2007, Dewey, 1938, Greene, 1995, LaBoskey, 2004). This implies that each person will bring a unique web of relations to the collective conversation. Teachers can show they value these unique relations by demonstrating what can be learned from differences. They can allow spaces for questioning and encourage students to make their mark in the curriculum by expressing their evolution of thinking, their struggles of coming to terms with concepts, of regaining equilibrium that is disturbed by *others*. These are the activities of knowing. Knowing is not passive but an active engagement requiring a personal presence with meaning making. These *others* are a necessary part of learning. They not only include other people but also subject matter, materials, contexts, and feelings. Macintyre Latta and colleagues (2007) refer to the activity in these spaces as dialogues:

Sometimes these dialogues are tactile, occurring between participants and materials being handled. Sometimes these dialogues are visual occurring between participants and all that is being viewed. Sometimes these dialogues are emotional, occurring between participants and responses to situations. And, sometimes these dialogues are verbal, occurring between participants and other voices. These dialogues are interconnected and indivisible, superseding distinctions between the head and the hand, the mind and the body, seeing and acting, feeling and thinking, non-verbal and verbal, and calling all participating to enter into the thinking movement of learning. (p.31)

All of these entities create multiple ways of knowing leading to uncertainties. Attention to the learning spaces created between these entities promotes a richness and depth of meaning leading to emergent problem finding and solving (May, 1993).

The problem finding and solving is at times uncomfortable when it is authentic. In many science classrooms, problems are set by the curriculum. The teacher carries out these orders and students replicate the experiment. It is all very detached and known in advance. How different a science class would look if students' wonders about a concept evoked problems to be solved. How much more interested or connected would a student be to these problems? Private theories and misconceptions can be reshaped when made public by a teacher's sensitivity to what is emerging in contexts. Reciprocity is the key to this sensitivity. The student's interpretation of this reciprocity is valuable. It necessitates the depth a student will encounter. The dynamic interactions that occur when experience is reordered to include the *other*, open doors to learning and transforming self.

Open Doors To Learning And Transforming Self

Because I see learning as experiential, each act of learning must be related to a personal history and context. The knower and the knowledge are developed and modified with each learning experience. Being in the process of learning is valued. There is always a sense of becoming. However, there is never the sense of becoming all the same.

When a teacher acknowledges context, especially through the formative assessment process, the connections made by each student are revealed. However, there is an interpretive, reflexive process that must occur between the student, teacher, and

actions revealed. If there is no reciprocity, the assumptions made by the teacher or student could be faulty. Reciprocity is the negotiation of understandings, not the teacher's idea of the meaning. The teacher must be open to what is being said as well as what is not being said. The teacher must be able and willing to engage the student or be engaged by the student with an openness to the emergent. When the teacher or student tries to convince or determine the direction, reciprocity breaks down. Student involvement in this negotiation is paramount to embodiment and the formative process.

When knowledge is experiential, learners gain a glimpse of their identities in their actions. Their actions reflect their knowing. Their bodies become "instruments of expression" for their thinking (O'Loughlin, 2007, p.71). Integrity and consistency are consequences of this kind of knowing. Learners are called to compose their identities through their concrete actions. This can be a great source of conflict when people have predetermined their life's stories. When students are used to having problems posed for them and answers are viewed as known by authority, accumulating what that authority has is all that is required. However, when questions spring from the experience itself, exploration of the self is necessary. There is a reason the learner has asked a question. The teacher's role is providing experiences where students may engage in questions of personal relevance and draw upon their past stories in order to reweave their personal narratives.

Enabling students to see how moments of learning relate to their being requires reciprocity. Identity is not merely a label we can give ourselves or others, but a total story continually redefined by interactions with the world. Any time teachers can position

students to be creators, they encourage identity making. When students see their process of knowing, they can see themselves in their learning. When students feel they are part of the interdependence between self, other, and subject matter, they are able to personalize the situation and shape their thinking. They can be authors of their learning (Macintyre Latta, et al, 2006). This authoring positions them to be the authorities of their learning.

Students must now take the responsibility to decide how they will author their learning biography. They may sit back choosing to partake in the content in a safe, vicarious way or be persuaded by the content to take action when beliefs are called into question. When they feel the freedom to use their imaginations, they can risk venturing into the unfamiliar or uncomfortable spaces that were previously barricaded. They can integrate content into their personal lives with “integrity, responsibility and autonomy,” (Barone, 1993, p.237).

During the semester I saw students struggling with their vulnerable teaching identity. Some came with ideas of teaching that were not open for negotiation. Venturing into the unknown and questionable was not an option for them. Some came open and trusting of uncertainty willing to struggle with something they felt was in their best interest. Others came passively to the encounter but were drawn into the creating process. They were not drawn in because I structured the learning around a theme I knew interested them. They were drawn in by a reflexive relationship with the content, their ideas, past experiences, beliefs, their practice and others. By taking notice of the qualities and relations within an experience, the students were positioned to question their beliefs

and notice how their beliefs played out in their actions. They were positioned to notice the present moments in their learning and to inquire from there a direction. Noticing the unity of each individual moment as a whole shapes and transforms identity. Formative assessment allowed for these moments to be expressed and shared. Each student learned something about themselves as teachers because of the interactions and reciprocity within the teaching/learning/assessment process.

Discoveries, Reframed Thinking, Transformed Practice

This work has been a story of movement, transition and growth. It has revealed just how complex the teaching/learning/assessment process is. It is one thing to talk about the complexities, but quite another to experience them. I began this study wanting know what processes illuminated the dynamic reciprocity of formative assessment. I understood that seeing formative assessment as a linear process brought about mechanical implementation. What emerged was the importance of reciprocity in promoting embodied understandings.

By attending to the ways in which reciprocity revealed itself and using those insights to further students understanding, my focus was on the process of learning and the interaction between teaching, learning and assessment. Although I was continually attending to the unfolding process, one area that I did not emphasize was the student's interpretation of this dynamic interaction. The role of reciprocity became a primary factor in considering embodied understandings. Faulty assumptions provided avenues for misunderstandings which halted access to further learning. Students had individual ways of interacting with this process. When I negotiated these interactions with them, learning

continued. When negotiation was not possible, learning became mechanical and distant. Formative assessment enabled the teaching/learning/assessment interaction to be revealed. Reciprocity furthered the work of learning toward embodied understandings.

Experiencing the complexities of the teaching/learning/assessment process can be difficult in educational settings. Breaking teaching, learning and assessment into separate components allows for a clear description and an attempt to control variables. I feel this is a problem for preservice teachers once they get into a practice situation. They have an idea that coursework will produce ready-made teachers.

It is not enough to know about something, but experience alone is also insufficient. Students express that once they get into the classroom, they will get the *feel* for it. What exactly is this *feeling*? I believe it is an embodiment of the teaching/learning/assessment process. It is putting into practice what they have come to understand as teaching. The question then becomes, can this embodiment be taught in preservice courses or is it something that must be discovered through practice? I believe the reciprocity of formative assessment is one avenue to enable students to embody the teaching/learning/assessment process by providing the space for personal theory/practice connections.

I include the word *personal* because it is not an imposed theory that I can explain to my students that will enable them to make a connection. Students can read about educational theory, and they can reflect on that reading in mechanical ways. Drawing them into the complexities that come from interactions through concrete experiences provides avenues for meaning making. When students actively make meaning for

themselves, they embody that meaning as part of their identity. Integrity is then necessary to practice in ways that express their understanding. It is having them express their ideas of theory through reciprocity with other(s) alongside their experiences of practice that may provide meaningful encounters of embodied understanding for preservice teachers.

What was it that Adam gained so completely? What was it that Karly struggled to grasp? What was it that distanced Agnes from personal encounters with learning? In all of these cases, I believe, like Dewey, they all struggled with their equilibrium.

Dewey (1938) writes:

The discrepancy exists because the means used, the organs and habits of biological behavior and the organs and conceptions employed in deliberate inquiry, must be present and actual, while consequences to be attained are future. Present actual means are the result of past conditions and past activities. They operate successfully, or 'rightly,' in (1) the degree in which existing environing conditions are very similar to those which contributed in the past to formation of the habits, and (2) in the degree to which habits retain enough flexibility to readapt themselves easily to new conditions (p. 39).

Looking at Adam's story, it is evident that his past courses were nothing like this one, but his flexibility enabled an awakening. Karly's story of finding flexibility to be her answer to complexity validates Dewey's thinking. Unfortunately, Agnes' conditions were too different for her to see the efficacy of constructivist methods in her future. I

provided experiences that predicted an uncertain future. This was too different for her, and she was too inflexible to account for such differences.

Each of these students experienced this course as different from any other course in their past. It seems, then, that flexibility plays an important role in being open to reciprocity. How can I transform my practice to enable this flexibility especially for students who are inflexible? It is easy enough to work with the Adams and Karlys of the world. Can I just write Agnes off as an extreme outlier? This seems unethical and irresponsible. I am confident there will be other Agnes' in my future.

Revisiting the qualities of value, responsibility, and integrity, I understand my role anew. I see that valuing students is more than trying to fulfill their every need. It is continually trying to negotiate their interpretations of events and repositioning them toward new openings. Student responsibility is not merely showing up for class and turning in assignments. Teachers must continually place them in positions to take responsibility for their learning by drawing them into the creation of meaning. When they create meaning, integrity becomes an issue that plays out in actions within the classroom.

In order to practice with the integrity with which I have proposed, I need to embody a view of students and situations as having potential. I must remove the old eyes that see students as deficient in the prescribed curriculum, even when I feel that curriculum is best. I have a responsibility to provide an accessible curriculum for students to engage in meaning making, not a prescribed curriculum. I see my responsibility as providing opportunities for theory/practice relations (not theory

imposition) by providing multiple opportunities for negotiation within the learning gap. I need to ensure this gap is not too large as to be intimidating and not too small that it confines and controls. Planning is now about ongoing judgments not tightly defined procedures even though the students may want these procedures. Attention to this intersubjective distance is aided by the reciprocity of formative assessment.

I did expect formative assessment to expose the complexity within the learning process. I did expect the reciprocity to influence interactions and growth. I did expect to use formative assessment as an extension of myself and not a mechanical tool. What I did not expect was the depth of reciprocity encountered to guide embodied understandings. In part, this was due to my lack of understanding about the student's role in reciprocity. When I finally realized my role was not to force learning, but provide experiences which enhanced the formative process, learning became interactive and three dimensional.

Implications for Practice

Is embodiment too great a goal for educators? Does it ask too much of students? It is a great leap to view knowing as part of self when schools have continuously rewarded surface learning. Reciprocity is key in determining how fast and how deep to venture into the learning gap. Formative assessment can aid a preservice teacher's development of the sensitivities involved in this judgment making. Self-study enabled my own development of this dynamic process by placing me in a position of critical reflexivity. Self-study held me accountable for future practice. I could easily have disregarded the low points of the semester and moved on hoping for the best next year. I

could have easily blamed students as not open and therefore not reachable. Self-study enabled me to work through these difficulties with the interaction of theory and others. It enabled an encounter that was personally relevant. It placed me in the direct path of creating meaning with theory not merely applying theory. It held me accountable for “using methods that will provide evidence to us, to our students, and to our colleagues that we are learning from what we are discovering; that we are reframing our thinking and transforming our practice in defensible ways” (Laboskey, 2004, p. 828).

Formative Assessment Enables Access To Relational Complexities

One method that holds great potential for making the teaching/learning/assessment process transparent is formative assessment. Relational complexities can be ignored and are often times lost in the midst of the many barriers present in classrooms. Time constraints, high teacher/student ratios, small budgets and standardized tests create conditions that ignore process and undermine potential.

Formative assessment reveals the learning process in all of its variation and complexity. Noticing this variation and complexity allows a recognition that past events and conditions have influenced how a student learns. Students come to class more or less likely to take initiative of their own learning. Students who are used to having quick surface answers will need more assistance being repositioned. Teachers “should know how to utilize the surroundings, physical and social, that exist so as to extract from them all that they have to contribute to building up experiences that are worth while” (Dewey, 1938, p. 40). Formative assessment enables teachers to recognize that complexities are not found in individuals alone but within the interaction including the concrete materials

and environment. The social, historical, and physical are all resources which add to the complexity and should be used to further growth. Formative assessment exposes these resources. Reciprocity enables proper use of these resources.

Reciprocity Determines Depth

When the nature of teaching and learning are considered a dynamic process of movement, transition and growth, depth and connection of content become an issue. The more experiences a teacher can provide that draw on the relations between and among content, personal experience, and other(s), the greater the possibility for depth of learning. There is a continuum of readiness for students because of the continuity of previous learning experiences. The person who undergoes a movement, transition or growth experience is somewhat different with each successive experience (Dewey, 1938). The conditions for learning are also altered with each experience. It is not an individual, isolated event and creates multiple and varied needs. The teacher must account for these individual needs and capacities. Prescribing the same curriculum for all students denies depth. Reciprocity enables depth when it is three-dimensional.

The student's role in reciprocity cannot be underestimated. It is the student that helps to create this three-dimensional space. Without the student, it becomes an imposed space. It was far too easy for me to assume I knew where students were in their understanding. I was placed in a position of authority. I was in the position of authoring their lived stories. By repositioning authority to be relational, students were allowed to author their own lived stories, to take up the responsibility of delving deeply into each lived experience. This positioning was negotiated through reciprocity.

Formative Assessment Enables Sensitivities For Judgments

I have shown relational complexities to be a given in any classroom. Formative assessment provides a language for teachers to access the dynamic interactions inherent in the teaching/learning/assessment process. Each time a teacher considers what may have been missed or gone unnoticed, an opening is created for the development of future sensitivities. Although there are things a teacher should be looking for, there is a recognition that unanticipated events will happen and may go unnoticed. Since I see a teacher's responsibility as not only to providing meaningful experiences but to move those experiences in directions that lead to further learning, it is important for teachers to be sensitive to the movement, transition and growth within each interaction.

What is required to notice the subtleties within a teaching/learning moment? Formative assessment enables teachers to see that interactions are present, complex and ongoing. Reciprocity furthers the interaction by allowing a space for negotiating understandings. This space is filled with qualities that arouse, stimulate and halt interaction. The more interaction teachers have within this space, the more opportunity they will have to develop those sensitivities needed to make judgments regarding the movement of the experience. All of the senses enhance perception. Enhanced perception will enable differentiation and relationships among and between the qualities within an interaction to be noticed (Eisner, 1998).

Understanding these differentiations and relations requires an integration of the senses with a knowledge of the history of the students, the subject, the school, the community, their learning, their interactions. These histories guide a teacher's perception

to what may be noticed within the whole interaction. Understanding the nature of teaching and learning, human development, tools and resources, all foster perception. Teachers can then adjust the conditions of the interaction to bring out the potential of students because they have perceived the nuances and can make judgments about the worth of the qualities (Eisner, 1998). However, noticing the subtleties in a teaching/learning moment is not an individual event. Students are also able to notice subtleties. What the student notices may be completely different from what the teacher notices. Reciprocity enables each perception to inform the whole experience. Because histories can also limit perception, reciprocity allows for negotiation that broadens. When everything that is perceived is accounted for, the potential for growth in an experience can be moved in a positive direction.

Self-Study

Self-study has enabled me to formally inquire about my experiences using formative assessment with preservice teachers. It enabled thorough deliberation throughout the semester with different theories playing out in practice, taken for granted notions challenged, and insights redirecting the inquiry. It fostered my own embodiment of the formative assessment process because of the continuous reflexivity involved. This reflexivity was cultivated through interactions with my critical friend, colleagues, students, theory, and content each affecting my beliefs and actions. My critical friend broadened my interpretation of my interactions with students. My students aided my interpretation of theory/practice relations. They each held me accountable for practicing with integrity and growing from the insights gained.

This self-study is one telling of formative assessment's potential in promoting embodied understandings. It is not a *how-to* method of implementation. Rather it is a narrative account of a lived engagement with "theory and practice, research and pedagogy, self and other" (LaBoskey, 2004, p. 818). Embodied understandings of formative assessment give teachers access to the relational complexities that are inherent in any classroom. When the process is acknowledged there is attention to the search for potential within the experience. To disregard this seems unethical and irresponsible. Disregarding process narrows the purpose of learning to predetermined behaviors, goals and rules. By acknowledging process, teaching and learning is now reframed to include action, transformation and judgment.

Action requires judgments to be made regarding a coordination of seeing, thinking, doing and acting in relation to the movement of the action toward growth and the betterment of self and other. Transformation is the embodiment of that betterment. It includes showing through actions evidence of growth. Growth for the betterment of self and others requires ethical judgments. Judgments are based on enhanced sensitivities to the particulars in perception and their relationship to the whole. These judgments are ever present accounting for past, present and future directions because the contexts are ever changing. The direction of judgments is always focused on the potential good.

Teachers and teacher educators have enormous power to affect learning. My hope is to provoke and challenge them to question what is at stake when the teaching/learning/assessment process is acknowledged, what it means to teach ethically and responsibly, what it means to value students, what it means to encourage students to

take up the responsibility of learning with integrity. By illuminating the dynamic reciprocity of the teaching/learning/assessment process through formative assessment, my intention is to empower teachers, students, parents and policymakers to broaden the conversation regarding to whom and for what teachers and students should be held accountable by providing a language and perspective of embodied teaching, learning and assessment.

References

- Alvesson, M. & Skoldberg, K. (2000). *Reflexive Methodology: New vistas for qualitative research*. Thousand Oaks, CA: Sage.
- Ayers, W. (2001). *To teach: The journey of a teacher*. New York: Teachers College Press.
- Bahbah, H. K. (1994). *The location of culture*. New York: Routledge.
- Barone, T.E. (1993). Breaking the mold: The new American student as strong poet. *Theory into Practice*, 32 (4), 236-243.
- Bass, L., Anderson-Patton, V., & Allender, J. (2002). Self-study as a way of teaching and learning: A research collaborative re-analysis of self-study teaching portfolios. In J. Loughran & T. Russell (Eds.), *Improving teacher education practices through self-study* (pp. 56-69). London: Routledge Falmer.
- Bell, B., & Cowie, B. (2001). The characteristics of formative assessment in science education. *Science Education*, 85, 536-553.
- Berry, A. (2005). Teaching about teaching (Doctoral dissertation, Monash University, 2005). Dissertation Abstracts International, 99, 309.
- Berry, A., and Loughran, J. (2005.) Teaching about teaching: the role of self-study. In C. Mitchell, S. Weber and K. O'Reilly-Scanlon (Eds.), *Just who do we think we are?*(pp. 168-180). New York: RoutledgeFalmer.
- Berry, A., & Loughran, J. J. (2002). Developing an understanding of learning to teach in teacher education. In J. Loughran & T. Russell (Eds.), *Improving teacher*

- education practices through self-study* (pp. 13-29). London: Routledge Falmer.
- Biesta, G. (2004). "Mind the gap!" Communication and the educational relation. In C. Bingham & A. Sidorkin (Eds.), *No education without relation*. (pp. 11-22). New York: Peter Lang.
- Bingham, C. & Sidorkin, A. (2004). The pedagogy of relation: An introduction. In C. Bingham & A. Sidorkin (Eds.) *No education without relation*. (pp.1-4). New York: Peter Lang.
- Black, P.J. & Wiliam, D. (2003). In praise of educational research: formative assessment. *British Educational Research Journal*, 29(5), 623-637.
- Bodone, F., Gudjonsdottir, H., and Dalmau, M. (2004). Revisioning and recreating practice: Collaboration in self-study. In J. Loughran, M. Hamilton, V LaBoskey, & T. Russell (Eds.), *International handbook of self-study teaching and teacher education practices* (pp. 313-342). Dordrecht, The Netherlands: KluwerAcademic Publishers.
- Bullough, R. V. Jr. (1997). Practicing Theory and Theorizing Practice in Teacher Education. In J. Loughran & T. Russell (Eds.), *Teaching about teaching: Purpose, passion and pedagogy in teacher education* (pp. 13-31). London: Falmer Press.
- Bullough, R. V. & Pinnegar, S. (2001). Guidelines for quality in autobiographical forms of self-study research. *Educational Researcher*, 30 (3), 13-21.

- Bullough, R. V. & Pinnegar, S. (2004). Thinking about the thinking about self-study: An analysis of eight chapters. In J. Loughran, M. Hamilton, V. LaBoskey, & T. Russell (Eds.), *International handbook of self-study teaching and teacher education practices* (pp. 313-342). Dordrecht, The Netherlands: Kluwer Academic Publishers.
- Clandinin, D.J. & Connelly, F.M. (2000). *Narrative Inquiry: Experience and story in qualitative research*. San Francisco: Jossey-Bass.
- Clandinin, D.J. & Connelly, F.M. (2007). Navigating sites for narrative inquiry. *Journal of Teacher Education*, 58(1). 21-35.
- Cobb, P., Wood, T., and Yackel, E. (1993). Discourse, mathematical thinking, and classroom practice. In E.A. Forman, N. Minick, and C. A. Stone (Eds.), *Contexts for learning: Sociocultural dynamics in children's development* (pp. 91-119). Oxford: Oxford University Press.
- Cochran-Smith, M. & Lytle, S. L. (1999). Relationships of knowledge and practice: Teacher learning in communities. In A. Iran-Nejad & P. D. Pearson (Eds.), *Review of research in education* (Vol. 24, pp. 249-305). Washington, D. C.: American Educational Research Association.
- Cowie, B., & Bell, B. (1999). A model of formative assessment in science education. *Assessment in Education*, 6(1), 101-116.
- Creswell, J. W. (2005). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (2nd ed.). Upper Saddle River, NJ: Pearson, Education, Inc.

Darling-Hammond, L., Hammerness, K, Grossman, P, Rust, F., & Shulman, L. (2005).

The design of teacher education programs. In Darling-Hammond, L. & J. Bransford (Eds), *Preparing teachers for a changing world: What teachers should learn and be able to do* (pp. 390-441). San Francisco: Jossey Bass.

Dewey, J. (1916). *Democracy and education*. New York: Free Press.

,(1922). *Human nature and conduct: An introduction to social psychology*. New York: Modern Library.

,(1933). *How we think*. Lexington, Mass: D.C. Heath.

,(1934). *Art as experience*. New York: The Berkley Publishing Group.

,(1938). *Experience and education*. New York: Macmillan.

,(1938). *Logic: The theory of inquiry*. New York: Henry Holt.

,(1958). *Experience and nature*, New York: Dover.

Diamond, C.T., & Van Halen-Faber, C. (2005). Apples of change: Arts-based methodology as a poetic and visual sixth sense. In C. Mitchell, S. Weber & K. O'Reilly-Scanlon (Eds.), *Just who do we think we are?* (pp. 81-94). New York: RoutledgeFalmer.

Duschl, R. & Gitomer, D. (1997). Strategies and challenges to changing the focus of assessment and instruction in science classrooms. *Educational Assessment*, 4(1), 37-73.

Eisner, E. W. (1998). *The enlightened eye: Qualitative inquiry and the enhancement of educational practice*. Columbus, OH: Merrill.

- Eisner, E. W. (1997). The promise and perils of alternative forms of data representation. *Educational Researcher*, 26(6), 4-10.
- Eisner, E. W. (1991). What the arts taught me about education. In Willis and W.H. Schubert (Ed's) *Reflections from the heart of educational inquiry*. (pp. 34-48). New York: Suny.
- Esposito, L., & Murphy, J.W. (2000). Another step in the study of race relations. *The Sociological Quarterly*, 41(2), 171-187.
- Feldman, A., Paugh, P., & Mills, G. (2004). Self study through action research.. In J. Loughran, M. Hamilton, V. LaBoskey, and T. Russell (Eds.), *International handbook of self-study teaching and teacher education practices* (pp. 943 978). Dordrecht, The Netherlands: Kluwer Academic Publishers.
- Frisina, W.G. (2002). *The unity of knowledge and action: Toward a nonrepresentational theory of knowledge*. Albany, NY: State University of New York Press.
- Garrison, J. and Rud, Jr. A., (1995). Introduction. In J. Garrison and A. Rud, Jr. (Eds.), *The educational conversation: Closing the gap*. (pp. 1-9). Albany: State University of NY Press.
- Gradin, S. and Carter, D. (2001). *Writing as Reflective Practice*. New York: Longman Publishing Group.
- Greene, M. (1995). *Releasing the Imagination: Essays on education, the arts, and social change*. SanFrancisco: Jossey-Bass.

- Griffiths, M. (2002). Small tales and working for social justice. In J. Loughran and T. Russell (Eds.), *Improving teacher education practices through self-study*. (pp. 161-175). New York, NY: RoutledgeFalmer.
- Grumet, M.R. (1993). The play of meanings in the art of teaching. *Theory Into Practice*. 32 (4). 204-209.
- Guba, E. G. & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp.105-107). Thousand Oaks CA: Sage Publications.
- Guerin, G. & Maier, A. (1983). *Informal assessment in education*. Palo Alto, CA: Mayfield.
- Hamilton, M. (2004). Professional knowledge, and self-study teacher education. In J. Loughran, M. Hamilton, V. LaBoskey, and T. Russell (Eds.), *International handbook of self-study teaching and teacher education practices* (pp. 375- 420). Dordrecht, The Netherlands: Kluwer Academic Publishers.
- Hansen, David, T. (1995). *The call to teach*. New York: Teachers College Press.
- Hogan, K., & Pressley, M. (1997). Scaffolding scientific competencies within classroom communities of inquiry. In K. E. Hogan and M. E. Pressley (Eds.), *Scaffolding student learning: Instructional approaches and issues*. (pp. 74-107). Cambridge, MA: Brookline Books.
- Hunsberger, M. (1992). The time of texts. In W.F. Pinar & W.M. Reynolds (Ed's). *Understanding curriculum as phenomenological and deconstructed text*. (pp.64- 91). New York: Teachers College Press.

- Jackson, Philip W. (1998). *John Dewey and the Lessons of Art*: New Haven: Yale University Press.
- Johnson, D.W. & Johnson, R. T. (1989). *Cooperation and competition: Theory and research*. Edina, MN: Interaction Book Co.
- Kelchtermans, G. & Hamilton, M. (2004). The dialectics of passion and theory: Exploring the relation between self-study and emotion. In J. Loughran, M. Hamilton, V. LaBoskey, & T. Russell (Eds.), *International handbook of self study teaching and teacher education practices* (pp. 1211-1230). Dordrecht, The Netherlands: Kluwer Academic Publishers.
- LaBoskey, V. (2005). Speak for yourselves: Capturing the complexity of critical reflection. In C. Mitchell, S. Weber and K. O'Reilly-Scanlon (Eds.), *Just who do we think we are?*(pp. 131-141). New York: RoutledgeFalmer.
- LaBoskey, V. (2004). The methodology of self-study and its theoretical underpinnings. In J. Loughran, M. Hamilton, V. LaBoskey, & T. Russell (Eds.), *International handbook of self-study teaching and teacher education practices* (pp. 817-869). Dordrecht, The Netherlands: Kluwer Academic Publishers.
- Leinhardt, G. (1988). Situated knowledge and expertise in teaching. In J. Calderhead (Ed), *Teachers' professional learning* (pp. 146-168).
- Liston, D. (1995). Intellectual and institutional gaps in teacher education. In J. Garrison & A. Rud, Jr. (Eds.), *The educational conversation: Closing the gap*. (pp. 129-142). Albany: State University of NY Press.

- Loughran, J. (2004). A history and context of self-study of teaching and teacher education practices. In J. Loughran, M. Hamilton, V. LaBoskey, & T. Russell (Eds.), *International handbook of self-study teaching and teacher education practices* (pp. 817-869). Dordrecht, The Netherlands: Kluwer Academic Publishers.
- Loughran, J. (2002). Understanding self-study of teacher education practices. In J. Loughran & T. Russell (Eds.), *Improving teacher education practices through self-study* (pp. 239-248). London: RoutledgeFalmer.
- Loughran, J. & Northfield, J. (1998). A framework for the development of self-study practice. In M. Hamilton (Ed.), *Reconceptualizing teaching practice: Self-study in teacher education* (pp.7-18). London: Falmer Press.
- Macintyre Latta, M., Buck, G., Leslie-Pelecky, D., & Carpenter, L. (2007). Terms of inquiry. *Teachers and Teaching: theory and practice*,. 13 (1), 21-41.
- Macintyre Latta, M. & Olafson, L. (2006). Identities in the making: Realized in between self and other. *Studying Teacher Education*. 2 (1), 77-90.
- Macintyre Latta, M. (2001). Letting aesthetic experience tell its own tale: A reminder. *Journal of Aesthetic Education*, 35 (1), 45-51.
- Macintyre Latta, M. (In progress). The dynamics of formative assessment.
- Margonis, F. (2004). From student resistance to educative engagement: A case study in building powerful student-teacher relationships. In C. Bingham & A. Sidorkin (Eds.), *No education without relation* (pp. 39-54). New York: Peter Lang.

- May, W.T. (1993). Teaching as a work of art in the medium of curriculum. *Theory into Practice*. 32 (4). 210-218.
- Miller, M.E. (1996). Ethics and understanding through interrelationship: I and thou in dialogue. In R. Josselson (Ed.), *Ethics and process in the narrative study of lives* (Vol 4, pp. 129-147). Thousand Oaks: Sage.
- Mishler, E. (1990). Validation in inquiry-guided research: The role of exemplars in narrative studies. *Harvard Educational Review*, 60 (4), 415-442.
- Mitchell, C. and Weber, S. (2005). Just who do we think we are...and how do we know this?: Re-visioning pedagogical spaces for studying our teaching selves. In C. Mitchell, S. Weber and K. O'Reilly-Scanlon (Eds.), *Just who do we think we are?* (pp. 1-9). New York: RoutledgeFalmer.
- Mitchell, I. (2004). Identifying ethical issues in self-study proposals. In J. Loughran, M. Hamilton, V. LaBoskey, & T. Russell (Eds.), *International handbook of self-study teaching and teacher education practices* (pp. 1393-1442). Dordrecht, The Netherlands: Kluwer Academic Publishers.
- Moshman, D. (1999). *Adolescent psychological development: Rationality, morality, and identity*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Munby, H., Russell, T., and Martin, A. (2001). Teachers' knowledge and how it develops. In V. Richardson (Ed.), *Handbook of research on teacher education* (4th ed., pp. 877-904). Washington, D.C.: American Educational Research Association.

- Noddings, N. (1988). An ethic of caring and its implications for instructional arrangements. *American Journal of Education*, 96(2), 215-231.
- Nuthall, G. (2004). Relating classroom teaching to student learning: A critical analysis of why research has failed to bridge the theory-practice gap. *Harvard Educational Review*, 74(3), 273-306.
- Ogle, D.M. (1986). K-W-L: A teaching model that develops active reading of expository text. *The Reading Teacher*, 39(6), 564-570.
- O'Loughlin, M. (2006). *Embodiment and education: Exploring creatural existence*. Dordrecht, The Netherlands: Springer.
- Pelias, R. J. (2004). *A methodology of the heart: Evoking academic and daily life*. New York: Alta Mira Press.
- Putnam, R. P. , & Borko, H. (2000). What do new views of knowledge and thinking have to say about research on teacher learning? *Educational Researcher*, 29 (1), 4-15.
- Schon, D. (1987). *Educating the reflective practitioner*. San Francisco: Jossey-Bass.
- Schulman, L.S. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review*, 57, 1-22.
- Senge, P., Cambron-McCabe, N., Lucas, T., Smith, B., Dutton, J. & Kleiner, A. (2000). *Schools that learn: A fifth discipline fieldbook for educators, parents, and everyone who cares about education*. New York: Doubleday.
- Shepard, L.A. (2005). Linking formative assessment to scaffolding. *Educational Leadership*, 63 (3), 70-75.

- Shepard, L.A. (2000) The role of assessment in a learning culture. *Educational Researcher*, 29 (7), 4-14.
- Stake, R. E. (2000). Case studies. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (2nd ed., pp. 435-454). Thousand Oaks CA: Sage Publications.
- Stengel, B. (2004). Knowing is response-able relation. In C. Bingham & A. Sidorkin (Eds.), *No education without relation* (pp. 139-152). New York: Peter Lang.
- Tashakkori, A. & Teddlie, C. (Eds.), (2003). *Handbook of mixed methods in social and behavioral research*. Thousand Oaks, CA: Sage Publications.
- Tidwell, D. (2002). A balancing act: Self-study in valuing the individual student. In J. Loughran & T. Russell (Eds.), *Improving teacher education practices through self-study* (pp. 239-248). London: RoutledgeFalmer.
- Torrence, H. & Pryor, J. (1998). *Investigating Formative Assessment*. Buckingham: Open University Press.
- Treagust, D., Jacobowitz, R., Gallagher, J., & Parker, J. (2001). Using formative assessment as a guide in teaching for understanding: A case study of a middle school science class learning about sound. *Science Education*, 85, 137-157.
- Trumbull, D. (2004) Factors important for the scholarship of self-study of teaching and teacher education practices. In J. Loughran, M. Hamilton, V. LaBoskey, & T. Russell (Eds.), *International handbook of self-study teaching and teacher education practices* (pp. 1211-1230). Dordrecht, The Netherlands: Kluwer Academic Publishers.

- Tunstall, P. (1996). Teacher feedback to young children in formative assessment: A typology. *British Educational Research Journal*, 22 (4), 389-395.
- Usher, R. (1996). Textuality and reflexivity in educational research. In D. Scott & R. Usher (Eds.), *Understanding educational research* (pp.33-51).
- Vygotsky, L.S. (1978) . *Minds in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.
- Weber, S., & Mitchell, C. (2002). Academic literary performance, embodiment, and self study: When the shoe doesn't fit: Death of a salesman. In C. Kosnik, A. Freese, & A. P. Samaras (Eds.), *Making a difference in teacher education through self study*. Proceedings of the Fourth International Conference on Self Study of Teacher Education Practices, Herstmonceux, East Sussex, England (Vol. 2, pp. 121-124). Toronto, Ontario: OISE, University of Toronto.
- Whitehead, J. (2004). What counts as evidence in self-studies of teacher education practices? In J. Loughran, M. Hamilton, V. LaBoskey, and T. Russell (Eds.), *International handbook of self-study teaching and teacher education practices* (pp. 313-342). Dordrecht, The Netherlands: Kluwer Academic Publishers.
- Whitehead, J. (1998). Creating a living educational theory from questions of the kind, "How do I improve my practice?" *Cambridge Journal of Education*, 19 (1), 1-11.
- Zeichner, K. (2001). Educational action research. In P. Reason & H. Bradbury (Eds.), *Handbook of action research: Participative inquiry and practice* (pp.273-282). Thousand Oaks, CA: Sage Publications.

Zeichner, K. (1999). The new scholarship in teacher education. *Educational Researcher*, 28 (9), 4-15.

Zeichner, K. & Liston D. (1987). Teaching student teachers to reflect. *Harvard Educational Review*, 57 (1), 23-48.

APPENDIX A

Observation Protocol for Class Video

Observation Protocol

Used for video recorded class sessions at UNL

Project: Exploring the Reciprocity of Formative Assessment

Time of observation:

Date:

Place:

1. Describe the setting: (Number of students, classroom arrangement, number absent, physical surroundings, etc.)

2. Describe the instructor's purpose:

3. Describe the learning activity:

4. Describe the instructor's interaction with students: (how does instructor come to know students, establish trust, access student thinking, funnel from broad observations to narrow ones, use specific quotes especially when noting kinds of feedback and insights brought to light because of that feedback, describe if student needs were met, describe body language, etc.)

5. Describe any peer interactions that relate to the learning process: (what resources do they turn to, how do they respond to each other, etc)

APPENDIX B

Informed Consent Letter



IRB#2006-09-022 EP Date Approved: 09/29/06 Valid Until: 09/28/07
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COLLEGE OF EDUCATION AND HUMAN SCIENCES
 Department of Teaching, Learning and Teacher Education

Informed Consent Form

Exploring the Reciprocity of Formative Assessment

You are invited to participate in this research study. The following information is provided in order to help you make an informed decision whether or not to participate. If you have any questions, please do not hesitate to ask.

You are eligible to participate in this study because you are a student in the Elementary Science Methods Course (TLTE 315) and you are 19 years of age or older. The purpose of this study is to explore individual student learning through assessment.

This study will be ongoing throughout the fall semester of 2006. Participation will take place during the regular 10:00 am class periods at UNL. As part of the regular course expectations, you will be planning, identifying, and responding to student learning and then implementing your plans in an elementary classroom. You will use what you learn in this course to teach science lessons, assign and grade student work, and respond to student work through writing, discussion or interviews. Sessions at UNL may be videotaped and all course assignments and correspondences will be copied. **You may be asked to be interviewed at the end of the study** after grades have been turned in and you give your additional consent to the interview. You do not have to participate in the interview in order to participate in the study. Data collection for this study will end December 20, 2006.

Video taped class sessions will be used for **data analysis of instructor teaching practices only**. No portion of the video tapes will be used for any other purposes. Only the investigators will have access to video tapes. Any transcripts made will use pseudonyms.

There are no known risks associated with this research. However, if you feel uncomfortable being identified in the video tape, you may review these tapes and ask that portions not be used. You may also choose to sit out of view of the stationary camera. Your participation is **not** dependent upon your being in view of the camera. Also, your instructor will not know who is participating until after grades have been turned in.

As a result of participation in this research, it is possible that you may learn more deeply about elementary science teaching and the research process. The information obtained from this study may help us to better understand how responding to individual learning needs aids teacher planning, decision-making, and ultimately, student learning. There is no compensation for participating in this study. There are no responsibilities required for participation that are outside of normal course expectations with the exception of a voluntary interview after the course has ended and grades have been given.

Any information obtained during this study which could identify you will be kept strictly confidential. Audiotapes, videotapes, and copies of student work samples that could aid understanding will be kept in a locked file in the investigator's office for a maximum of 3 years and will then be destroyed. The information obtained in this study may be published in educational journals or presented at educational conferences, but your identity will not be disclosed.

You are free to decide not to enroll in this study or to withdraw at any time without adversely affecting

_____ initial



IRB#2006-09-022 EP
 Date Approved: 09/29/06
 Valid Until: 09/28/07

COLLEGE OF EDUCATION AND HUMAN SCIENCES

Department of Teaching, Learning and Teacher Education

your relationship with the investigator, the University of Nebraska-Lincoln or your cooperating school. **You are only being asked permission to use your class data for this project. Your grade will not be affected if you choose not to participate in this study. The instructor will not know who is participating until after grades have been turned in.**

You may ask any questions concerning this research and have those questions answered before agreeing to participate or at any time during this study. You may call the project advisor at any time (402-472-9958). If you have questions concerning your rights as a research subject that have not been answered by the investigator or to report any concerns about the study, you may contact the University of Nebraska-Lincoln Institutional Review Board (402-472-6965).

DOCUMENTATION OF INFORMED CONSENT

You are voluntarily making a decision whether or not to participate in the research study. Your signature certifies that you have decided to participate having read and understood the information presented. You will be given a copy of this consent form to keep.

- I agree to participate in this study.
- I agree to be video taped during sessions at UNL
- I agree to be interviewed

 Name of Research Participant

 Signature of Research Participant

 Date

 Signature of Investigator

 Date

Identification of Investigator
Primary Investigator
 Juli Kaftan – Doctoral Candidate
 Instructor – University of Nebraska-Lincoln
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Project Advisor
 Margaret Macintyre Latta
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APPENDIX C

Constructivist Teacher Surveys

Preservice Teacher Perceptions/Opinions

Name _____

Student ID# _____

The following questions are designed to inform my teaching by helping me understand your level of comfort and knowledge in teaching science using scientific inquiry. For the following statements, please place a check in the box containing the number that corresponds with your level of agreement/disagreement. Please assess your own skills and opinions as honestly as possible.

- 1= Strongly Disagree
 2= Disagree
 3= Neither Disagree nor Agree
 4= Agree
 5= Strongly Agree

	1	2	3	4	5
1. I understand what scientific inquiry is.					
2. I feel comfortable designing a scientific inquiry.					
3. I have the skills necessary to design a scientific inquiry.					
4. I am understand and am comfortable with science content.					
5. I believe I would enjoy teaching science using scientific inquiry.					
6. Inquiry-based science activities are appropriate for all students.					
7. I am excited about teaching science to elementary or middle school students.					
8. I feel prepared to teach scientific concepts using scientific inquiry.					
9. Virtually all students can learn to think scientifically.					
10. Science is not relevant to the lives of some students.					
11. I have the skills to assess every student's level of understanding of science.					
12. I have the skills to develop appropriate science activities for all students.					
13. I feel prepared to involve parents in the science education of their children,					
14. I feel prepared to develop science lessons that meet the needs of all students.					
15. I feel prepared to develop appropriate assessments for all students in my science classes.					
16. I feel prepared to encourage participation of all students in science activities.					

FIGURE 4.8 Does Your Teaching Support Constructivism? Use this continuum to determine the extent to which you are supporting constructivism.

Teacher	Student	Who identifies the science lesson topic issue?
←————→		
No	Yes	Are students' preferences considered relevant?
←————→		
Teacher	Student	Who asks questions?
←————→		
Teacher	Student	Who identifies needed resources (printed and human)?
←————→		
Teacher	Student	Who locates printed resources?
←————→		
Teacher	Student	Who plans the investigations and activities?
←————→		
No	Yes	Are varied evaluation techniques used?
←————→		
No	Yes	Do students practice evaluating themselves?
←————→		
No	Yes	Are concepts and process skills applied to new situations?
←————→		
No	Yes	Are students encouraged to take action on what they have learned?
←————→		
No	Yes	Do science concepts and principles emerge from topics studied because they are needed?
←————→		
No	Yes	Is there evidence that science learning is being extended beyond the walls of the school?
←————→		

Source: Adapted from Robert E. Yager, "The Constructivist Learning Model," *Science Teacher* (September 1991): 56

APPENDIX D
IRB Compliance Document



HUMAN RESEARCH PROTECTIONS
Institutional Review Board

October 2, 2006

Juliann Kaftan
Margaret Macintyre Latta
TLTE
9855 Devonshire Drive
Omaha NE 68114

IRB # 2006-09-022 EP

TITLE OF PROJECT: **Exploring the Reciprocity of Formative Assessment**

Dear Juliann:

This letter is to officially notify you of the approval of your project by the Institutional Review Board (IRB) for the Protection of Human Subjects. It is the Board's opinion that you have provided adequate safeguards for the rights and welfare of the participants in this study. Your proposal seems to be in compliance with this institution's Federal Wide Assurance 00002258 and the DHHS Regulations for the Protection of Human Subjects (45 CFR 46).

Date of EP Review: **09/26/06**.

You are authorized to implement this study as of the Date of Final Approval: 09/29/06. This approval is Valid Until: 09/28/07.

1. You have received the IRB approved Consent form for this project. Please use this form when making copies to distribute to your participants. If it is necessary to create a new informed consent form, please send us your original so that we may approve and stamp it before it is distributed to participants.

We wish to remind you that the principal investigator is responsible for reporting to this Board any of the following events within 48 hours of the event:

- Any serious event (including on-site and off-site adverse events, injuries, side effects, deaths, or other problems) which in the opinion of the local investigator was unanticipated, involved risk to subjects or others, and was possibly related to the research procedures;
- Any serious accidental or unintentional change to the IRB-approved protocol that involves risk or has the potential to recur;
- Any publication in the literature, safety monitoring report, interim result or other finding that indicates an unexpected change to the risk/benefit ratio of the research;
- Any breach in confidentiality or compromise in data privacy related to the subject or others; or
- Any complaint of a subject that indicates an unanticipated risk or that cannot be resolved by the research staff.

For projects which continue beyond one year from the starting date, the IRB will request continuing review and update of the research project. Your study will be due for continuing review as indicated above. The investigator must also advise the Board when this study is finished or discontinued by completing the enclosed Protocol Final Report form and returning it to the Institutional Review Board.

If you have any questions, please contact Shirley Horstman, IRB Administrator, at 472-9417 or email shorstman1@unl.edu.

Sincerely,


Dan R. Hoyt, Chair
for the IRB


Shirley Horstman
IRB Administrator

cc: Faculty Advisor