

DEVELOPMENT OF SCIENCE TEACHER IDENTITY IN PRE-SERVICE
TEACHERS AS 'SITUATED COGNITION': DEFINING 'SELF' AS 'TEACHER' IN
A SCHOOL BASED CONTEXT

by

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(Under the Direction of Carolyn S. Wallace).

ABSTRACT

This multiple case study employed interpretivist methodology to form a grounded theory of how three participants, in a unique situated block of course-work integrating methods, curriculum and practicum, advanced their developing identity from that of a university student of teaching to that of a beginning teacher. The study found that pre-service science teachers viewed the move from student to teacher with varying levels of anxiety and expectation depending on the initial understanding of teacher identity that had been established from their personal and school biography. The pre-service science teachers studied cast themselves into the role of science teacher through different means. Access to multiple role models and fully contextualized was pivotal to their further development of teacher identity. Constant exposure to multiple styles in method of teaching, in student teacher interface, and even classroom atmosphere developed a strong implicit message about teaching as a created process rather than a prescribed process.

Pre-service science education students arrive at their final year of training with an understanding of what it means to be a teacher. This initial understanding forms the lens through which they will view their final year experiences. It must also be allowed to form the foundation of their development. Accomplishing this requires authentic practice with multiple points of contact in which they may locate their learning. Although many reformed programs exist, their commonalities and their full impact are not presently known.

INDEX WORDS: teacher identity, school-based methods, situated cognition, community of practice

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B.S., Houston Baptist University, 1993

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A Dissertation Submitted to the Graduate Faculty of The University of Georgia in Partial
Fulfillment of the Requirements for the Degree

DOCTOR OF PHILOSOPHY

ATHENS, GEORGIA

2003

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August 2003

DEDICATION

This work is dedicated to my children, David, Daniel and Sarah Lyon. In my desire to be a model for them, I defined myself as ‘teacher.’

ACKNOWLEDGEMENTS

I want to particularly acknowledge Carolyn Wallace, my major professor, who has been patient and invaluable. I also want to thank my committee members and faculty and staff of the Science Education Department to UGA for giving me their time and advice and allowing me to share my research with them. Thanks to Christy Lake for transcribing one of my interviews, to Mai Yin Tsoi for doing the reliability check of my codes, and to Libba Hartzog for proofreading. Also, I want to acknowledge my principal and co-workers at Phoenix High School for their support and encouragement while this was being written, thanks Kevin, Patty, Patsy, Vicky, Clark, Andy and Mark.

Finally, I want to thank my husband, Dalton. I never would have started college as a 30 year old homemaker with a GED without his gentle confrontation. After I started, he encouraged me at every step and never implied by word or deed that I should not continue as far as my desire for learning would take me.

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CHAPTER 1

INTRODUCTION

Background

Apprenticeship in the form of a clinical experience has been a part of preparation for practice in many professions. The clinical experience in teacher preparation traditionally has traditionally been student teacher placement during the final semester of teacher education. However, as the social and cultural influences that mediate education have been researched and understood in light of constructivist learning theory, the agenda for good teaching has changed. Teachers must be curriculum planners and researchers, prepared to take into account many variables in organizing students' learning in consideration of diverse prior knowledges and needs. These current demands have redefined teaching and fundamentally changed the considerations of reformed teacher education.

Many colleges of education have moved toward reform by expanding clinical internships or by creating professional development schools in conjunction with local school districts (Darling-Hammond, 1999). In other university systems there has been resistance to changing the length of teacher education programs beyond a 120-semester hour undergraduate program. Reform of teacher education in these programs has required creative thinking as well as critical questioning of how to implement the constructivist practices of teaching and learning in the teacher education program. Dr. Carolyn Wallace and Dr. Steve Oliver of the University Of Georgia Department Of Science Education addressed this challenge in the fall of 2000 through the creation of an alternative model

of the curriculum, methods and practicum semester of secondary science teacher education (Keys, Oliver, & Lyon, 2000). The resulting alternative program exercised the principle of cognitive apprenticeship outlined by Collins, Brown & Newman (1987). to achieve greater integration of theory and practice and to introduce pre-service teachers to critical thinking about their own practices and the practices of others prior to the high stakes student teaching placement.

This alternative model fully situated the curriculum and methods classes in a secondary school setting and employed multiple instructors, through some overlapping of the roles of high school science classroom instructor and university classroom instructor. Also, two or more pre-service teachers shared classroom observation and practice in the science classroom of each of the mentor teachers. The program was designed to blur the false boundaries between curriculum, methods, and practicum and to create many social spaces in which meaning might be made or re-made. In this model, as in traditional models, the university professors, high-school science teachers, and pre-service science teachers each predominantly performed their traditional role in the community of practice. However, each of these members in the community of practice also alternated into other roles within the venue. Figure 1 shows the overlapping roles into which each participant in the community of practice alternated. These overlapping role created unique social spaces for negotiation of meaning.

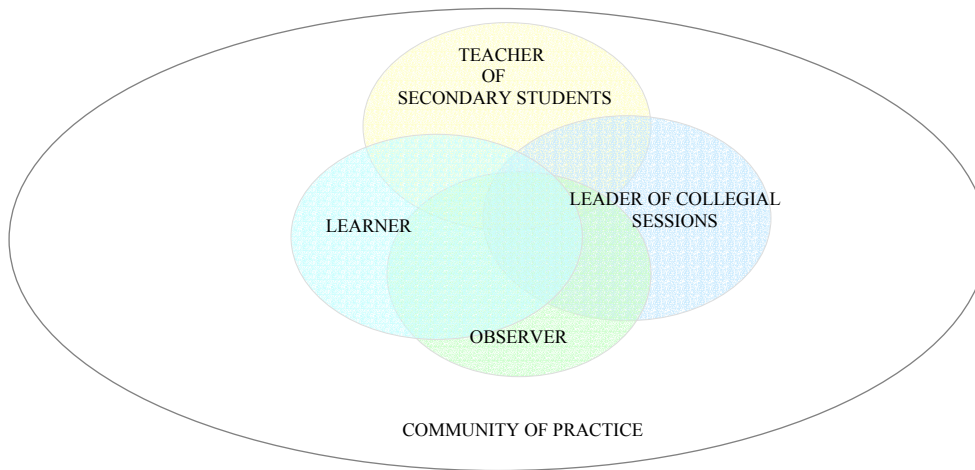


Figure 1. A graphic example of the overlapping roles and the resulting social spaces for negotiating learning.

In the classroom of the mentor teacher, pre-service teachers had ongoing opportunities to explore and perform the roles of science teacher through participation ranging from observation to independent teaching. Additionally, the interns were able to meet with their peers, mentors and professors in collegial sessions in the same setting in which they had each performed these various roles. These collegial sessions encompassed the traditional topics of methods and curriculum classes and agendas set by the open discussion among practitioners.

The model of teacher education in which this study took place involved integrated teaching protocols and it embedded instruction in an established community of practice. The teaching protocols that were integrated into the design included observation, demonstration, modeling, and multiple instructors in a field site. The instructional plan allowed learning experiences that embedded methods for science laboratory instruction,

classroom instruction, planning, assessment, and decision making with classroom management, materials management, communication skills, and instructional adaptations. The learning venue that resulted placed all of the cognitive skill development in a complex social context. This social context provided immediate and on-going feedback from multiple sources, thus creating a dynamic learning environment. The resulting cognitive apprenticeship model of pre-service science teacher education abounded with potential implications for research (Keys, Oliver, & Lyon, 2000). The current study was inspired by the potential impact of the dynamic blending of cognitive and social learning trajectories on the formation of teacher identity for these pre-service science teachers.

Purpose and Rationale

The purpose of the study was to investigate how participation in this uniquely situated and integrated course for methods, curriculum and practicum facilitated the negotiation of identity from that of a university student of teaching with that of a beginning teacher. Areas of educational research informed by the study include the intertwined issues of pedagogical resistance, teachers' professional identity, and community of practice theories.

Pedagogical resistance, the resistance to change from preconceptions to informed pedagogy, has been very well documented in research literature. This discourse takes place under various headings including theory to practice research, teacher beliefs research, and conceptual change research. Some researchers have been strongly critical of the ability of teacher education programs to influence a real change in the beliefs and practices of pre-service teachers (Kagan, 1992). However, others have found that there is a conceptual change in pre-service teachers' understandings and a real move toward more

informed pedagogical thinking, although these researchers vary greatly in the degree of conceptual change reported. (Feiman-Nemser, Mc Diarmid, Melnick, & Parker, 1989; Feiman-Nemser & Bachmann, 1986; Rodriguez, 1993). Those researchers that report a move from preconceptions toward more informed pedagogy in some areas also report stability in some areas of preconceptions (Nettle, 1998, Feiman-Nemser, Mc Diarmid, Melnick, & Parker, 1989; Feiman-Nemser & Bachmann, 1986, Rodriguez, 1993).

Therefore, the preponderance of evidence has indicated that the persistence of highly imitative preconceptions and reflective, purposeful pedagogical change are simultaneous events in the pre-service teachers' experience. The current study considers the ways in which the model of pre-service science teacher education mediates the shifts between pedagogical change and pedagogical persistence.

Teachers' professional identity, the complex conception of self in the role of teacher, can be seen to be intertwined with issues of pedagogical change through the common basis of preconceptions. That is, that students choose the career of teaching based on some preconception of what it is to teach. These preconceptions must be mediated by and incorporated into their personal identity, the knowledge of whom they are, what they value, and how they define and achieve success (Bullough & Gitlin, 1995; Beijarrrd, Verloop & Vermunt, 2000). This amalgam constitutes the beginning of their professional teacher identity. Teachers' identity can also be viewed as a subset of professional identity in the general social context. In this regard, teachers' identity is about the ways in which society defines professionalism and the ways in which the practitioner defines professionalism and the profession (Furlong, et. al, 2000; Sachs, 2001). Therefore, teacher identity emerges as a complex negotiation between the many

social roles of the individual (Summara & Luce-Kepler, 1996). The current study considers the ways and means through which this complex negotiation occurs.

Communities of practice have been referred to as “The invisible key to success” (Stewart & Brown, 1996). in the professional business world; the same might be said in the professional development of teachers. Communities of practice share a history or a background, they share an on-going enterprise, and they involve learning a way of dealing with the shared facets of their world (Wenger, 1998). In research, communities of practice have been determined to be strong mediating factors in determining developmental trajectories (Billett, 1998). Furthermore, it has been shown that developing a professional teacher identity happens within a community of practice, and that the community of practice impacts professional development (Britzman, 1986). The current study considers identity through the lens of engagement in a community of practice. The study illuminates the ways in which the community of practice can locate initial professional teacher identity and can selectively advance or hinder the further development of that identity.

Research questions

Research questions guiding the study include:

- (1). How do pre-service teachers in the pre-service block perceive the move from student to teacher?
- (2). How does pre-service teachers’ participation in collaborative, situated learning cast them into the teacher’s role?
- (3). How are multiple role models reflected in the emerging identity of the teacher in training?

(4). How is the integration of existing teacher identity and developing teacher identity constructed in situated cognition?

Epistemology and Theoretical Framework

The research study was done within a social constructivist epistemology with an understanding that knowledge is transferred, interpreted, and modified through social and cultural interaction. Knowledge exists as non-static and non-objective because it exists within the non-static, non-objective realm of humanity. Any objective reality that may exist in the physical world has been filtered through the inevitably subjective human interpretation. Therefore, that which is determined to be knowledge has been moderated by agreed upon uses and meanings among individuals, societies, and cultures. The lack of an ideal objectivity has been somewhat balanced by the social negotiations of meaning construction. That is, the exchange, use, and recursive modification of meaning advances knowledge in valuable ways for human use, thereby diluting the ill effects of individual subjectivity through the screening processes of social exchange and use. This epistemological stance invites the study of meaning as a part of social and cultural situatedness and makes certain demands of the theoretical framing of the investigation.

A social constructivist epistemology clearly demands that the point of view of the social actors, their understandings, and their meanings should be of primary importance. Symbolic interactionism, which is a social interactionist theoretical framework founded on exactly this premise, meets many of the study demands. According to Blumer (1962), the basic assumptions of symbolic interactionism are the following

- 1). That human actions are based on the meanings that they have ascribed to the things with which they interact,

- 2). That these meanings are the result of interaction with others, and
- 3). That these meanings are modified through interpretation and use (Crotty, 1998).

Denzin (1978, as cited in Crotty, 1998). points out that the investigator using symbolic interactionism as a theoretical framework must view the interaction from the standpoint of the meaning makers. There was a good fit between this requirement of symbolic interactionism and the purpose and setting of this investigation. The alternative model in which participants took part oriented the investigator toward the participants' standpoint. Observation of the participants' interactions with students in the classroom, observation of their interaction with a variety of teaching role models, observation of their participation in the university curriculum, and the reading of their reflective journals and other work products provided the investigator and participants with a shared social space in which to communicate.

Although symbolic interactionism was clearly suited to frame the proposed investigation, there were some inherent problems in undertaking a study built around this framework. The researcher, through the exercise of sufficient discipline must attempt to approach the subjective point of view of the participants, but it is inherent that the attempt cannot ideally succeed. This is basically an attempt to objectively assume the subjective point of view of others and thus contradicts itself. Therefore, the theoretical perspective of situated cognition has been employed as a further frame within which symbolic interactionism has been implemented.

Situated experience has traditionally been of concern in education, sociology, psychology, and philosophy (Wenger, 1998). This common ground of tradition makes

situated cognition a useful theoretical perspective in which to frame this inquiry into how teacher identity development was facilitated by participation in this unique situated integration of methods, curriculum, and practicum. Situated cognition subsumes and augments symbolic interactionism as laid out by Blumer, 1969 (as cited in Wenger, 1998). In this study, the conceptualization of the students' evolving self-identity as teachers was dealt with as an artifact of the social situation in which they took place (Bullough, 1991). Thus, symbolic interactionism is nested within situated cognition.

Overview of the Study

This was a multiple case study investigating how participation in a uniquely situated integration of methods, curriculum, and practicum facilitated the shift of identity from that of a university student of teaching to that of a beginning teacher. Three participants in the science education classes on curriculum, methods, and practicum, were studied. These classes were commonly referred to as the 'block,' and they must be taken concurrently prior to the student teaching placement which is the final science teacher preparation experience. The block of classes attended by these participants was conducted under the second trial of an integrated and situated model. The class hours for all of the courses were combined, and the attendance hours of the students were not discretely awarded to a particular class; rather credit was awarded for the block as a whole. Likewise, the assignments, although mirroring the objectives of the traditional discrete courses, were not segregated for credit in any one of the courses. All of the block classes were held at a local high school, with students alternating their time in the high school classroom with their time under university instruction at the high school.

Data collection

Data was collected through interpretivist methods including interview, study of student artifacts, writings and observation. The premises of Brown, Collins, & Duguid (1989). formed the basis for the use of situated cognition as a theoretical perspective, compelling the consideration of four realms of evidence of learning. 1). Learning must be interpreted in the context of its use. 2). Learning must be interpreted through the use of learning tools (this includes the use of concrete tools and cognitive tools). 3). Learning must be interpreted by progress within the community of practice. 4). Learning must be interpreted by the authentic activities of learners. Collection and interpretation of this type of evidence required that each type should be accounted for individually and collectively. Therefore, the context of the specific school and of the individual classroom needed to be taken into account during observations, interviewing, and perusal of journal reflections. Additionally, decisions and reflections on concrete learning tools and the learning strategies that the participants employed and observed being employed by others needed to be identified through observation and through perusal of journal writings and then probed through interview questions. Evidence of the participating pre-service teachers' progress into the community of practice was gathered through observations of their participation in the university class discussions, observations of their actions in the mentors' classroom, review of the artifacts of their teaching, and reading their journal writings. For example, the kinds of questions asked and answered, as well as the way in which classroom work was distributed among the interns and their mentor were sources for evidence on the progress of the participant into the community of practice. Ultimately, each of these realms of evidence was interpreted through the authentic

activities of the learners. Their opportunities to teach, to co-teach, to tutor, to interact informally with the students, to interact with mentors, to interact with peers, and most of all their reflections on these activities offered raw data and guided further probes. Each of these realms of evidence mutually informs the interpretation of the others and thereby informs the collective interpretation of the data.

Analysis

Analysis was ongoing. Journal writings were read periodically with note taken of particular concerns and interactions meriting comment in the journal. This analysis formed the basis for interview probes. Previous notes and interviews were re-read or tapes listened to prior to the next interview, forming the basis for further probes. Upon completion of data collection, more formal recursive analysis began. The phases of analysis included, initial open coding, three sets of axial coding based on the participants activity, chronological sorting, biographical sorting, and finally selective coding based on the types of interactions within the community of practice. The final coded data were analyzed for threads of identity formation that emerged.

CHAPTER 2

LITERATURE REVIEW

Three main strands of literature informed this inquiry. Cognitive apprenticeship as conceived by Collins, Brown and Newman (1987). was key to the model in which the current study was bounded. Situated learning literature, with its roots in cultural anthropology, informed cognitive apprenticeship and informed the theoretical frame of this study. Finally the literature surrounding teacher professional identity fundamentally informed the questions of the study. Happily, these strands share much common ground

Cognitive Apprenticeship

Apprenticeship is intended to embed knowledge and skills in the social and functional context of practice (Collins, Brown & Newman, 1987). Collins, Brown & Newman present a design they call cognitive apprenticeship, whereby knowledge of fact and concept are applied, evaluated, and adjusted in the context of authentic use, thus emphasizing cognitive and meta-cognitive processes over physical skills and processes. They propose the application of this design to the teaching of elementary mathematics; however, examination of the purposed framework reveals its potential for application to pre-service teacher education prior to the traditional apprenticeship of student teaching.

Collins, Brown and Newman's (1987). proposed design is communicated as a four-dimensional framework of content, methods, sequence and sociology. They analyzed three models of teaching that have documented success and found that each of these models had characteristics of traditional cognitive models and characteristics of

apprenticeship. They found that these characteristics emerged within four dimensions, content, methods, sequence, and sociology. These dimensions and their related characteristics were derived from analysis and commonalities of three models of successful learning environments (Palincsar & Brown, 1984; Scardamealia & Bereiter, 1985; Schoenfeld, 1983, 1985; as cited in Collins, Brown & Newman, 1987). Two of the four dimensions, content and sequence, are familiar terms in education and are often considered to be interrelated in traditional educational hierarchies particularly in science education through scope and sequence organizations. The transfer of these dimensions into the design of cognitive apprenticeship is relatively seamless. However, the dimensions of method and sociology are less explicit due to their dependence on context. These require specific crafting as a part of a cognitive apprenticeship-learning framework for application to pre-service teacher education. Cognitive apprenticeship, as proposed by Collins, Brown, and Newman (1987)., has the potential to make these dimensions of classroom practice less invisible to pre-service teachers, thereby beginning to weave them into the cognitive and metacognitive fabric of their understanding of the teacher's role. This potential recommended the application of this model to pre-service teacher education.

Specific consideration of the methods and sociology dimensions of cognitive apprenticeship as they apply to pre-service secondary science teacher education should begin with a consideration of the characteristics of the sociology dimension. Sociology, in the context of this learning framework, is the studied consideration of the social context in which learning takes place and the intentional use of the social context as a

productive part of the learning process. The social matrix in which learning is embedded is the foundation upon which this dimension rests.

Lave (1991). points out that traditional apprenticeship takes place entirely within an active, productive environment. All participants are engaged in the target skills at various levels, and all participants are expected to contribute to the authentic process of practice. The resulting degree of success or failure in the expected contributions is immediately instructive in the authentic performance of the target skills. As apprentices advance in skill, they are advanced in responsibility and participation. Therefore, the inclusion of sociology in a learning framework should take into consideration the authenticity of the context and the social interactions with experts, peers, and clients. The characteristics that Collins, Brown and Newman (1987). identify as demanding consideration in the dimension of sociology are situated learning, the culture of expert practice, intrinsic motivation, and the exploitation of both competition and cooperation. Through the interpretation of these terms, their relevance becomes apparent.

Interpretation of the terms Collins, Brown and Newman (1987). use to characterize the sociology dimension shows that they are all tightly connected concepts and that they exert a shared set of constraints on the design of a leaning environment. The *situated learning*, refers to a setting and conditions for learning in which the learner actively uses knowledge for an authentic purpose under authentic conditions and solves problems that emerge from the practice and performance of their skills. This exerts the constraint of a performance setting in which problems may present themselves and in which solutions may be attempted. Thus, an active learning environment with immediate feedback is needed.

The meaning of *culture of expert practice* extends from situated learning. Skills learned in practices which are confirmed by authentic success form the beginnings of personal expertise. In contrast, untried skills learned passively remain the skills of an amateur. Thus, an apprentice has some claim to knowledge from personal experiences of success or failure, some level of expertise. Therefore, they may claim membership in the community of expert practice at some level. Several things that support learning occur as a result of this membership. As a beginning expert, their contribution to the discourse has more validity and is figuratively ‘heard’ or interpreted differently than it would be if they were unpracticed learners. As a fledgling member in the culture of expert practice they gain entrée to the discourse of fully seasoned practitioner as an insider, whereas a passive learner would continue to be ‘outside’ the realm of actual practice. Along with this entrée into the insider discourse comes greater access to expert thinking.

Intrinsic motivation is also related to situated learning. In a passive learning environment, the motivation to perform well, to learn, is often extensively extrinsic, such as getting a good grade or pleasing the teacher. Some degree of extrinsic motivation may be inevitable, but creating some sort of intrinsic motivation is essential to anchoring an on-going learning process. The realistic tasks that form the learners’ activities in a situated learning setting promote the intrinsic motivations of coherent goals (Lepper & Greene, 1979 & Malone, 1981; as cited in Collins, Brown and Newman, 1987).

Finally, exploitation of both competition and cooperation provides a means to use the social interactions among apprentice peers in the learning situation as a way to build intrinsic motivation. Exploiting cooperation through cooperative problem solving has benefits that are familiar to the social constructivist educator. It allows the knowledge,

skill and insight particular to the unique experience and point of view of individual apprentices to blend and mix into a mutual base from which to initiate new efforts. Exploiting competition may seem to be the reverse of the use of cooperation, but this is a superficial impression. Examination shows that this is really a further use of cooperation. When apprentices are given the same task to carry out, they will perform that task differently. In a shared situation, these differences and the different responses among all of the other participants will be observable. In order to exploit the inevitable comparisons of the different performances and different responses, the focus of comparison must be consciously directed toward the process rather than the product. In this way the competitive comparison of performance can be turned toward cooperative sharing and problem solving.

Meeting these demands places constraints on the planning of an application in the following ways. 1). The application must involve the active participation of the pre-service teachers in the legitimate functions of teaching science. 2). It must cast pre-service teachers as members of the culture of practice by allowing them to carry out the tasks of experts in the presence of experts. 3). Finally, to exploit both cooperation and competition, it must involve multiple participants at the inductee level. It is easy to see that this cannot take place in isolation from the secondary science classroom. Although the sociological constraints might be met in student teacher placement if multiple students shared a classroom placement, the dimension of method is less malleable to the student teaching placement.

The characteristics of a cognitive learning environment in the dimension of method are modeling, coaching, scaffolding and fading, articulation, reflection, and

exploitation. The most important facet of these characteristics is that they are externalization of internal processes. For example, modeling is an action of the expert. It is useful to the learner only to the extent that it can be interpreted. Therefore, modeling is an on-going process. The beginning apprentice will be able to observe only what their experience allows them to see. The same expert performance will reveal much more to the advanced apprentice who can 'see' through lens of his or her own developing expertise than it will reveal to the less experienced apprentice.

Likewise, coaching, the use of verbal and non-verbal cues, hints, guidance and direction, will become more useful as apprentices develop increasingly expert perceptions of the target skills of the profession. Development of recurring observations of modeled behavior and recurring coached performance is advanced through scaffolding and fading, articulation and exploitation. Scaffolding and fading encompasses the application and removal of any of a range of supports. These might be anything from very literal facilitation of the apprentice's performance through stepwise direction, or through the simple support of encouragement and affirmative body language during their performance. It follows that fading is the process of weaning the apprentice from dependence on these supports. Articulation and reflection are tightly connected, with each facilitating the other. These constitute the post-performance phase of learning in which students replay, in some way, their own performance and deconstruct it through questioning and reflection both personally and among their peers at various levels of the expert community. Social interactions among the participants arising from the questions and theories provoked by reflection builds the mutual knowledge base.

Employing the constraints previously enumerated to provide a structure in which the methods characteristics may be practiced calls for an apprenticeship which is different from that of the student teaching placement. Modeling, coaching, scaffolding and fading and exploration are cyclic and incremental processes calling for recursive interplay between the apprentice and the expert. These methods are built into the apprentices' performances of the legitimate role of science teacher in some functions while observing and learning from the expert's model of practice in other functions. Through such performance, these methods may evolve in a range of participatory roles such as observation, tutoring, co-teaching and independent teaching.

Enacting these roles in the presence of an experienced practitioner could have a multi-layered outcome. The pre-service teacher will have the opportunity to form a concept of the task and its enactment from both the modeled behavior. The student may then perform the task in accord with their concepts and ability. Through coaching they may refine their understanding of the pedagogical concept. Fading in both task performance and task selection encourages increasing exploration on the part of the apprentice. At a more subtle level, the pre-service teacher can become self-monitoring and self-correcting as the coaching process itself becomes a model for the teachers.

The additional characteristics, articulation, and reflection are built within the structure of cooperation and competition among multiple participants. The very important caveat here is that the competition is not between individuals, but it is honed by the comparison of the success of processes, and that it takes place in service to cooperation and collaboration. The cooperating group of learners/experts should benefit from the comparison and the opportunity to choose among the comparative successes of different

processes. In the process of collaborating and comparing, participants will need to reflect upon the tasks undertaken and the processes employed and will need to articulate their reasoning and understanding of the task and the process as well as the rationale that will guide their next interaction. Certainly there are concurrent courses that approach the characteristics of articulation and reflection; however, concurrent courses only serve to continue the unrealistic segregation of practice and theory rather than to integrate them through embedding in a shared context.

Situated learning

Situated learning focuses on the relationship between learning and the social situation in which it occurs (Lave & Wenger, 1991). Both situated learning literature and cognitive apprenticeship literature refer strongly to learning activity within a context. In the case of cognitive apprenticeship, the emphasis is on the learning implicit within the context of culture as an internal negotiation. In situated learning, the emphasis is on the learning implicit within the external negotiations of social context. Therefore, this somewhat fuzzy distinction is seen to be rooted in the locus of learning.

In cognitive theory, learning is held to be an internal process which takes place within the individual. In cognitive apprenticeship, conceptual and factual knowledge, and cognitive skills are set and practiced in the context of their use. This approach is proposed to acculturate the learner into the community of practice. Just as in classical cognitive theory, learning is an internal process. Cognitive apprenticeship occurs when this internal concept is externalized in a collaborative or problem solving context. In cognitive apprenticeship, learning is advanced in a cyclical manner of alternation, internalization

and externalization, with culture playing the contextual role in externalization (Brown, 1989; Collins, 1989).

Situated learning theory developed largely in an effort to bring clarification to notions about various concepts of apprenticeship. In situated learning theory, the focus is on the relationship between learning and the social context. No implication is made that fixed representations are acquired or that an abstract lesson is taught. The premise that meaning, understanding, and leaning are relative to contexts rather than to self-contained structures dominates this view of learning. In this way, learning takes place in the space of social context, as a negotiation between people rather than as a purely internal process. The learner gains skills and knowledge through co-participation in the practice of experts. This is legitimate participation to the degree that the learner shares a limited responsibility for the product (Lave, 1985; Lave, 1988; Lave, 1991; Lave & Wenger, 1991).

Much of the recent research in the realm of situated learning relates to adult or vocational education with a significant subset in the field of instructional technology. This research, particularly in vocational and technical training, offers informative insight and implications. Situated learning and the professional development of beginning elementary teachers as instructors of science intersect in Roseberry and Puttick's (1999). case study of the professional development of a beginning elementary teacher as a science educator. Like many, if not most, elementary teachers, the teacher in this case study did not see herself as a science teacher. However, her students viewed her as an authority on science as she taught the science lessons in the elementary curriculum. Seeing herself and her teaching through the responses of the students allowed her to form

a picture of herself as a science teacher (Roseberry & Puttick, 1997). This research shows that there are strong implications for the use of situated learning as a way for teachers to move into the culture of science teaching and make sense of it. Furthermore, the reflective learning of the teacher also constitutes situated sense-making in this research analysis. This is an excellent example of the co-participation aspect of situated learning as applied to teacher learning. The teacher is seen to learn about her teaching from the participation of the students (Roseberry & Puttick, 1997). Just as these researchers have looked at the social context of learning and its impact on sense-making, others have explored the cognitive apprenticeship process of externalizing internal concepts as a way for teacher to make sense of teaching.

Wenger (1998). outlines a social theory of learning extended from situated learning and cognitive apprenticeship research. Four premises summarize basic assumptions in which this social theory of learning is founded. First, the fact that humans are social beings is a central aspect to learning. Second, knowledge is competence in enterprises valued within social contexts. Third, knowing is exhibited through active social engagement. Finally, meaning is the product of learning. Therefore, social participation is the focus of this theoretical conception of learning. As such, it is characterized by four key components: 1). Meaning – the way that the learners experience the world as meaningful, 2). Practice – the way that learners sustain mutual engagement, 3). Community – the way learners define enterprise as worth pursuing and the way we recognize competence, and 4). Identity – the creation of a personal history of ‘self’ within a community. Wenger’s social theory of learning informs and directs a view of situated learning of students in a cognitive apprenticeship model and informs the

analysis of identity in the making. Borko and Putnam (1998; Putnam & Borko, 2000). put forth a comprehensive overview of contextual learning and the preparation of teachers in the current literature. These researchers state the importance of designing pre-service teacher education programs that incorporate the situated, social, and distributed facets of cognition. They suggest several strategies for the creation of authentic activities that encompass these aspects of cognition. They cite cohort based programs as a tool for building discourse communities to support the social and distributed nature of cognition. The development of school based teacher education programs also receives their support as a means to enact inquiry and reflection. Professional development schools are associated with both the preceding strategies as well as with research and the development of practicing professionals. Implementing cohort based, school based methods or professional development schools require significant effort and collaboration between the university and the k-12 schools. Although acknowledging the fledgling status of situated perspectives, these researchers make three key recommendations: 1). Teacher education should be situated in multiple settings. 2). Teacher education should utilize the establishment of discourse and learning communities. 3). Teacher education should be attentive to the tools of inquiry and reflection (Putnam & Borko, 1998; Borko and Putnam, 2000). In a case study utilizing situated perspectives in teacher preparation, Borko and others (2000). concluded that if conceptions of teacher learning and a vision of reformed practices are shared there is a positive impact on teacher preparation (Borko, et. al., 2000).

Identity

Identity is a shifting, non-static event where individuals are both the object of and the agent of the creative process (Hollingsworth & Miller, 1994; Kondo, 1960, as cited in Bianchini, Cavazos, & Helms, 2000). While identity is a subject of study in psychology, philosophy, sociology, anthropology and education, there is no consensus on the meaning of identity (Bianchini, Cavazos & Helms, 2000). Researchers tend to focus only on the aspect(s) of identity relevant to their particular research interests and question(s).

Therefore, the picture of identity that emerges from an overview is complex, intermingled rather than layered, and necessarily subjective in point of view. Hollingsworth & Miller's (1994) choice of phrasing, "messy intersections and collisions," expresses the sort of conceptual structure that is familiar, even central, to social constructivist thinking.

Examination of research dealing with teacher's professional identity shows these intersections and collisions occurring within the multiple contexts of the larger social / political culture, within personal biography, within the culture of schools, and within realms of experience with teaching.

The way that the culture at large identifies professionalism in field determines how power is negotiated and allocated to the profession by determining the rewards of the profession and mediating entry into the profession. Socio-cultural collisions arise in three competing discourses that shape the view of teaching as a profession. These are the traditional view, the managerial view or the democratic view. The traditional view of professionalism holds the concepts of knowledge, autonomy and responsibility as being central to professional practices in order to respond to complex and unpredictable situations (Furlong, et al, 2000, in Sachs, 2001). The first of the reform views, managerial

professionalism is apparent in much of the language employed by the political / bureaucratic language of reform, which echoes a business management view of education. This managerial professionalism, embodied by product accountability, performance, and standardization, arises from an entrepreneurial view of education by society (Sachs, 2001). This view aligns with the industrial model of social reproduction that dominated the first half of the twentieth century and serves some of the same purposes within society by seeking efficient and economic systems geared toward production of a uniform and utilitarian product. The political validation of vouchers, home schooling, privatization of education, pay for performance, and other competitive marketing type schemes reflect the movement of society toward this managerial model of professionalism. This view of professionalism is propagated by the universalist idea that all organizations are basically the same and by the isomorphic idea that commercial models are the natural form for organizations and that public service models are deviant (Clarke, 1995, as cited in Sachs, 2001).

Sachs (2001). suggests that the second reform view of professionalism, termed democratic professionalism, arises from internal views of educational reform. Democratic professionalism is propagated on inclusive, demystifying, liberatory principles that promote collaborative, cooperative action between teachers, students, parents and communities (Apple, 1996; Preston, 1996; in Sachs, 2001). How the culture at large defines the professional profoundly shapes the parameters of professional identity. The managerial view of professionalism is dictated by policy imperatives which are market driven. The resulting entrepreneurial identity becomes fixed within individualistic, competitive, regulative, well-defined parameters. Conversely, an activist identity results

from the democratic view of professionalism. This view of identity is set amid critical reflection and idealized values of democratic empowerment and inclusion, never becoming fixed in addressing social issues mired in ambiguity and uncertainty (Sachs, 2001). The cultural concepts of professionalism and the identity that they entail must be negotiated within an existing personal biography (Bullough & Gitlin, 1995).

Personal biography includes the ideas of “self” or “self concept” that have been formed through the primary socialization of the family and re-formed through the multiple secondary socializations of personal history (Bullough & Gitlin, 1995; Beijarrrd, Verloop & Vermunt, 2000). These complex socializations produce various beliefs and images that impact the development of professional identity. Recent research emphasizes the importance of recognizing and examining the beliefs, values, and images based in personal history as the starting point of forming a teacher identity (Hawkey, 1997). Childhood images of teachers, in both formal and informal learning, stamp the beginner’s ideas about teacher identity. Diverse images of the teacher as nurturing or controlling, as authoritarian or authoritative create possibly false but powerful dichotomies (Weber & Mitchell, 1996). The role of teacher is already defined on the basis of prior relationships with teachers and understandings of teaching formed by individuals as learners (Bullough, Knowles & Crow, 1992). The way in which the individual has defined the role of teacher reflects both their lived experiences of learning and the socio-cultural casting of the teacher’s role(s). Together, these constitute the starting point for building teachers professional identity.

Personal history is also a present process, continually augmented and reformed by lived experience. As such, beginning teachers must negotiate at least three sources of

identities into self as teacher: 1). Previous identities (multiple personal identities). 2). the identity developed while doing university work (a pre- professional identity)., and 3). the identities that they develop while doing student teaching (the beginning of teacher professional identity) (Sumara & Luce-Kepler, 1996). Sumara and Luce-Kepler explored the negotiation of these identities through the use of John Dewey's (1902/1956, as cited in Sumara & Luce-Kepler, 1996). The Child and the Curriculum as a format for journal-style reflection. These researchers describe three domains of identity that must be negotiated by beginning teachers. These are, the identities that they bring with them into teacher education, the identities that they develop during course-work and the identities that they develop during practice. The researchers found that whatever degree of dissonance exists between these domains of identity must be either negotiated and resolved into an authentic identity or suppressed beneath a fictive identity, superficial identity of role playing without internalization and resolution (Sumara & Luce-Kepler, 1996). Research has shown that these processes of accommodation or acculturation have a major impact on useful, transferable learning (Cobern, 1993). Thus, a picture of teacher identity is bounded by a person's biography which is itself bounded by social and political culture. Notably, two of the three domains of identity to which Sumara & Luce-Kepler (1996). refer are framed in the context of school culture. Furthermore the subculture of schools overlays a large portion of a teacher's personal biography and the identities that they bring with them into teacher education.

The culture of schools impacts the personal history of teachers at many levels. School is where the self-identity that is formed in the family during early development is impacted by the larger social culture's organization and expectations, without the

immediate filtering of family interpretations. As such, schooling greatly expands the lifetime negotiation between one's self perception and self image as reflected from others. Taking on the roles assigned by others provides an ongoing data source for informing an individual's internal conceptualization of self (Bullough, Knowles & Crow, 1992). Through participation in schools one begins to regularly and directly access this data source. Nias (1989, as cited in Bullough & Gitlin, 1995). refers to the internal self as the core identity and the socially negotiated self as the situational identity. The situational identity developed within the context of school culture may be a significant element in the emerging identity of the teacher. The culture of schools will overlay their professional experience similarly to the ways in which it overlays their personal biography. The situational identity developed in schools may be seen to inform the images of teaching constructed by the pre-service teacher. Weber and Mitchell's (1996). study examined the explicit images of 'teacher' in drawings produced by pre-service elementary teachers. The drawings and the journal reflection on the drawings revealed the tensions and ambivalences surrounding their beginning teacher identity (Weber & Mitchell, 1996). Furthermore, prior concepts about teaching and learning may be modified through interaction with the identity formed in a socially negotiated situation (Cole & Knowles, 1993). These prior images, subject to socialization, predicate the development of teachers' professional identity (Cole & Knowles, 1993; Weber & Mitchell, 1996; Hawkey, 1997).

Beijarrd, Verloop & Vermunt, (2000). studied eighty secondary school teachers' perceptions of their roles as subject matter experts, pedagogical experts, and didactical experts. Each of their participants had 4 or more years of experience as teachers. They

found that the teachers' reported significant changes in their perceptions of their identity over the length of their experience. They concluded that the situational identity developed in the context of school culture is greatly expanded through the experiences of teaching and learning to teach. These experiences include the initial understanding of the teacher's roles and the understanding of the teacher's role that develops, on an on-going basis, through practice. In other words, students of teaching enter with an understanding of what content mastery, what technical teaching skill, and what relational skill they expect teaching to require, based on their thirteen plus years of personal history with teachers and learning. To this understanding of a teacher's roles they added new data gained through the new situation of being seen as a student of teaching (Beijarrd, Verloop & Vermunt, 2000).

As previously stated, much of our conception of self originates from seeing ourselves as others see us (Bullough, Knowles, & Crow, 1992). This role taking process establishes a feedback loop where the 'core self' views the situational self through assuming the perspective of the 'others.' (Bullough, Knowles & Crow, 1992; Connelly & Clandinin, 1988, Huber & Whelen, 1999). Huber & Whelen (1999) use Connelly and Clandinin's elegant expression of teacher identity as being a "story to live by" and add that the act of telling this story changes the storyteller. Extending this analogy along the lines of Bullough, Knowles & Crow's (1992) role taking comments, this story is also changed by the 'others' involved in telling the story. Therefore, both the situation and the 'others' involved in teaching influence and shift the initial teacher's identity (Friesen, Finney & Krentz, 1992; Bullough, Knowles & Crow, 1992). The "others" that influence

the developing teachers' professional identity are the students, the school as an entity, and the members of the community of practice.

The struggle with and experience with students and subject matter shapes the professional identity of the beginning teacher (Feiman-Nemser & Remillard, 1995). The landscape of the school influences the relational context of teaching and in turn, the teacher influences the school landscape (Huber & Whelen, 1999). Huber and Whelan's two year study revealed that the gaps and contradictions that a practicing teacher must negotiate arise both within the classroom and outside of the classroom in the larger context of the school (Huber & Whelen, 1999). Thus, the teaching identity is shaped differently in different situations. For example, teachers of at risk students experience unique identity shaping experiences that points them toward a strong advocacy role (Friesen, Finney & Krentz, 1999). This situated understanding of professional identity is largely mediated through communities of practice.

Human development is often categorized through either biological maturity or social role assumption. Certainly as adults, development is most often characterized by the assumption of social roles. In this regard, Stephen Billett (1998, p. 21). proposes that "Transformation and development of adult knowledge is secured through social practice" Indeed, a central tenant of constructivist theory is that individuals are meaning makers. Through co-participation in various communities of social practice meanings are shared among individual participants and recursively revised (Billett, 1998). The developmental view of adult social roles has significance relative to professional identity, since it is as adults that professional roles are pursued, developed, and practiced. Communities of practice are said to hold the invisible key to success by providing a venue for the

swapping of trade secrets. (Stewart & Brown, 1996). Hence, the way that new participants are allowed to practice and the support that they are given to make their participation successful are powerful determinants of how they perceive themselves within their new social roles (Billett, 1998).

Dannels (2000). studied the overlapping roles in the community of practice of senior engineering students involved in a capstone design sequence. She found that the overlapping roles in communities of practice provide both audiences and goals for professional performance (Dannels, 2000). Identity mirrors practice through the forming of a community of practice in five distinct ways. Communities of practice: 1). creates a venue in which to negotiate experiences through interactions with others; 2). provides a set of members against which one can compare and contrast identities; 3). provides a learning trajectory that allows past and present experiences to direct future projections of identity; 4). provides a nexus for reconciling overlapping roles and experiences; and 5). provides a mode in which to establish the necessary relationships between global and local ways of belonging (Wenger, 1998; Sachs, 2001).

These parallels between participation in communities of practice and identity negotiation provide the key to positioning a study of identity. Teachers' professional identity is bounded by the multiple domains of political/social culture, personal biography, school culture, and experiences with teaching. This complexity understandably leads investigators to choose limited aspects of identity as they pertain to particular questions. However, by defining the multiple and overlapping communities in which teachers are members and by looking at teachers' professional identity development as it is situated in and facilitated by participation in the social practice of

teaching and learning communities, the potential exists to greatly augment the present understanding of this process.

Ultimately, teacher identity emerges in a parallax view, shifting with any viewer's examination. Though understanding teacher identity is an amalgam of interactions, this shift is seen as more than just the viewer's perspective; it is also an authentic shift because of on-going interactions. A phenomenon of this sort is somewhat analogous to Heisenberg's uncertainty principle concerning atomic theory. This principle states that it is not possible to know with entire accuracy the position and momentum of an atomic particle because the very act of determining the position puts energy into the system that simultaneously alters the position. Scientists have to settle for close approximations to the position of particles. This can be seen to be true for those who study identity also, since, in the process of examining, the examiner becomes part of the complex interactions underlying identity. Whether it is self-examination or examination by another, the examination process impacts the system of interactions, thereby shifting the identity to some degree.

Wenger's (1998). five dimensions of identity development as parallels to practice provide a way to approximately locate teachers' professional identity, an internal construction, through observable social actions and interactions. With these dimensions as a guide, the study of the learning and teaching practices of pre-service teachers as they first gain experience in the teacher's role has the potential to provide a vital window into the process of their professional identity development.

CHAPTER 3

METHODOLOGY AND METHODS

Epistemological Framework

The researcher held a social constructivist epistemological framework, subscribing to the view that knowledge is subjective in nature and that knowledge is filtered through the means of its social use and acceptance. This epistemological stance placed the researcher under certain obligations. The subjective nature of knowledge required that the researcher explore and expose her own subjectivity and bias. Furthermore, the researcher entered the social context of the participants during the research in several ways and thus became a part of the social context upon which the use and acceptance of knowledge was founded. This intermingling of the researcher into the social context of the research had to be acknowledged, defined, and held within limiting boundaries through the research design.

Researcher Subjectivity and Bias

Three activities in the researcher's participation as a graduate research assistant in science education established the bias under which this study was formulated and carried out. Two of these activities originated from transcribing research interviews for the professors of the science education department. These transcriptions included interviews of science education students at the University of Georgia on the topic of multicultural science education, and case presentations and interviews of students

participating in a teaching internship at a Philippine university. The third activity was the review of a research study in an initial qualitative research course.

During the student interviews concerning multicultural science education, students had voiced frustration with the recurrence of the topic of teaching for cultural diversity in several of the required education courses and frustrations with the nature of the discussion. According to several of these students the repetition of the topic of multicultural education had already effectively stressed its importance. The further discussions of multicultural education pertaining specifically to science were perceived as redundant; more importantly, students complained that none of the multicultural education lectures and readings had told them how to accomplish multicultural inclusion. They complained of being told over and over that it was urgently necessary to do a thing, but not being taught how to do it. It sounded familiar to the researcher from listening to her own high school students when they would be frustrated when trying to make the shift from content knowledge to critical thinking. The demand for concrete instructions on what to do and a fool-proof set of steps to follow or a list of answers seemed to be the same. This had directed the researcher's thinking toward the abstraction of teaching practices.

The interviews of the teachers in training in the Philippine University were steeped in the fully contextualized practice of teaching. These student interviews did not voice the same frustrations. Certainly, they were culturally conditioned not to voice frustration in the overt way that the American students did, and this might account for much of the difference in the tone of these transcripts. Still, the students' seemed to be more secure in their efforts to learn by enacting teaching than the University of Georgia

students had been in dealing with the theoretical concepts of teaching. This caused the researcher to bemoan the demise of teaching laboratories in university sponsored lab schools. However, with so much difference between the cultures of these two sets of students, no real connection was made in the researcher's mind.

A third influence framing the researcher's bias had come from the course introducing qualitative research methodology. This course had usual, obvious and intended influences on the researcher's developing thinking about epistemology, and one study in particular made a lasting impression, Ways of learning: An Ethnographic Study of the Work and Situated Learning of a Group of Refrigeration Service Technicians, (Henning, 1998). This was the first encounter that the researcher had with research into situated learning. In response to this study the researcher wrote, "The problem of motivating learning, the locus of control and ownership of learning, and the insider / outsider types of multicultural discourse are some significant areas that might benefit from Henning's research. These issues speak to our most urgent problems by linking microsocial practices to macrosocial culture" (Lyon's class assignment, October 19, 1999). Situated learning was mainly the province of vocational training, as it was in this case, and no other part of this particular research base was encountered during the researcher's course work. These impressions were filed away in the researchers mind.

This is the fertile ground that had been tilled prior to the spring of 2000 when the researcher learned of the plans for the implementation of a situated and integrated model of the pre-service science teacher education block of classes. During the first conversation about the impending program the researcher leaped to the expectation that there would be an impact on professional identity based on Henning's findings.

Furthermore, the contextualized learning environment that had been lost with the passing of university lab schools was partially retrievable in this model. Finally, the opportunity for students to move back and forth between theoretical concepts and contextualized practice suggested a way to move them past the expectation of concrete instructions on ‘THE’ way to implement teaching and toward creating multiple ways to implement teaching. The researcher requested and received permission to design and pilot a study on the effects of participation in the situated and integrated block of classes on pre-service teachers’ developing identity.

The ensuing pilot was carried out during the 2000-2001 school year with the expectation that identity would be impacted and that the impact on teacher identity would enable pre-service teachers to move toward informed pedagogical practice. The pilot study had several effects on the researcher’s stance. Foremost among these effects was limiting the expectations of the impact of the program on pre-service teacher identity. It was seen that identity was impacted to very different degrees among participants, and the possibility of no impact or a negative impact had been raised. It had been shown that reviewing literature on situated learning and cognitive apprenticeship was insufficient. An equally thorough study of the literature on identity was needed. Furthermore, the researcher came to doubt the data due to the intrusiveness of the methods employed and to her quasi official status with the university. This cast the seeming indications of changing identity on the part of some of the participants in further doubt. Therefore, the researcher proceeded to redesign the study with far more reservations as to the possible outcome and with less intrusive data collection methods.

The pilot study revealed a need adapt the study design to maintain a fairly distant stance between the researcher and the program in which the research participants were taking part. Specific decisions delineated the researcher's entry into the social context of the pre-service teachers. At the time of the present study, the researcher had no graduate assistance standing. The researcher never observed in any of the high school classrooms except those of the participants. During classroom observations, only passive observation and note taking were employed. All intrusive activities, including conversations with the high school students were strictly avoided. No formal feed back was offered to the pre-service teachers. When they specifically asked for feedback it was turned back to them as a question. Such as, 'How did I do? How do you feel you did?' Likewise, when observing the university class sessions, the researcher maintained a passive note taking role. In small group discussions the researcher occasionally asked questions but refrained from offering opinions or answers to general questions. The questions that were asked were not pedagogically laden. They were of the nature of 'What does he or she teach?' or 'What do you mean?' for the purposes of clarification. Finally, all but one of the interviews took place away from the physical setting of the high school. The one interview that did take place at the high school was to accommodate the needs of the participant. It was hoped that changing the physical setting would further distance the researcher from the social context of the participant's learning.

Context of the study

The community

The County of Rocky Harbor was the smallest county in the state in land area while being, at the time of the study, fourteenth in population at approximately 100,000.

Much of this small land area had been taken up by the flagship university of the state university system. The location of the university had an impact on every aspect of the community. The streets teamed with the traffic generated by the temporary residents, university students. The downtown area had remained vital in this community mainly because of its the proximity to the university. That proximity also had a deleterious effect on the property tax base upon which the local school depended because of the large amount of university land that held tax free status. However, this was offset by the sales tax associated with the active commerce generated by the university faculty, the visitors drawn to the area to attend university activities, and by the consumerism of the students. Consequently the local schools had come to depend on a special options sales tax for much of the building and technology in the schools (ACC Online, 2003).

The university's presence skewed some perceptions of the community. The majority of university students were from relatively affluent middle class or higher backgrounds. The accoutrements of class that accompanied them included automobiles and disposable income. The university students created about a 10% shift in White and African American racial demographics. The recent census showed that the county was about 65 % White, 27% African American 6% Hispanic and Latino and 2% other. However, taking the university students out of the census the statistics realigned to about 55% Whites and 36% African American, although there were still less than 9% other. The city / county webpage referred to the community's socio-economic make up as being 'bi-modal,' consisting of both middle class families and poverty level or below members. Eighteen percent of the citizens were reported as living in poverty; this translated to 27 % of the children under 18 living in poverty (ACC Online, 2003.2003).

The school

Rocky Harbor High School (RHHS). was one of two high schools in a city / county school system located in a town that was economically and socially centered on the presence of the University. Rocky Harbor had been on a block schedule for several years with ninety minute class periods. The 2001-2002 school year was the first year for the approximately fifteen hundred students to attend classes in a new and updated building. These students are served by a faculty and support staff of one hundred thirty-five, of which fifty-four held Masters Degrees, sixteen held Educational Specialist degrees, and five held Doctorates. The Rocky Harbor teaching staff included two teachers with National Board Certification and four teachers seeking national board certification (Principal's Executive Summary, 2002).

Rocky Harbor provided a variety of educational programs under the academic categories designated by the state. These included courses designated as, Advanced College Prep (ACP), College Prep (CP), and Advanced Placement (AP). A majority of students attended ACP classes, which would earn a college prep seal, supporting their reported intentions to attend a college or university. The CP classes could be applied toward a college seal or a career / technical seal. Rocky Harbor offered more AP classes, 13, than any other high school in the northeast part of the state, and some students in these classes were part of joint enrollment programs with local colleges and the university (Principal's Executive Summary, 2002).

Rocky Harbor tracked student achievement through national measures, state measures and graduation rates. The Scholastic Aptitude Test (SAT). was taken by 72% of the students in 2001. Performance on the SAT had remained fairly consistent over recent

years at Rocky Harbor. The RHHS totals for the year of the current study were eleven points above those of the other local high school and twenty two points above the state average total but remained below the national average total by eighteen points. In 2001, 98 students took a total of 198 AP tests achieving a 73% pass rate and Rocky Harbor produced four state merits semifinalist scholars. All eleventh graders take the State High School Graduation Tests (SHSGT). in Writing, Language Arts, Mathematics, Science and Social Studies. The percentage of students passing these tests at Rocky Harbor are within a few percentage points of the state results and they reflect the state trend for the lowest passing percentage to be in science. Finally, the graduation completion rate at Rocky Harbor in the 2000-2001 school year was only 57% with a dropout rate of 13%. The administration credits block scheduling with the fact that more non-graduating students did not drop out. Data on the type of diploma earned by these graduates was unavailable (Principal's Executive Summary, 2002).).

The students

Diversity at Rocky Harbor included racial and socio-economic factors and students with identified special needs. The racial diversity among the Rocky Harbor student population was 65% minority. This percentage was broken down into 57% are African American, 4% Hispanic, 3% Asian and 1% multiracial. This diversity has been fairly constant in recent years although the school population was nearly 10% mobile in any given year. Approximately 14% of the students were identified as having special needs. These included specific learning disabilities, emotional and behavioral disorders, mild, moderate, severe and profound intellectual disabilities, autism, vision impairment, speech and language impairment, and orthopedic or other health impairment. Students

identified as gifted made up 12% of the Rocky Harbor student body and were served in the ACP or AP classes to which all students have access. The socio-economic diversity of Rocky Harbor reflects that of the 'bi-modal' community make up, where approximately 27% of those less than eighteen years of age live at or below the poverty level. The number of students specifically on the free or reduced school lunch program was not available in the Principal's status report (Principal's Executive Summary, 2002).

The program

The program under study was an integration of university courses in science curriculum, methods, and practicum. These courses constituted a block of classes that pre-service science teachers must take concurrently prior to their student teaching semester. In this integrated design, credit hours, attendance hours, and assignments were melded into one set rather than three discrete sets. Furthermore, the classes were moved off of the university campus and onto the campus of Rocky Harbor High School, which was located near the university. Another of the innovations of the program was the multiple and overlapping roles of the interns, teacher-mentors, and university educators.

The science teachers at RHHS and the UGA pre-service science teaching interns and faculty were all White and predominantly, though not overwhelmingly, female. There were eleven science teachers, five White males and six White females, in the Rocky Harbor science department at the time of the study. Ten of these science teachers accepted two or three interns each into their classrooms. Although the eleventh teacher did not accept interns into his classroom, he did participate as a presenter in the university class and as a consulting mentor. The pre-service teacher cohort was fairly large, consisting of 24 students, 15 females and 9 males. One of the students was a South

African, the other were all American born. The two university professors were White, one female and one male, and the graduate teaching assistant was American-born Chinese.

The Classroom Context

Most of an intern's time on the Rocky Harbor campus was spent in the classroom of their specific mentor or in the science department work room that had been designated as the university classroom. The RHHS science department faculty had input into the layout of classrooms during the planning of the new building that they had moved into in January of 2000. The science classrooms were laid out with lab stations around the periphery of the room and a well of student desks in the middle. The lab stations were the waist high, all purpose type stations with plumbed in gas and sinks, and storage underneath, suitable for physical or life science labs. The classrooms were rectangular and each room had a lab demonstration table at the front of the room and a work room / stock room adjacent to the main classroom, windows along at least one wall, and a computer for the teacher. This planned layout indicated a departmental vision of what student science learning should be. The access to activity specific work space, natural light and openness, and individual stock and lab preparation areas demonstrated a vision of science learning as open, collaborative, and activity oriented.

The three classrooms specific to this study had each taken on the imprint of the teacher and had developed an individual atmosphere. In Ms. Howard's classroom, the teacher's demonstration table and the windows were opposite of each other at the narrow ends of the room. Viewing the room from the perspective of the demonstration table looking toward the windows at the far end, there was a poster of the periodic table on the

wall beside the stock room, to the right of the demonstration table and on the opposite wall there was a poster of laboratory safety rules. The door to the hallway was to the left of the demonstration table. There were no plants, displays, or bookcases and the blinds to the windows were down and partially closed. The overhead projector was on a small table on the left side of the demonstration table with a pull down screen opposite it on the wall over the left end of the White board. The faucets of the demonstration table were in the line of sight of students viewing the screen from the left half of the room. On the right side of the demonstration table there was a teacher's desk and computer. All student desks were positioned to face the front of the room. This room had a very utilitarian atmosphere. Although there was not an excess of space, the room seemed a little vacant, as if the periphery of the room was extraneous.

Mr. Blair's classroom was also oriented lengthwise, with the demonstration table along the long side of the room. The door to the hallway was on the end of the room to the left of the demonstration table and the windows were on the end of the room to the right. The blinds to the window were raised all the way up on some days and down but open on others. There was a book case under one window with a variety of illustrated reference books available to students. There were plants on the bookcase and several posters around the room and a large periodic chart. The bookcase also supported 'in' and 'out' baskets for student work. The three solid rows of student desks extended across the room, making it difficult to reach some students without disturbing others. The overhead projector was centered in front of the demonstration table and the pull down screen was centered in front of the White board. This arrangement did not block the view of any of the students. The teacher's desk and computer were left of the demonstration table and

the stockroom door opened behind and to the right. This room seemed to be full, warm, and chaotic, a wall to wall class room.

Ms. Brown's classroom was also oriented lengthwise, but in this room the door to the hallway was on the long side of the rectangle, as were the windows. The teacher's demonstration table was to the left of the door as one entered, with the teacher's desk at the further left, at the side of demonstration table. There were windows on the opposite lengthwise wall and the blinds were raised on all of the occasions observed. The room had anatomical charts on the end walls, as well as posted safety rules and a periodic chart. The student desks were arranged facing the demonstration table with passing aisles on at least one side of each student. There were three lab stations at each end of the room. The overhead projector was centered in front of the demonstration desk opposite of the pull down screen above the Whiteboard. This class room felt open, active, and academic. It seemed to be a very functional, open work area. The impression was not so much warm, as it was academic and comfortable, and fully used.

The common meeting ground of the participants with their peers, instructors, professors and graduate assistants was the science department work room. This established a subtle but not insignificant message about their place in the professional community of practice. The break room was a large open room on the internal side of the hall way adjacent to the band room. There were both round and rectangular tables arranged informally around the room. There was no designated 'front' of the room except possibly the entry. There was no White board or overhead projector and screen. This was distinctly not a classroom; rather, it was a faculty room, a place off limits to students. Having been designed as a work room, it had cabinets, a microwave, and a wet sink along

the outside wall and a bathroom along the inside wall. The overall implications were that, the people in this room were faculty and information in this room was shared rather than taught. The activities in this room were focused on teaching the students at Rocky Harbor High at least as much as it was teaching the pre-service teachers the methods and curriculum of secondary science.

Design

This interpretivist case study constituted a grounded theory of pre-service science teachers' conceptions of self as teacher (Strauss & Corbin, 1990, Crotty, 1998). Four strategies of grounded theory defined the methodology of the current inquiry. Primarily, the collection of data and the analysis of data were simultaneous events. Therefore, the on-going analysis informed subsequent data collection. In this way the research remained true to the premises of constructivism and symbolic interactionism by allowing the reciprocal relationship between data and analysis to direct the investigation. Further, the processes of data collection and analysis were allowed to evolve from the data. Third, comparisons between data sources and setting directed and refined emerging categories and themes. Finally, theory development was viewed as a formative process rather than as a summative process with useful interpretation having been a defining characteristic (Charmaz, 1994).

Participants

The literature on identity indicated that new learning and experiences were interpreted within a complex background of personal and cultural experience. Accounting for this complex background would call for detailed ethnographic study of

the participants. Although this was not the purpose of the current study, some sort of allowance had to be made for the diversity of personal biographies that the participants brought to the experience. These personal biographies determined both the starting point of the participants' concept of the teacher's role and the tools or the "lenses" through which they viewed themselves, their teachers, and their students. Therefore, some range of personal biography was desirable. This range was sought on the basis of gender, educational preparation, school experiences, and their responses to a brief initial interview of their professor.

Initially, two male and three female students were approached as possible participants. They were chosen without the researcher having met them, based on the notes taken by Dr. Oliver, one of their professors, during an intake interview. They were chosen on the basis of apparently diverse backgrounds and their expressed variety of motives for being in the program. During brief conversations outlining what would be required of participants, each of these candidate was willing to participate in the study. One of these female candidates was approached because, as a South African, she represented the only culture that was not White American. However, after talking with her it was apparent that her socioeconomic status and position might not be particularly different than that of a White American, as had been hoped. Furthermore, she had certain chronic health problems that might interfere with consistent attendance and participation. This candidate was eliminated. Another female candidate had more extensive vocational teaching experience than was apparent from her intake interview. She was eliminated on the basis of having a set professional identity that was likely to be un-malleable. However, she had a co-intern, that is, an intern assigned to the same mentor, who came to

the researcher's attention during a visit to the classroom. This student, Helen, was willing to participate and her intake interview indicated that she had thought of being a teacher off and on from childhood. The early roots of her teaching identity were intriguing and she was recruited as a study participant.

Similarly, the South African candidate had a female co-intern, Kate, which came to the researcher's attention. Kate held a bachelors degree in biology and was returning as a graduate student in science education to enter the teaching profession. This biographical setting was very different from Helen and yet they would both be establishing their first professional stance as teachers. Thus, with Helen and Kate recruited, the task became recruiting a male candidate. The male that was ultimately recruited was Trevor. He was a true undergraduate, like Helen, but with a much more recent idea of himself as a potential teacher. Furthermore, unlike either Helen or Kate, he identified himself at his initial interview with Dr. Oliver as a potential coach.

The resulting field of participants consisted of Helen, an undergraduate with a childhood image of herself as a teacher; Kate, a graduate who returned to become a teacher after having tried a couple of different entry level careers and found them dissatisfying; and Trevor, an undergraduate who thought of teaching as a career after becoming discouraged with the pre-med program. These three White middle class participants were lacking in cultural or economic diversity, as many of the present cadre of American teachers are. Although the full diversity idealized in planning the study was not available, there was gender diversity and, more importantly, there was distinct diversity in personal and school biographies and in the origin of their idea of themselves science teachers.

Data collection

Data were collected through interpretive research methods including interviews, participant observations and examination of work products and of student journal entries. The data were focused on revealing the ways that pre-service teachers were developing his/her conceptions of self as teacher through looking at their participation in the community of practice. Wenger pointed to five distinct ways in which participation in a community of practice paralleled the development of identity. Communities of practice:

- 1) Create a venue in which to negotiate experience through interactions with others;
- 2) Provide a set of members against which one can compare and contrast identities;
- 3) Provide a learning trajectory that allow past and present experiences to direct future projections of identity;
- 4) Provide a nexus for reconciling overlapping roles and experiences; and
- 5) Provide a mode in which to establish the necessary relationship between global and local ways of belonging (Wenger, 1998).

These parallels between participation in communities of practice and developing roles provided the key connection between the data collected and the purpose of the inquiry. These five parallels were employed as a way to access the participants' changing understandings of self as teacher. Wenger's (1998). points 2-5 guided the follow-up questions used in participant interviews. Specifically, issues which arose in the format of main questions or in the participants' initial replies to the main question were fleshed out in follow-up questions that encouraged comparisons between the participants' own

intentions and actions and their perception of the intentions and actions of others in the community of practice. Likewise, participants were asked to make comparisons between their initial teaching practices and later teaching practices and to predict their future practices. Seeming contradictions between ideal practice and actual practice or between the roles of the teacher as accepting and nurturing versus rigorous or disciplinary were specifically probed. The final parallel, the establishment of a relationship between global and local ways of learning, focused on the participants building a relationship between the local ways of learning that they brought into the program from their own school biographies and their attempts to relate those ways with the more global concepts of learning as presented in the science education program. Also, discussion of any contrast between pedagogy as taught in the university context and pedagogy as practiced in the specific venue was utilized as one way to get at global versus local ways of belonging. Identifying this potential for dissonance was sought as a way to explore the social space for identity development in which identity was developing. Finally, the key parallel for this study was to analyze all the data for negotiations between and among the participants in the community of practice.

Two ninety minute planned interviews were carried out with each participant during data collection. The first interviews were performed in early October and the second in early November of 2001. Likewise, two planned observations of a full ninety minute class session were carried out for each participant in his / her classroom. One of these occasions was when the participant was leading the teaching and the other was when the participant was supplementing their mentor teacher's instruction with one-on-one or small group interactions with students. Additionally, several shorter unplanned

observation visits were paid to the participant's classroom and several informal conversations were held after these visits. Following these visits and conversations, key points and topics were noted. Also, two full sessions of the university class meetings were attended and observed. All of the participants' written work was read and particular attention was paid to their journals.

The student journals entries were a vital source of data. The journals were the first assignment that the pre-service interns were given. Beginning on the first day of class and continuing throughout the semester they were to write a journal entry for each of the three days a week that they attended the methods block of classes. Interns received a written description of the journal assignment and a scoring rubric for the assignment as a part of the course syllabus (see Appendix A). The syllabus also contained the scoring rubric for the journal assignment (see Appendix B). The journal assignment constituted 20% of the interns grade and the journals were periodically collected and read by University faculty or the teaching assistant. The interns received feed back from these readers in the form of margin notes. These margin notes took the form of posed questions, offered insights, or affirmations of the interns reflection. When the journals were collected for these periodic readings, they were made available to the researcher for copy. All of the journals were copied as a safeguard against omitting information that might later be needed. Only the 8 copied journals of the study participants and of the co-interns in their high school mentor's classroom were read by the researcher. In this way, the researcher was able to obtain an overview of the methods block activities being experienced by the participants. Only the journals of the participants' journals constituted data; however, the journals of their co-interns provided a more complete context in which

to view the participants data. The rubric was designed to direct reflection on the activities of teaching across the three domains of knowledge, affect, and action (see Appendix A). Wallace and Oliver found that the topics of the journal entries were persistent over the journaling period but that the focus of the students' interest within those topics progressed away from technical concerns and toward more personal concerns (Wallace & Oliver, in press). The assignment guidelines and the scoring rubric that the interns received could have influenced the data that were available from this source: however, the data that was captured did not follow the journal matrix.

In the current study, the journal reflections of the pre-service teachers allowed the researcher to hear the participants' interpretations of their experiences in their own words, thereby allowing on-going analysis and final analysis to remain closer to the data. The journals also anchored cross-data comparisons with observational data and interview data to reveal the impact of some experiences by contrast. For example, all of the participants were willing to discuss some things in response to interview prompts that they had not discussed in their journals. Likewise, some observed activities that were not commented on in the journals could be specifically probed during interviews for illumination. Thus, the journals allowed the researcher entrée into the participants' silences and afforded an opportunity to disrupt those silences (See Appendix C for a typical journal entry with open codes).

The final data collected came from brief interviews of the participants during their first year of teaching. A contact leading to a telephone interview was attempted with each of the participants one year after the initial interviews. Two of the three participants responded to this contact and one of them passively avoided several attempts. The third

participant was finally interviewed in person about six months after the first attempts to contact her.

Analysis

Analysis was ongoing. Journal writings were read periodically with notes being taken of which particular concerns and interactions merited the participants' comments in the journal. This analysis formed the basis for interview probes. Previous notes and interviews were re-read or tapes listened to prior to subsequent interviews, forming the basis for further probes.

Prior to creating the coding scheme, interviews were transcribed and the participants' daily journal entries and other written artifacts were read multiple times (Strauss & Corbin, 1990). The first set of open codes was developed as margin codes based on who the participant was reporting about, what activity was being reported, what the affective tone was, and the spontaneity of elaboration. The emerging axial codes included, planning, teaching, observing, collaborating, consulting, participating in critique, attending lectures, completing assignments, and participation in discussions. The final selective codes were built around the participants' interactions within the community of practice. These codes were developed as interactions with specific roles in the community of practice. In this regard the community of practice included the university professors, the mentor teacher to which they were assigned, the mentor teachers participating in the program but not assigned to the participant, peer interns (other interns in the cohort, but not sharing the same classroom assignment), co-interns (other interns sharing the same classroom assignment), and high school students in their assigned mentor's classroom. This coding scheme was seen to encompass the data and to

fit with the theoretical perspective of social cognition and identity. At this point, one of the interviews was passed to a peer of the researcher, along with a description of the selective codes for a reliability check. The result showed very close alignment between the researcher's coding of the interview and this associates coding of the interview.

After applying selective coding, the researcher reverted to an axial sorting of the data by chronologically aligning data elicited by interviews with spontaneous journal writings and classroom activities. This sort of comparison had been used as on-going analysis during data collection and was applied at this point to fully frame the final data analysis. This axial sorting did not change the selective codes, but chronological review of the data was used to point out inconsistencies, point out concerns raised but never brought to closure, and to connect shifts in the participants' data to particular events. The chronological alignment of data allowed the journal writings of the participant's co-interns written on the same day to be compared. This was done to put the participant's journal data in a larger perspective as a way to reveal their standing and progress in the immediate community of practice.

Threads of data indicating development of further teacher identity that emerged from the various aggregations of initial coded data included: 1) Changes in tone of the writing in the journals and of the interview responses as expressed by the use of positive adjectives, ownership language about students or teaching, and spontaneous elaborations on practices or interactions. 2) the frequency to which participants referenced their comments or activities to particular other members of the community of practice, 3) the choice of events on which they commented in their journals, 4) the amount of detail included in reflections or interview accounts of specific actions or actors observed in the

community of practice, and 5) which actors in the community of practice they sought out for further time or feedback. To find the meaning in these emerging threads, raw data were re-read and coded only for references to the participants' personal or school biography. These biographical data were considered alongside the threads of emerging teacher identity and re-analyzed for continuity and / or punctuating events. A final round of analysis sought to infer answers to the research questions and toward building a grounded theory of the how the teacher identity of the participants was being impacted by their participation in the situated block. The resulting pattern of interplay between selective codes and recursive analysis revealed connections between the personal and school biographies of the participants and the data and linked those connections to specific experiences in the practice community. The following graphic illustrates this interplay with the data.

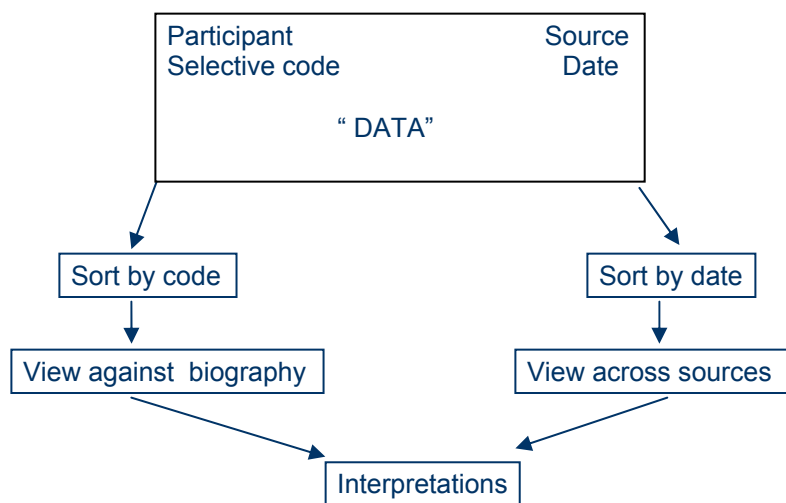


Figure 2: A graphic illustration of coding and analysis.

CHAPTER 4

A STUDENT BEGINS FULFILLING HER DESTINY

Initial teacher identity

Helen entered the pre-service science education block as a fifth year undergraduate in her early twenties who had finally surrendered to her desire to teach in spite of family and peer pressure to, “Get your degree in something bigger and better basically” (Helen’s interview, 10/12/01). She had changed majors three times, evolving through nursing, business, and ecology before moving into secondary science education. However, she stated, “I knew I that I wanted to teach. I always wanted to teach” (Helen’s interview, 10/12/01). The teacher’s role was rooted in her childhood experiences when, as the oldest of five children, she tutored her younger siblings. In relating this early teaching experience, she described having used guided practice as a tutoring method. Of course, she did not have any way of identifying the tutoring method in those terms at the that time. “[Math] That is where I remember really teaching. Showing them [her siblings] and then saying you do 10 of these and then I will come and look at them” (Helen’s interview, 10/12/2001). How did she know to do this to help students learn? “Maybe it wasn’t direct. It was just implied by being a student and having teachers to interact with” (Helen’s interview, 10/12/01). She learned to push her sibling / students toward her expectations, and she learned to tolerate the frustrations they expressed. “I would tell them, ‘If you don’t try I can’t help you.’ So I mean, they would get annoyed but they got it. They understood it by the time I was through” (Helen’s interview, 10/12/01).

Several important clues from Helen’s incoming teacher identity were indicative of the path of teacher development that she would follow through the pre-service block and

into her first year of professional practice. Student / teacher interactions were paramount in her account of early teaching, specifically, how teachers made her feel about learning and about her own abilities. She stated in her initial intake interview with Dr. Oliver that, looking back, she could identify an inspiring science teacher because, “She challenged us, made us want to succeed. She asked a lot of me and I wanted to give a lot back. She really communicated with everyone” (Helen’s interview, Sept.2001). In a more detailed reflection, Helen said, “I can remember being with my high school science teachers. My biology high school teacher, she was just so smart, so confident. I mean she was smart. She came out there and she expected so much from us, and I liked somebody saying I expect you to know more than just this” (Helen’s interview, 11/9/2001).

Dr. Oliver asked Helen what was needed for her to learn to do the same kinds of things that this inspiring science teacher had done. She listed, a positive environment, interactions with students, and the respect of students founded on what she can make learning be for them (Helen’s interview, Sept. 2001). She accounted for much of her own success as being based in her response to the expectations of the significant people in her life. “Here’s the thing, I think that all along I’ve had people who believed in me, ok. I’ve had people who said you’re smart and we expect you to be able, not in a bad way, in a good way, we expect you to know this and this and this” (Helen’s interview, 11/9/2001). She stated, “ So, you know what shaped me is like every positive person in my life I guess has said you can do anything or you can do this or you are smarter, wow, you can do science, that is impressive, or anything like that” (Helen’s interview, 11/9/2001).

The picture of Helen’s initial understanding of teacher identity that emerged from her personal and school biography included the following:

- (1) Students are capable and should be challenged; students will rise to expectations;
- (2) A teacher's confidence in her students will inspire the students toward self confidence;
- (3) Teachers are responsible for creating the students' learning experience;
- (4) Teacher's mastery of content should be such that it inspires the students confidence in her teaching; and
- (5) Student learning has taken place when students demonstrate what they have learned.

This initial teacher identity was founded in her school and personal biography as she understood her role as a student, the role played by both her formal and her informal teachers, and her own initial teaching actions and successes. The description of her early teaching and her speculation that she learned implicitly indicate that she was coming into the situated pre-service science education program well prepared to be imprinted upon by the community of practice.

Helen's interactions with her mentor

At Rocky Harbor High School (RHHS), Helen was placed with Ms. Howard in her ninth grade CP level physical science class. This class was a majority minority class of ninety percent black students. Helen, Ms. Howard and Martha, the other student intern in the class, were all White. This racial imbalance in city schools was not rare. Neither was the double trump of teachers being in authority and being members of the culture of power in such classrooms. Incoming teachers as well as established teachers commonly find themselves in exactly this cultural dynamic and being prepared to teach diverse

students, across cultural and racial boundaries has become a significant part of teacher education programs (Aikenhead, & Jegede, 1999). Helen's science education program had included an emphasis on preparing to teach in culturally diverse classrooms; therefore, she had reason to expect to see this model of teaching enacted in the classroom. Indeed, Ms. Howard's first conversations with her interns revealed several of her conceptions of power dynamics in society as enacted in RHHS. Helen's co-intern, Martha, stated in her first journal entry, "I start my reflective writing with one of the most disturbing problems I think I will encounter this semester" (Martha's journal, 8/13/2001). She proceeded to relate Ms. Howard's dramatically detailed recounting of a conflict from the previous year. This conflict involved a student's rejected late work, several parent conferences, administrative conferences with the parent and Ms. Howard individually and together, and a parent complaint that resulted in an investigation of the teacher by the Department of Family and Child Services. In her detailed recounting of the melodrama, Ms. Howard portrayed the administration in a very bad light, and she portrayed herself as personally and professionally betrayed. Martha and Helen were understandably concerned at the lack of support that the teacher received in spite of written and signed class policies regarding students' late work. However, in her journal, Helen limited her comments on the same situation to, "She is a bit sarcastic and cynical when talking about the students, the teachers and the principal. It left a bad impression to hear her talking about the students (past and present). in a negative manner" (Helen's journal, 8/13/2001). Further reflections from the first days of class show that Helen's relationship with her mentor was not fated to be one of admiration and emulation.

Helen's journals and interviews during August show that students are the meter stick by which she measures Ms. Howard's value as a mentor. Her reflections from this period of time include the following:

- “Ms. Howard obviously knows that these students are not the higher achievers in the school. She has made that fact painfully obvious to us” (Helen's journal, 8/16/2001).
- “Ms. Howard does not expect much of the students. She seems to buy into a stereotype of Black students and has low expectations based on that. Although she works in a school that is mostly Black, she makes racial comments. I don't understand why she is teaching here or maybe anywhere. She doesn't trust the administration, she doesn't like the kids” (Helen's interview, 10/12/2003).
- “Yes, Martha and I both noticed that she actually used the phrase “African American rigging,” at one point (Helen's interview, 10/12/2003).
- ‘Early in the semester there were times that I thought I would have to ask for a different class assignment because of Ms Howard's attitude toward the students’ (Helen's journal, 8/22/2001).

By the ‘student meter stick’ that Helen trusted, Ms. Howard did not measure up and this indelibly tainted all of their subsequent interactions. The mentor's overt and covert self revelations created a lens through which Helen would see little positive modeling.

Through the next two months of work with Ms. Howard it seems that they reached an impasse. Helen commented on only the earliest observed teaching activities of her mentor. She noted that Ms. Howard's agenda for the first day was set on discussion of

rules and procedures. Helen reflected that, “The only thing missing from the day was a discussion about science. There was not an introduction to it or an explanation of different subjects they were going to study. I would have talked about the course subjects to try to instill some interest and excitement” (Helen’s journal, 8/13/2001). Nine days later, she wrote, “Ms. Howard gave a test. I was absolutely floored by her” (Helen’s journal, 8/22/2001). Helen reported Ms. Howard had told her that she forgot to review the day before for the test. According to Helen, seventy five percent of the students had failed a quiz over the material and Ms. Howard did not hand back these quizzes until after the test, which made them useless as feedback for the students. Helen observed that she did not re-teach, or even review on the basis of the quizzes. It was notable that this was the same day that Helen had recounted growing frustration with her mentor’s racism and expressed reluctance to return to this class (Helen’s journal, 8/22/2001). When the test was returned, only six of the twenty seven students had passed. Helen wrote, “When I asked her what she intended on doing about it she told me that she went over the test with them and will give them a quiz again soon. I am flabbergasted. I would have thought that she would have gone back and re-taught the whole unit” (Helen’s journal, 8/27/2001). Helen stopped reflecting much on her mentor after this point in time. Only two more journal entries about her mentor appeared. The first and only positive modeling reported occurred three days after the conversation on test results when Helen observed Ms. Howard give a lecture with notes on the overhead projector. She observed in her journal that the notes were large and bold, that the mentor altered her voice, used relevant examples, moved around the room, and was interactive with the students (Helen’s journal, 8/27/2001). However, this account stood alone in a paragraph, isolated by a line

break that does not appear elsewhere in the handwritten reflections, making it seem like it was almost an after thought. The final journal entry about the mentor is in early September, when Helen taught for two days. On the first day of her teaching she wrote about her lesson, “It was hard to enforce the bell assignment because the kids were not used to having one. Ms. Howard doesn’t have a procedure for starting class” (Helen’s journal, 9/7/2003). On the second day she wrote, “One thing that did bother me was that Ms. Howard did not give me any feedback. Sometimes I wish I had a more involved / interactive mentor teacher” (Helen’s journal, 9/10/2003).

Ms. Howard disappeared from the journal by the time the intern had known her for a month. She only appeared in the first research interview reluctantly and indirectly about half way through the interview in response to probing what she had learned about unit planning. In this instance, Helen responded, “I don’t have much of a picture [of unit planning] from my mentor. She kind of flies by the seat of her pants” (Helen’s interview, 10/12/2003). In the same interview Helen became excited when she responded to a probe about the meaning of the University class assignments. Helen explained that she had found information that contradicted assumptions that had been made about a particular student. The interviewer asked if she and her co-intern had discussed this result with Ms. Howard. Helen replied, “She really has not been interested in anything that we’ve done [for the University assignments], so I do it more for me and for what I am getting out of it. That is why I don’t like to talk about it, because I don’t want it to become an excuse or let it hold me back. I am just doing my thing and trying to figure out from everybody else, and from her as well, different things that I want to do” (Helen’s interview, 10/12/2003). Ms. Howard’s practice entered the November research interview only

twice. Once when feedback from observations was being probed, Helen said that her mentor offers her no feedback until asked and then she says, “Oh it was good. It was fine” (Helen’s interview, 11/5/2003). She also confessed in the same interview that her co-intern and Ms. Howard were more closely aligned philosophically, and that she had disengaged from most discussions to avoid having to choose between confrontations and compromising her own values. She made a final and summative statement of her mentor’s role in her development by saying, “Ms. Howard is not what I would want to be or what I am striving to be” (Helen’s interview, 11/5/2003).

Moving from reflections as an account of activities and observations toward critical reflections in the form of deconstructing and questioning can be problematic. Critical reflection from a novice on the actions of a practitioner can be a difficult point to reach (Ethell & McMeniman, 2000; Bullough, 1989). The poor intern / teacher relationship at the outset may have caused Helen to be less than ready to find positive modeling in her mentor’s teaching activities, but interestingly her initial critical stance set up a venue for critical reflection that encouraged the intern to deconstruct the mentor’s activities, diagnose the outcomes, and prescribe points where her own teaching would diverge. Helen’s situation with her mentor was certainly a high risk situation for her learning. However, she was able to move toward useful critical reflection rather than to become stuck in disillusionment. She made it clear that she did not perceive poor mentoring as an excuse for poor performance on her part. (Helen’s interview, 10/12/2003). Helen’s initial teacher identity was fairly well set by her biography. This certainly helped her to take a critical stance toward her internship with Ms. Howard. Helen needed to look elsewhere to create an assumable professional identity and to assure

that her criticism did not deteriorate into bashing. Interactions with other members in her community of practice provided perspective and served as a springboard for Helen's development.

Interactions with other mentors

Mentor teachers were invited into the university class to teach a particular topic, thus giving all of the interns access to all of the mentors to some degree. The university provided professional observation and feedback on the teaching activities of the interns. Both of these strategies provided by the university program provide an alternative view of professional practice that was very important in Helen's development of teacher identity.

Helen reached out to the resource of other mentors indirectly, through her peer Ann, following the experience of being, 'flabbergasted,' by Ms. Howard's handling of assessment (Helen's journal, 8/24/2003). Ann had many good things to say about the things she saw going on in her mentor's classroom, so Helen asked Ann how her mentor handled post assessment. Paraphrasing Ann's reply, Helen wrote, "Dr. Case had given a test to her chemistry II class and they had not done as well as she expected them to do, even though all the students passed the test....She asked the students what she could do to help them learn the information better. To my surprise she got some really good answers from the students....I know I will take this technique with me" (Helen's journal, 8/24/2003). On the same day she attended a presentation by Mr. Jones and Ms. Allen on classroom management. She wrote that it is a good idea to have the teachers come in, commenting that it provides an array of material from which to draw ideas. She writes, "I also like the packet they prepared for us. There are a number of suggestions and concepts

in there that I will use in my classroom. I will have a starting point and something to refer to” (Helen’s journal, 8/24/2003). The juxtaposition of events was the telling point in these entries. On the same day that she is, ‘flabbergasted,’ by Ms. Howard’s practice, she picked up a technique to fill this gap from Dr. Case via an intern, viewed a presentation she valued, and received a concrete resource for alternatives to meet a particular classroom challenge. This enabled her to make the positive, confident statement, “I have a starting point...” (Helen’s journal, 9/24/2003). Helen quickly began to fill the gap left by a poor mentor / intern relationship and also began to tap into the opportunity to develop her own professional identity from an array of professional practices and philosophies.

These interactions within the broader community of practice did not fade from her reflections over time as the reflections on interaction with her mentor did. While she took favorable note of the presentations of other mentors on several subjects and continued to be delighted with the many resources that she was building from their shared work, the greatest impressions appeared to be made by Dr. Case’s presentation on unit planning. “I loved this lesson. It is so important to see other teachers’ ideas because there is always room for improvement” (Helen’s journal, 9/21/2001). After viewing Dr. Case’s unit plans, she proclaimed that this was her goal for planning and organization (Helen’s journal, 9/21/2001).

Helen was conservative in her comments about mentoring during interviews. She stated that she felt unfortunate in her mentor assignment for reasons of personal philosophy, organization, and classroom management, but clear in her search for input from observing other mentors (Helen’s interview, 10/12/2001). “Even as far as classroom

set up. My [mentor's] classroom has very little that has been done to make it comfortable and intimate. When I go into other classes they have book shelves, pictures, plants and all kind of things. First day, you walk in and people are going to know that I care about this place and I am choosing to be here" (Helen's interview, 10/12/2001). Direct probing of the differences in practice among various teachers and their effect on her as a teacher elicited a series of replies that were very revealing of the particular value that multiple role models have for Helen.

- "I was so jealous of the other student interns and how they would say they had such incredible mentor teachers. Because I'll tell you, the teachers that have come in, I have been so impressed by them and I was like, wow, how unfortunate I am in this situation where I am not getting perhaps the best example. But I'll tell you, it has been a good learning experience for me, to be on this end of it and then be able to go and observe these other teachers and think, "Well, that's me, not this" To kind of see both ends, has helped me to see where I want to be" (Helen's journal, 10/12/2001).
- "So, I think that this helps me in seeing the other teachers strive for something. I see, if I go about it this way, this is where I am going to be, if I go about it this way, this is where I am going to be" (Helen's journal, 10/12/2001).
- "I kind of know different attitudes, different styles of teaching, different approaches and I know how I feel about them. What I consider good and bad. I don't know all of them by any means but I have a starting point" (Helen's journal, 10/12/2001).

- When Helen tries to imagine having only one mentor and one classroom available she replies, “Um um. I [would] go into student teaching unprepared. Especially if I have someone like Ms. Howard because, I don’t know the other ways to do things. I haven’t seen them in action and I haven’t heard teachers talk about what they do and why they do it....That would have been a very bad start” (Helen’s journal, 10/12/2001).

So, given the multiple roles, which would she use to pattern herself as a teacher? “The best of all of them” (Helen’s journal, 10/12/2001).

During November, Helen visited some of the other classes and again she focused on the mentors’ modeling in areas in which she has been critical of her own mentor. After visiting Ms. Brown’s Biology II class Helen wrote, “The respect is mutual and unstrained and this allows the class to run smoothly” (Helen’s journal, 11/9/2001). She also visited the class of her first identified goal setter, Dr. Case. Helen wrote, “Dr. Case does a wonderful job. She is smiling as she welcomes her students. It is obvious that she really knows her students and that her students are very comfortable talking to her” (Helen’s journal, 11/14/2001). Helen believed that this was attributable in part to Dr. Case’s preparedness. “If a teacher comes to class unprepared and unorganized and rushed then the students will have no respect for the teacher. The classroom would not be a place of active learning” (Helen’s journal, 11/14/2001).

Helen’s use of other mentors developed from a conscious effort to fill the dissonance that she experienced between her initial understanding of teachers’ identity and the identity that her mentor communicated. Her search for mentoring was focused on evidence of success with students. This anchoring of learning in student evidences also

extended from her initial understanding of teaching. Furthermore, she brought forth her definition of student success from her initial teacher identity where she understood that success occurred when students reflected the confidence and the challenge that the teacher put forth or they “got it.” Measuring mentors by these standards of success, Helen was able to utilize several other mentors to selectively fill the gaps that she faced.

Interactions with peers

Helen’s interactions with peers played an increasingly larger role over time, as the interns came to know each other’s mentors, their content areas, and the student populations of each others’ classes. The first two specific references to peer interactions came just in time to counterbalance the day when she felt dread at having to return to her mentor’s classroom. The delight at a peer having been identified by a student away from school with the statement, ‘You’re my teacher,’ was followed in a most timely manner by the saving grace of having a peer, Ann, share Dr. Case’s post-test debriefing strategy (Helen’s journal, 8/13/2001; 8/24/2001). Her co-intern was also a resource and, although she felt that they were not closely aligned philosophically, they were able to work together well on content and to plan together for their first two days of teaching (Helen’s interview, 11/5/2001; Helen’s journal, 9/5/2001). As the semester progressed, Helen relied on interactions with other peers more than with her co-intern. “We really help each other and give each other ideas. I definitely see the importance of talking to other teachers...it is important to realize as a teacher that there is help out there and it is within reach” (Helen’s journal, 9/28/2001). It is striking that as early as September she was linguistically approaching a professional identity for herself and her peers as teachers.. She also expected the peer interactions to continue to be important to her professionally

throughout her career. She wrote, “As teachers, especially science teachers, it is so important to meet / converse with other teachers so we can share ideas and challenge one another. Teaching is equal parts teaching and learning. We have the amazing ability to learn from students, peers, counselors, etc. Today was just another nail in my belief that interaction among science teachers is essential!!!” (Helen’s journal, 10/17/2001). This was a very positive statement for her to be able to make, particularly in consideration of her philosophical discontinuity with her classroom mentor.

Feedback from peers had a special significance to Helen. When Jerry observed her teaching of one lesson in her mini-unit, she valued his comments in a special way, saying, “Anytime you are listening to a peer, someone you consider a friend as well, and they give you honest productive criticism, it is going to be a lot more effective than having a teacher say you need to do this and this different. That is a peer; they are going through the same stuff” (Helen’s interview, 11/5/2001). In contrast, she suggested that the critique of an official evaluator might become a laundry list of dos and don’ts.

Hearing the same criticisms from a peer observer caused her to hear the critique differently when it was repeated by a professor. She reports being less anxious and more able to listen without feeling defensive (Helen’s interview, 11/5/2001). Helen also had the opportunity to act as an observer to her peers.

Janie had asked Helen to observe the second day of her mini-unit. She felt that she needed more insight from an observer. One series of occurrences during this observation stood out in Helen’s journal. In this advanced class of bright motivated students there was one young man who asked frequent questions using technical vocabulary and complex descriptions. The point of these questions was obviously to

interrupt the flow of the lesson and hopefully to trip up the intern. After the observation Helen reported her suggestion that Janie take the young man aside and limit his questions to 3 or 4 and / or invite him to write down his questions during the lecture and then they could discuss them after the lecture one-on-one (Helen's journal 11/5/2001). Helen's observation of her co-intern was not as productive. She discussed observing Martha, her co-intern in Ms. Howard's class, giving a lecture with notes on the overhead projector. She recalled that Martha had put all of the notes up at one time and the students had focused on copying rather than listening to her elaboration. Helen, observing this student behavior, reported suggesting to Martha afterward that she might try tracking the notes with a cover sheet. Helen recalled that Martha received the suggestion blandly and did not incorporate it into her practice (Helen's interview, 11/5/2001). This was not too surprising to Helen. In an earlier interview probe about her relationship with her co-intern she related, "We disagree on a lot of issues" (Helen's interview, 10/12/2001). These issues reportedly included discipline and expectations of student performance and behavior. These different expectations for student performance were distinct and showed up in their different responses to student work. Helen's understanding was that when students' showed progress, Martha was ready to move on, apparently believing that they had succeeded as far as they were capable. Helen expected the students to be able to show their understanding of the material being taught and did not feel that she should move on to new material without evidence that such understanding had taken place. She was concerned about these differences, "So when we are helping, and she is going about it one way and I am going about it another, I wonder if it is fair. They are getting

different messages. (Helen's interview, 10/12/2001). Other resources for peer coaching extended beyond formal bounds.

Peer comments were not just valuable as observation and critique. Informal discussions took place outside the university classroom or the mentor's classroom. These discussions were facilitated by the common venue and proved to be a valuable learning resource. For example, when probed about planning and executing her mini-unit, Helen related that she had more material than she could get through on the first day. Where did she learn to over plan? She credited discussions among peers of their own experience with timing. "So they are like, you know plan a lot that can be flexible" (Helen's interview, 11/5/2001). "There were certain things that I definitely wanted to get done, but like, I had other things that were important but not critical" (Helen's interview, 11/5/2001). Peers remained an important part of her learning as she looked back from the point of view of a practicing professional. "When we would meet for Dr. Oliver and Dr. Wallace's classes, we would share our experiences, we would talk about how each of our mentors worked with students (Helen's telephone interview, 11/9/2002).

Interactions with students

Helen's initial teacher identity hinged on her understanding of how she had interacted with teachers when she was a student, how she had interacted with her siblings as students when she first taught and how she succeeded in learning and teaching. She learned to teach implicitly from interacting with her teachers, "It was just implied by being a student and having teachers to interact with" (Helen's interview, 10/12/01). (Helen's interview, 10/12/01). She succeeded at teaching by following this implicit model and she measured her success by her students' achievements, "They understood it

by the time I was through” (Helen’s interview, 10/12/01). This foundation for teacher identity is unshakeable. Ms. Howard’s adverse comments on students were anathema to Helen just as surely as Ms. Brown’s mutual respect with students and Dr. Case’s pleasant rapport with students were definitive of their expert practice in her eyes. Therefore, it was no surprise that Helen was most confident and most focused on what she learned from dealing with students.

During the first week of internship, Helen’s critical stance in Ms. Howard’s classroom already began to pay off as she focused her observations on students. She observed that during a quiz on lab safety, a great deal of classroom business was being handled. Furniture was being moved, text books were being given out, and papers were being returned. “There is too much confusion during the quiz, and it left it easy for the kids to cheat and hard for them to concentrate....It was loud and crazy” (Helen’s journal, 8/15/2001). On the same day she witnessed a “popcorn lab” that was intended to introduce scientific method. Once again, confusion and lack of planning and structure were an issue. Helen deconstructed the activity in her journal and diagnosed problem areas and prescribed possible solutions (Helen’s journal, 8/15/2001).

Student learning and esteem continued to be the reference value in a series of entries that extended over four class days, and culminated in the infamous assessment that leaves her ‘flabbergasted.’ (Helen’s journal, 8/24/2001). In these entries, Helen foresaw a problem with the material on metric conversions. Following Ms. Howard’s lecture and example, Helen helped the students on one side of the room with their worksheet. Helen quickly learned that these students did not understand the lecture material and that she had to re-explain how to set up a problem, how to multiply fractions

and even the correct order in which to enter the numbers into the calculator. “It was not that some needed help. They all needed help. I had to show every student on my side of the room how to do the math” (Helen’s journal, 8/16/2001). Helen concluded that lecture had been a poor choice for this material and that demonstration, more examples, and examples with more relevant measurements might have helped. (Helen’s journal, 8/16/2001). Even at this very early stage in her internship, Helen’s thinking was readily stimulated by student feedback and by taking the students’ point of view in considering the content material. In the assessment of this material, Helen was very critical of the timing of review and of returning the quiz to the students after they had already taken the test. On the day of the test, she confined her entry to doubtful speculation about how prepared the students were and simply said, “I will be curious to see the grades” (Helen’s journal, 8/22/2001). As stated previously, the test results were poor. From Helen’s point of view, that was a routine problem. Her serious concerns lay in the teacher’s response to the situation. “As a teacher, I would hold myself responsible. Therefore, I would evaluate how I had taught the material, come up with more effective methods, and re-taught and retested it” (Helen’s journal, 8/27/2001). Helen then turned her critical questioning inward and asked herself, “How do I assure myself that the kids are giving the effort they need to and not blame myself for something out of my control” (Helen’s journal, 8/27/2001). Interestingly, after this entry, Helen’s reflections shifted to her own activities with the students.

The priority that Helen gives to student interactions was a consciously expressed value. On the day of the lab safety quiz she was delighted that, “I know eighty percent of their names” (Helen’s journal, 8/15/2001). Following the ‘popcorn lab’ she stated, “I

learned ninth graders can't be expected to recall percent without stimulation" (Helen's journal, 8/15/2001). This response was notably uncritical of the students, from whom she takes her lessons seriously. As she turned toward depending on student interactions in the mentor's classroom rather than on mentor interactions, Helen declared, "The need to belong and feel safe is basic. It is not until these basic needs are met that a student will feel that they can learn the knowledge of science that I want to present" (Helen's journal, 8/20/2001). Less than a week after writing this, Helen bemoaned the plight of students who experienced failure without remedy in an ill timed and possibly unfair assessment. In the November interview she made a clear priority statement. "I think the content is important, the science, it's whatever, but more than anything, people, it's like you're a person first before you are a student" (Helen's interview, 11/5/01).

Helen's first two days to teach showed that student feedback is vital to directing her actions. She found that assessing student work from these two teaching days was frustrating as she observed lackadaisical and incomplete homework or none at all. However, her faith in student feedback continued. "This is a good lesson because it challenges me to find new ways to determine the kids' understanding of what I am teaching them" (Helen's journal, 9/12/2001). Also, "I think that this class is teaching me just as much as I am teaching them (Helen's journal, 9/12/2001).

The largest block of teaching occurred for Helen in preparing and teaching a mini-unit. Helen's mini-unit extended through eight class days. Referring to the first day of teaching in the mini-unit she said, "Today was the most challenging day that I've had since coming to Rocky Harbor" (Helen's journal, 10/3/2001). Her lesson included several different types of activities and some group work. It began well on the first day; however,

the lesson had fallen apart when she transitioned to group work. “That class has not been trained for group work” (Helen’s interview, 11/5/2001). Undaunted, Helen tried group work in the next day’s lesson. This time, when the students’ behavior began to deteriorate, she pulled back to whole group practice before it got out of hand and retained the flow of the lesson. Dr. Oliver observed this lesson, and Helen reported that afterwards Dr. Oliver said, “You have a great ability to avert problems” (Helen’s interview, 11/5/2001). Helen reflects, “The thing about that is the only reason I can do that is because I’ve learned the personalities of those kids. You have to know your kids” (Helen’s interview, 11/5/2001). As the mini-unit progressed, she was able to do short small group activities successfully. “It was better. By then they knew what I expected of them....If you know your students, you should be able to minimize problems” (Helen’s journal, 11/7/2001). Throughout the mini-unit, she watched for evidence of student learning, and she questioned the outcome of her teaching. As the time for testing approached, she reviewed the material with them and made a point of saying that she expected all A’s and B’s. She wrote, “One boy raised his hand and asked if I would be mad if they did bad on the test. This made me happy and sad. I was happy because the student cared about my feelings toward his performance. I was sad because of the shock on his face that someone really expected and wanted them to do well on the test” (Helen’s journal, 10/10/2001). Finally the completed test over two chapters that she completely taught were graded and Helen rejoiced, “THE KIDS DID EXCELLENT!!!! I was so impressed with my students’ grades. They did wonderful. It made me feel good grading the tests. I can’t wait to give them back their grades!” (Helen’s journal, 10/12/2001).

Helen was eager to share anecdotal accounts that she took as affirmations of her philosophy of focusing on the whole student. “I’ve have this one kid who’s in ISS quite frequently. He is probably there more than he is in class. My teacher can’t stand him. He hardly brings a notebook and pencil to class. He is the nicest kid to me. I formed a relationship with him. That is what is important....During inquiry based lab he was participating but he wasn’t writing down anything. He wasn’t making a lab report. I’m like, “How am I going to grade anything if I can’t see it?” he looks at me a minute and he goes, ‘Good looking out for me Ms. Hunter” (Helen’s interview, 11/5/2001). “They behave for me and I love it” (Helen’s interview, 11/5/2001). When Ms. Howard was out for two days Helen reported that the substitute had serious problems with behavior on the first day. On the second day the interns were there with the sub and, “There was such a drastic change in their behavior. This leads me to believe that the kids really see me in a “teacher” role” (Helen’s interview, 11/5/2001). These anecdotes demonstrated the great weight that Helen attributed to her identity as reflected by interactions with students.

Helen reported a mixed response to university assignments. On one occasion she said, “I feel some of the assignments are busy work” (Helen’s interview, 10/12/2001). However, the student journal was an assignment about which she was unequivocally enthusiastic. “I like the journals. I think that keeping a journal for everyday we are there is an excellent idea” (Helen’s interview, 10/12/2001). She was not enthusiastic about the assignments as a whole. She referred to the misconceptions assignment and the pre-assessment assignment as ill timed. “We were already a month into the semester and already knew the general level of the kids” (Helen’s interview, 10/12/2001). While she was very grateful for the number and variety of syllabi that she received from the RHHS

science teachers, she stated, “Pulling pieces from the syllabi to make our own was not as useful as hearing why they had put the things into the syllabi that they had” (Helen’s interview, 10/12/2001). She also commented that the university instructors were unorganized and that she sometimes found grading discrepant (Helen’s interview, 10/12/2001). However, in response to the interviewer’s probing she contradicted herself on the value of some of the assignments.

She confessed that she did learn some things that she did not know” (Helen’s interview, 10/12/2001). The interview stimulated a more detailed account in which Helen offered an anecdotal account from the pre-assessment assignment where she learned about the potential contrast between superficial observations of student abilities and assessed student abilities.

“Like, there was this one kid, there is this one kid in the class, the first couple of weeks, however long it was from the beginning to the pre-assessment assignment, well, he still doesn’t hardly talk, he didn’t do homework, he didn’t study. It was to the point that Martha and Ms. Howard thought that he couldn’t read. I wasn’t sure that it was that he couldn’t read as much as just that he didn’t care at that point. Because we hadn’t really done anything that had really brought him out. I asked Ms. Howard if I could talk to him, and she said no. Well, first of all I know that is one thing that I would have done. But on that pre-assessment, he scored very high. And I was like; “Wow” That was the first thing that showed that he knew something” (Helen’s interview, 10/12/2001).

This instance was not the only time that she recounted useful learning from the assignments. In her reflection on the assignment to identify students’ misconceptions in

science she wrote, “The deeper we dig, the better the answers. It was as if the students knew a little but were never asked to build on that information” (Helen’s journal, 10/17/2001). She commented that, “This also taught me how important it is to really get to know my students” (Helen’s journal, 10/17/2001). Apparently the university class assignments were an effective window into the students, and for Helen, the students are the most valid resource for building herself as a teacher

Afterwards

Helen successfully completed her student teaching and obtained a job teaching seventh grade life science (Helen’s telephone interview, 11/9/2002). In the first interview Helen said that she felt that being a teacher was her destiny. More than a year later, when reminded of that and queried about those feelings enduring, she replied, laughing, “Oh yes, even as hard as I am working this first year, I know that this is right for me. I love it and I believe it makes a difference. I would have to confess that I would be a little worried if I didn’t believe that the work load would let up a little eventually. I will be glad when everything isn’t my first time (Helen’s telephone interview, 11/9/2002).

Teaching continued to be all about the students for Helen. She stated that when she occasionally got discouraged, it passed because she looked to the students for direction. “The kids do [keep me going]. Their responsiveness. They are still young enough to get excited about understanding science. When they get excited, I get excited. I really believe that anything is possible for them, or if not anything, at least a wide range of things. I try to let them know I believe this” (Helen’s telephone interview, 11/9/2002). Helen had some insights to offer about her teacher preparation now that she was looking back on the Rocky Harbor pre-service science teaching block and on her student teaching

semester from the lofty perch of a classroom science teacher with almost one full semester under her belt.

Helen's reflection on the pre-service science teacher experience at this point was four-fold. She believed that having multiple mentors made a difference, that having students was vital, that having co-interns was important, and that the difference in focus between this pre-service experience and student teaching was pivotal. She could not speculate on what differences might have resulted from a more traditional format of course. But she did state, "I don't know if not hearing about other things would have caused me to just imitate the mentor. I know that there was a lot more going on than just in my mentor's classroom and lots of it fit with my ideas of teaching" (Helen's telephone interview, 11/9/2002). She definitely thought that having a co-intern in the classroom made a difference although she and her co-intern did not share the same perspective on classroom practice. "Yes, and if she hadn't been there I think that the mentor would have focused more on changing me. When we had planning periods, they would gossip about the students, or discuss class work and the bad work or bad behavior. Because they hit it off they would talk about other things, things going on in their life and stuff. That left me alone to think about the classes my own way" (Helen's telephone interview, 11/9/2002). In hindsight, Helen still focused on the importance of students just as she had in all previous data. "I think that I spent a lot more time with students in my education courses than they [the other first year teachers at her school] did. When you are student teaching you have to focus so much on planning, prepping, delivering and assessing lessons, it is pretty intense. In the semester before, at Rocky Harbor, I was with students and had some responsibilities some of the time, but most of the time, it was a lot more low key. I could

focus on the big picture: What students were like, what the teacher was like, how the students related with the teacher and the teacher with the student” (Helen’s telephone interview, 11/9/2002). She did not think that a longer student teaching experience could in any way replace the type of pre-service science teaching block that she participated in even though it would have given her students with which to work. “No, the semester at Rocky Harbor was very important. There was a lot less pressure then during student teaching, and we got to meet and compare with other student teachers and other practicing teachers. This gave me a lot bigger picture of teaching” (Helen’s telephone interview, 11/0/2002). In her case, it seemed that not one but all of the elements of this pre-service science teaching block made a lasting difference in how she constructed herself as a teacher.

CHAPTER 5

A STUDENT IN SEARCH OF A COACH

Initial teacher identity

Trevor was an undergraduate in his early twenties. He began his university career as a pre-med student. He shared much of his school biography in his journal entries. He grew up in a suburban county generally perceived as upper middle to upper class White and protestant. “I grew up in a town where grades were really important to kids, parents and schools alike” (Trevor’s journal, 10/01). In another entry Trevor further enlightened the reader about the culture of the schools in the community where he grew up when he said that teachers were held accountable to the point of losing their jobs if a school “faltered” (Trevor’s journal, 10/01). Trevor explained that he had never had a general level science class in high school, always honors, and that he had excelled in his grades both in and out of science. “I made really good grades in high school, and I did well enough on my SAT’s to get into both UGA and Georgia Tech. So my family, since I had mentioned being a doctor once in my life, took it upon themselves to start calling Dr. Trevor and such 4 (ok, 5 years). before I even made it to medical school” (Trevor’s journal, 10/01). However, he was ill-prepared for university work. “We were taught to study the material to test on it, not to learn it. That is exactly what happened: I never learned anything. I did well on my tests because I could regurgitate material. I hated that when I got to college I did not know how to study effectively, or even know any type of study skills” (Trevor’s journal, 10/01). He predictably struggled and found himself making grades unlike those of his high school career.

His ambition to teach science had its origins in an epiphany experience during the semester that he took organic chemistry. “We were studying the night before an organic chemistry exam and my friend had not even opened the book yet. I proceeded to try and teach him organic chemistry for 5 straight hours. Amazingly it worked, and he made the comment that I had really helped him out, and that he actually understood the topics that we were to be tested over. He made some joke about being a teacher part-time to pay bills while I was in medical school and the idea stuck. I had never noticed before that I was able to help my friends study and eventually do well on their tests, but after that night things changed for me” (Trevor’s journal, 10/6/01). He proceeded to apply to the college of education. However, the change was apparently not without some ongoing doubts. He wrote, “When I first decided that I wanted to teach, I remember specifically thinking one thing: “you’re quitting” (Trevor’s journal, 10/6/01). His family expectations along with his own feelings of compromise were something of an ongoing problem. His uncle was a sales director for a pharmaceutical company. As late as October of 2001, during his pre-service semester, he was being urged to consider going into pharmaceutical sales also (Trevor’s interview, 10/12/01).

This indecisiveness did not facilitate a strong picture of himself as a teacher. His teacher identity in this pre-service experience was framed as that of science teacher/coach. The origin of this identity remained vague. Probing questions did not elicit its origins so much as they ruled out some possibilities. He never had a science teacher or any teacher that was a coach. He was familiar with the stereotype of the teacher / coach engaging in passive teaching while working on play books and his comment was, “I hate that. I really hate that” (Trevor’s interview, 10/12/01). He was coached in wrestling in

high school, although he never alluded to this coach as a teaching model. He did relate an experience in the educational foundations course that may have focused him on the science teacher / coach image. “We had a Foundations of Education class here and one of the guys in it was planning to coach. And he was telling me that he had already been on many interviews and the very first thing that the principal asked him was about coaching” (Trevor’s interview, 10/12/01). When asked about his thoughts on that he said that, “It is important to the school I guess, money and the support of the boosters probably. A good coach and a winning team are important to the principal because the school needs that” (Trevor’s interview, 10/12/01). The only other instance of a coach as teacher allusion arose in his initial interview with Dr. Oliver in the interview notes under, “Why you decided to become a science teacher?” The notes read, in part, “- always wanted to help people – like to explain things, like coaching” (Dr. Oliver’s interview notes, fall 2001). Thus, Trevor began his pre-service science teaching block with the concept of teaching as a valid alternative to a pre-med biology degree, a nebulous idea from a peer that he was an able teacher and an image of himself as a science teacher / coach.

Certain claims about Trevor’s initial teacher identity can be surmised from the evidence in his personal and school biography. He recognized a socio-political hierarchy connected to education and he was accustomed to a traditional style of top-down management. Therefore, teachers were responsible for student achievement. Furthermore, he had achievement defined for him as “grades” and he had accepted that definition. He recognized the relationship of the schools to the school board and of the school board to the community in a clearly defined way. This understanding was that the community

expectations dictated the actions of the school board toward teachers and schools, where achievement was defined by grades and was a community expectation. This understanding placed teachers at the bottom of a political hierarchy with their status dependent on the community's perception of their performance. Combining this understanding from his school biography with his conjecture about why principals' asked about coaching criteria before academic criteria, an inference can be made that coaching was seen as a means to obtain more status in the socio-political educational hierarchy. Furthermore, his understanding of teacher identity was somewhat superficial. He understood teaching as helping people, "like coaching" (Dr. Oliver's interview notes, fall 2001). This inference was reinforced by his response to an interview probe on the jobs of a teacher. His response, "Be a paragon of virtue, a teacher, an educator, an overseer, mother, father, policeman, a psychologist, a doctor," (Trevor's interview, 10/12/01). interpreted the question in terms of role-playing. In an attempt to get past speaking of the roles of a teacher, a follow-up question was phrased as, "What tasks does a teacher do to accomplish these things" (Trevor's interview, 10/12/01). The reply was presented as analogies to the roles he understood, such as, "pulling them over" like a traffic cop, "keeping them out of everyday trouble," like a parent (Trevor's interview, 10/12/01).

The sum of the insights shows that Trevor's initial understanding of teacher identity was as follows:

- 1). Teachers hold a position at the bottom of a in a defined educational hierarchy;
- 2). The hierarchy that he recognizes is dictated by the political actions of school boards and communities;
- 3). That coaches are closer to the power base of the hierarchy; and

- 4). That his initial teacher identity is nebulous and limited to defining roles.

Trevor's interactions with his mentor

Trevor was assigned to Mr. Blair's ninth grade physical science class along with two other interns, Carla and Sandra. His first written observation of Mr. Blair's practice revealed some pertinent information about his own mindset. "Anyway, I was extremely surprised today in class when while going over the "Nature of Science," Mr. Blair mentioned evolution. I am definitely sure that I would've found something else to use as a tool for explaining the idea of a theory to the students. I do not know what the school board is like here, but, I wouldn't take my chances, especially on the first day of school, with some ninth graders I haven't gotten to know too well yet. I was glad, however, that he did make sure to let them know that the evolutionary theory is a THEORY!!! He made it clear that other ideas exist and that people have rights to their opinions" (Trevor's journal, 8/13/01). This commentary implied that he conformed to an authoritarian point of view in which correctness in science is dictated by the school board and by the community pressure. This was consistent with his biographical data. He stated that where he grew up, "If the school was faltering the teachers were always in trouble and some were even getting fired" (Trevor's journal, 10/01). His response to his mentor on day one showed that he was looking for a conventional authority figure after which he could model himself.

Trevor also commented on Mr. Blair's teaching practice that first day when he wrote, "I really like the way he has his notes structured. They flow from one idea to the next without cluttering each other (Trevor's journal, 8/13/01). However, these notes became a cause of concern two days later, as they prepared to administer a quiz. "He let

them use their notes on the very first quiz. I'm not so sure that was a good idea. I wonder if that will come back to haunt him in the later weeks or months when they have a quiz and they want to use their notes or if it will hamper their study skills if they know they can use their notes?" (Trevor's journal, 8/15/01).

Notes were something of a recurring concern for Trevor regarding Mr. Blair's practice. Trevor complained that, "These kids seem to be conditioned now to moan when the overhead is on. He does, he uses it, but he is apt to give into their complaints. I don't think, necessarily, he has a ton of power" (Trevor's interview, 10/12/01). While this remark clearly indicated that Trevor may not have found the clear cut authority figure he was looking for, this was not enough to shake his seeming tendency toward authoritarian conformity. When Trevor felt the dissonance of being split between his role as a student and as a teacher he fell back on this loyalty to authority. "Just, it is really hard to be in class to develop our teaching strategies and learn at the same time from these teachers. We can't really implement, well I am not going to implement mine, if they are different from the way that Mr. Blair is teaching. I just stay along the lines of how Mr. Blair does things, how he works his class and he handles students and everything" (Trevor's interview, 10/12/01). Despite Trevor's reluctance to buck established authority, there were some other things that occurred during those first days in class that concerned him, but they were not discussed until his own developing teacher stance was probed in a November interview.

Trevor was asked how he would run his own class now that he had spent this time in a high school science class and had taught some of the lessons. His reply proceeded for two and a half pages. Several more accounts of his interaction with Mr. Blair arose in this

reply. For example, “The first thing that he [Mr. Blair] says to us is that he is trying to mimic Ms. Brown’s class. Ms. Brown has juniors. It [Ms. Brown’s method] works because there is a complete difference in a junior and a freshman. I think he is trying to do too much with freshmen” (Trevor’s interview, 11/9/01). He continued in this line of thought, elaborating on classroom management. “Speaking of the fact that he told us that he is trying to mimic the way that she teaches, he only very rarely writes people up and Ms. Brown only rarely writes people up but she’s got,-- because if they step out of line, she puts them back in line. She tries to do it without writing them up. Mr. Blair tries to do the same thing but, she has this controlled chaos in her classroom. They are up making noise, but they are doing their work. I’ve never seen that before. I have observed in there a couple of times and they are just like, up dancing and then you look at what they are doing, they are doing their work. You know, they are knee deep in Biology or Ecology or what ever the class happens to be. It is just like, ‘Wow, they are up dancing and talking about other crap and they are working.’ These ninth graders just don’t have the cognitive capacity to do that. I don’t think. I haven’t seen it in any of them. And Mr. Blair is trying to let them do that. And he always talks about how he has so many discipline problems and how he lets the kids walk all over him. Why do you let them do that? But, I don’t know. I don’t know, if I am going to----I will have different classroom procedures for different classes” (Trevor’s interview, 11/9/01). Other than the management of students’ on task behavior there were also issues of managing student papers and of managing students’ collaborative grouping.

Mr. Blair’s room was a wide shallow room and there was a book shelf under the windows on the east wall that has a letter tray labeled “in box” and one labeled “checked

work” However, interns were observed collecting student work directly from the students. When asked about the procedure for taking up and returning student work Trevor replied, “It is not really a procedure, in essence it is a great procedure but he just talked about it once that I can remember. He talked about it the very first day of school. He mentioned it. We weren’t in there a lot at the beginning of the semester. Maybe it is just something he tried. I think it was a new idea because we were making signs for it. It was a procedure he was trying and it is either not working or he didn’t give it enough attention” (Trevor’s interview, 11/9/01). The other management issues that concerned Trevor in Mr. Blair’s classroom arose from Trevor’s experience in teaching lessons to Mr. Blair’s students.

Trevor and his co-interns were planning on team teaching a lesson by the end of August; however, when the day arrived he reported that, “We felt disorganized and met with Mr. Blair before class to postpone it” (Trevor’s journal, 8/29/01). A contradiction in how Trevor interpreted Mr. Blair’s action arose when he reported on his own teaching a little less than a month later. “Well I taught today if that is what you want to call it...I had everything planned out (or so I thought). and I was ready to go. We started class, and already things weren’t going my way. Mr. Blair had to say something beforehand and I think that threw my rhythm off. I was ready to get going and as soon as I was about to start, Mr. Blair needed to go over something. I wasn’t ready for this and it threw me off” (Trevor’s journal, 9/21/01). In the first instance the mentor’s casualness was reported as helpful flexibility and in the second it was reported to be a major stumbling block. As the tone of this entry suggested, Trevor’s problems had just begun with this lesson. “I told them initially that they could get into their lab groups. Well, one of the kids stood up and

said, 'We don't know our lab groups. Mr. Blair changed them.' And I was like, 'great.' I looked around and Mr. Blair wasn't there, he had gone in back to get something. I was like, 'well?' and about that time he came back in and I asked, 'Did you change their lab groups?' He said yes and I asked, 'Can we get them into their new lab groups?' He said, 'I have got to find the card.' Well, that was taking a while and they were already getting off task, all standing up and talking. So I got them back on task and told them to just sit down and work with someone seated nearby" (Trevor's interview, 11/9/01). Trevor reported not being put off of group work by this experience. He valued it in his own learning experiences and envisioned it as very being effective if he can get it to work smoothly. He was not particularly condemning of his mentor's casualness about his grouping procedure, although it caused problems with student management again while Trevor was teaching in November. On this second occasion Trevor got frustrated with the students' disruptiveness while they formed groups and during his debriefing, Mr. Blair seemed to be a little discouraging about allowing the students to work in groups and then expecting them to stay on task. Probing this mixed message received the reply that, "Well today was odd. Usually his is, 'Get in you groups, do your group stuff.' I think that he, I don't know, he is into a lot of stuff" (Trevor's interview, 11/9/01). Trevor usually gave his mentor the benefit of the doubt and he responded favorably to debriefing and critique.

After teaching an early lesson, Trevor received some clear critique from Mr. Blair that he had not done enough questioning and checking for understanding as he lectured. During an interview about this, Trevor said, "I don't think I did enough of that today. Mr. Blair made that comment and I think that he was right. I did it as an after thought"

(Trevor's interview 11/9/01). He went on to explain what kinds of questions that he might formulate for a review and for a quiz over the material. He seemed enthusiastic about it and seemed pleased to be able to have a specific area to work on. Overall, even when he was not happy with the results of the class management, Trevor was committed to supporting Mr. Blair's methods because he was the authority in the class. For example, he was talking about his own teaching again and said, "That is the only thing that makes me mad. When you are teaching and 4 or 5 people get up and walk around. Terry got up a couple of times and Shelia got up a couple of times. I should have said something but I held back because I figured, well, Mr. Blair is there and I figured they were interacting with Mr. Blair and it is his classroom so I didn't say anything" (Trevor's interview, 11/9/01). Although Trevor continued to be inhibited about doing things differently from how he understood Mr. Blair to do them, he had begun to write and comment on the places where he would do things differently. He seemed to have begun to find his own voice about classroom management and maybe he had begun to move slightly away from the idea that there is some ultimate authority for teaching behavior.

Interactions with other mentors

Trevor valued the opportunity to learn from other mentors both formally and informally. There was evidence that he was more receptive to learning from other mentoring. Concerning the presentations of the other RHHS mentors, he stated unequivocally that, "Every topic they have discussed I have gotten useful information out of" (Trevor's interview, 10/12/01). He was more emphatic in stating that the best part of the time with other mentors was when the discussion ranged beyond the specific topic of the presentation and into more general areas. "Well, when we sort of start having a

general discussion in the class and it is being taught by one of the Rocky Harbor teachers, then we are talking about this school, the one where we are all working. You know, and the kids that we are all working with. It is more, it means something specific because it happened there, and we're there. It is kind of like, "wow, we are here," you know? You can picture it in your head, what is going on. It is real; you can almost taste it in the room" (Trevor's interview, 10/12/01). Trevor learned to make use of these opportunities to discuss general classroom issues with other mentors' as a way to identify remedies for methods with which his own mentors practice has not satisfied him.

Two areas where Trevor seemed dissatisfied with his mentor's practice were the use and formatting of lecture notes and classroom management. He looked for other mentors in these areas. He reflected on the note taking format that he observed in a special education during his field observations in the educational psychology class. This teacher had used handouts for notes. He sought out a Rocky Harbor science mentor, Coach Zales, for a discussion of this format. "I talked to Coach Zales about it and he said it was a pretty good idea. He just usually has them write directly from the overhead. A lot of them are open-ended notes and they have to fill them in or something" (Trevor's interview, 11/9/01). He also made a point of observing Ms. Brown giving lecture notes to her class since she was Mr. Blair's declared model. "I think she taught her kids how to take notes the first couple of weeks of class. So that when I got there she was just talking and they were just kind of writing. That is a really good idea, but it is a little late in the year for that. We have to get content. But that sounds like something that I want to do along with graphing. Next year when I start teaching physical science, coming straight

from middle school, this is how you need to take notes in high school” (Trevor’s interview, 11/9/01).

He also sought out an alternative among his mentors for classroom management. In this case he bypassed Ms. Brown, having already decided that her management style was not workable in a freshman classroom and went to Coach Zales. “I like Mr. Zales way of just writing their names down on the board. I haven’t seen it in action yet. I have been trying to make time to observe it. He says that it works real well, because it is amazing how quick the behavior stops because their attention focuses to whatever they were doing. Because they know that if they get a check they get a detention. Now it is more of a way to get them to work” (Trevor’s interview, 11/9/01). Trevor did get down to visit the Coach outside of class time, “He [Coach Zales] said that, when I went and visited Thursday after class that he had six names in one day and that only one had a check by it. They got them on Monday and he erased them on Friday” (Trevor’s interview, 11/9/01). Trevor’s use of access to other mentors outside of class time and of the general discussion times with them in the university classroom had also sometimes raised concerns that would not other wise have come up.

The mentors’ teaching in the intern’s university class meeting was focused on specific strategies where they offered the strong points that they had developed through experience. One mentor, Mr. Page, had developed into something of a classroom demonstration specialist. “His demos were outstanding! I would have loved to be in his class when I was in high school! His room looks like a library of demonstrations” (Trevor’s journal, 9/26/01). However, the lesson in science demonstrations and the “library” of material did raise a concern. “The one thing that concerns me is that will I

ever have that much stuff” (Trevor’s journal, 9/26/01). Trevor wondered how science budgets were allocated and what the procedure for getting approval and funding for supplies and projects might be. Maybe because Trevor was very sensitive to power structures, he did not ask the questions about budget outside of his journal writing. Mr. Ball’s presentation on incorporating art into science curriculum was very favorably received by Trevor. He wrote, “Today we heard Mr. Ball lecture on instructional strategies concerning art, science and art and science. It was very neat how he tied in some concepts such as chemical bonding with the way the Sistine Chapel was painted. It was cool how he implemented the art aspect into his anatomy class” (Trevor’s journal, 10/12/01). Somehow the discussion seemed to often lead back to classroom management with these interns and in this case an anecdotal account that Mr. Ball shared caused Trevor some concern. “However, the more interesting story came later in the discussion about a problem student he had a few years back. Apparently the student made some unnecessary remarks about Mr. Ball’s wife and was a disruption in general. Mr. Ball called security to have him removed. ...this escalated into an ordeal that finally ended with the student being carried out, literally, by security. My concern here is not with how Mr. Ball, or Rocky Harbor, handled the removal of the student, but that fact that he was back in the classroom the very next day. How can they allow that student back into the classroom?” (Trevor’s journal, 10/12/01). While each of these mentors provoked questioning of school management practices, others did not seem to arouse much in the way of specific concerns for Trevor.

Neither Dr. Case’s presentation on unit-long planning nor Ms. Howard’s presentation on visual aids in science instruction caused any concern for Trevor. In

writing about Ms. Howard's presentation he again expressed how valuable the free ranging discussion was in contrast to only brief remarks about the formal presentation. "Ms. Howard was talking about visual aids today in our class and she seemed very, very nervous. ...She explained to us that she is nervous in general from when the bell rings in the morning until it rings that afternoon. Like most of our discussions with the teachers they seem to get off topic quite quickly. And I for one am glad. Not because I am bored with the material they are talking about, but because once we get off topic, it seems they loosen up some and some of the information we get is some of the best kind of information. We started talking about problem students and how she deals with them, how she handles parent conferences and how she helps kids out that are having troubles" (Trevor's journal, 10/10/01). While the discussion led by Ms. Howard did not raise concerns for Trevor, it did for others. He reported hearing comments that Ms. Howard was cynical and sarcastic. In his journal entry Trevor questioned whether this is a bad thing. "It sounded like a chiding remark, so my question to them is this: is that a bad thing? If so, why? I consider cynics to be more or less realists. one of the first synonyms is "questioner" (Trevor's journal, 10/10/01). Trevor usually aligned himself with established authority when there was any doubt and he did so in this instance. This indicated that he is outside of an informal information loop with his peers. He was contrasting her classroom practice with her professed concern for students and his peers were responding to something other than her verbal expressions of concern for students.

Dr. Case's presentation on planning, particularly, whole unit plans made a notably favorable impression on Trevor. He got very excited in his journal writing about unit planning and the accumulation of material. "During her lecture she stresses preparedness.

I completely agree. Nothing made me more angry than when my teachers weren't prepared" (Trevor's journal, 9/24/01). However he did seriously ponder, "How will I ever accumulate the materials and activities" (Trevor's journal, 9/24/01). Trevor always had an ear available for insider clues to how things worked and that along with his growing ability to reflect brought in a group of mentors who had taught him or had attended classes with him.

As Trevor's own practice of teaching became increasingly imminent and his reflection skills became increasingly acute, any successfully practicing educator past or present became a mentor teacher. Trevor talked extensively about his experience as a student in college. He was expecting to take some courses over that he was taking concurrently with the block and he was very critical of the passive teaching he had received in his science classes at the university. He complained of unapproachable instructors, rote instruction and a mismatch between the lectures and the assessments (Trevor's interview, 11/9/01). There was a certain familiar sense of blaming the instructor mixed with some new knowledge of pedagogy in how he faulted the instructor. The courses that he was concerned about repeating were science courses, and he seemed to still be haunted by his slide from an honors science student in high school to a frustrated pre-med student. He probably believed that he had laid this issue to rest with the transfer into science education, and he was very unhappy to still be fighting these academic battles.

However, he did remember his high school academic performance positively, and his high school teachers' practices had come up during interview probing of how he would do things when he had his own classroom. For example, he said, " So, I know

today I was writing the names of people that were absent on the handouts and I could imagine doing that in four classes a day, five days a week so that they will get them when they come in” (Trevor’s interview, 11/9/01). He suggested that even though a teacher may say that the policy is that absent students are responsible for getting their own make up work, “Well it is their fault if they miss it, but they are screwed if they don’t have the assignment, and I want them to learn, period” (Trevor’s interview, 11/9/01). When asked where he learned this make up work policy he replied, “Ms. Powers, she was my AP biology teacher and I had her for ninth grade physical science” (Trevor’s interview, 11/9/01). This was not the only context in which this teacher’s name came up as a mentor. She was also mentioned in his journal on the day that he reflected on Dr. Case’s lecture on preparedness. “For example, the AP Bio test (which I paid for out of my own pocket). was drawing nearer and nearer and what were we doing? Because our teacher wasn’t prepared... watching the Trials of Life video series! I personally have already started preparing for my mini-unit. I hope it pays off” (Trevor’s journal, 9/24/01). Trevor also reported learning from Ms. Powers to, “Just be fun with the kids; trying to have a good time. Make fun of yourself as much as possible” (Trevor’s interview, 11/9/01). Recalling these behaviors reminded him that one day while teaching he used a tactic learned from another teacher, “And I got something from Ms. Owens [his high school language arts teacher], too. Ms. Powers did teach it to me because she didn’t do it and Ms. Owens did. I know everybody hates to mess up and I messed up. And I wanted to, I realized it about halfway through talking about friction and I thought, I’ll wait to give it to them until I finish their notes. But how am I going to do that because when I go, ‘Alright guys I messed up.’ They are gong to be like, ‘Aw! We wrote all of that down and

now it's wrong.' It actually went okay. I messed up. Don't be afraid to tell them that you messed up. Well, Ms. Powers wouldn't have done that. ...she messed up a lot, but she fluffed over it and never took any blame for the mistakes. We didn't have any respect for her. Ms. Owens would just fess up and make a correction" (Trevor's interview, 11/9/01).

Trevor did not limit his casual learning to those who had taught him as a high school or college student. Some of his concerns had been stimulated by teachers that he met as fellow students. In the days following a presentation on laboratory safety he wrote, "The liability issue has me worried. I know a paper trail is very important in legal issues and from what I heard from a teacher in my Botany class last semester it is in education as well. He says that the best way to deal with a problem is to document everything....He said by showing this to the administration before any conference you usually find that they are going to be on your side. Also, he said that it was a great idea to have all of your bases covered by having a very thorough syllabus signed by the parents and the students with an extra copy of all the rules and regulations for the parent" (Trevor's journal, 9/10/01). Trevor sought mentors from many venues, acknowledging the authority indicated by their successful niche in an established hierarchy.

Actually, Trevor might have preferred it if more authority was exercised over his practice. "I want someone to rip me up; throw me to the wolves. I think that most of the time they are trying to be too nice. " (Trevor's interview, 11/9/01). He reported feeling that his evaluations were, "...all over the board" (Trevor's interview, 10/12/01). He explained, "If I am getting graded by 3 or 4 people and I am getting 3 or 4 different answers then it may mean that there is probably not a right answer. If I get the same answer from everybody then that is probably a pretty defining moment" (Trevor's

interview, 10/11/01). As a prior honor student, he understood himself to be capable of excelling with the proper leadership. However, the same sensitivity to hierarchical authority also caused him some very real anxiety.

Trevor was ambivalent about the professors as mentors. Dr. Wallace came by to observe on a day when the interns were supposed to teach and postponed it. He wrote, “I was just really nervous. It was not an excited nervous either, this was an ‘oh my God, don’t let me screw up anything today, one of my professors is in the room observing.’” (Trevor’s journal, 8/29/01). He clearly valued the professors’ reactions; however, when it came to the university class presentations that he attended, he placed greater weight on those of the Rocky Harbor mentors. “It is not as real feeling. Like it is a step back. It is general or not specific to where we are and what we are doing. In many cases it seems less valid” (Trevor’s interview, 10/11/01). Trevor confessed, “The classes presented by the university professors are less useful” (Trevor’s interview, 10/12/01). When probed he explained that, “Because I think it seems, well, not fake, but not like a real teacher. It is weird. I don’t see Dr. Wallace or Dr. Oliver as a high school teacher (Trevor’s interview, 10/12/01). The only presentation given by professors that showed up in Trevor’s journal was a brief comment on one given by Dr. Oliver. Trevor wrote, “Dr. Oliver handed out a few sheets on ‘Hands on Science learning’ I thought these were very helpful, but quite a bit confusing” (Trevor’s journal, 10/1/01). Ultimately, Trevor could be seen to pull in mentors wherever he found them. He respected their experience and their success at practice. However, he did not greatly utilize peers or professors as resources for coaching and learning.

Interactions with peers

Trevor had very little to say in either interviews or journals about working with his co-interns and peers. He revealed his cognitive interaction with his peers in only two early journal entries. When he and his co-interns prepared and administered a pre-assessment to Mr. Blair's students, he wrote, "I personally didn't like Carla's introduction of the pre-assessment. She made it sound like we didn't want to give it to them but that it was 'our assignment' and we had to do it. It sounded kind of bad" (Trevor's journal, 8/22/01). After his own teaching he sought feedback and helpful criticism from one of his co-interns and from one of the interns outside of classroom by inviting them to observe him. On this occasion he wrote, "I did talk to Martha, Carla and Mr. Blair. They all said I did fine but that I was nervous. I am going to try and work on that! I also want someone in there who is brutally honest with me. Someone to pick and prod at everything that I could do better (in a constructive way). that would really, really help me out" (Trevor's journal, 9/25/01). This was not the only time that Trevor disclosed his extreme nervousness or that he had expressed a desire for rugged criticism (Trevor's interview, 11/9/01; Trevor's journal, 8/29/01). However, there is no journal or interview record of his having acted on the desire for rigorous critique by discussing his point of view with potential observers and planning this kind of critique with them. Maybe his nervousness, particularly as expressed concerning the university professors, inhibited him from using the available opportunities to invite critique even though he professed to crave it (Trevor's journal, 8/29/01). Interview probes failed to draw much more information about his peer interactions.

Specific interview questions about his interactions with peers received specific responses, but they did not lead to the lengthy spontaneous elaboration that probes about mentors had elicited. As reported above, two areas of recurring concern for Trevor were lecture notes and classroom management. When asked about how his co-interns' coped with lecture notes, he replied, "Carla was doing notes last Friday and the way she was doing them, she had it on the overhead and they copied everything off the overhead" (Trevor's interview, 11/9/01). This limited reply was mirrored by his response when asked about co-interns experiences in classroom management. He discussed his own experience with bringing the class to task and commented, "I was worried that it was just because Mr. Blair was in the classroom because I had heard that when he wasn't in there Carla had a really rough time" (Trevor's interview, 11/9/01).

There was indirect evidence that he placed some value on peer input during discussions. He stated more than once that the general discussions following mentor presentations were particularly useful instruction. "Well, when we sort of start having a general discussion in the class and it is being taught by one of the Rocky Harbor teacher then we are talking about this school, the one where we are all working. You know, and the kids that we are all working with. It is more, it means something specific because it happened there, and we're there. It is kind of like, "wow, we are here," you know? You can picture it in your head, what is going on. It is real; you can almost taste it in the room" (Trevor's interview, 10/12/01). He mentioned the usefulness of these periods after Mr. Howard, Mr. Payne, and Mr. Ball made presentations. The "we" in these discussions were himself, his peers and the presenter. Obviously, his peers made up the larger part of "we" However, he was ready to discount his peers' opinions, particularly when it was

counter to established authorities. When asked if the validity of the mentor's information varied from mentor to mentor depending on his or the other intern's perception of the mentor's classroom practices, he replied, "I know it does to some people. I have heard people comment that it does. As far as I am concerned, they have been doing this for longer than I have; they have experience; I can learn something from them" (Trevor's interview, 10/12/01). Overall, Trevor remained enthusiastic about having peers in the program and he expected to rely on his teaching peers when he decided what procedures he would implement in his own classes. For example he said that he planned to seek the input of other teachers before making certain procedural plans. He declared that his intent to train a note taking procedure early in his own classroom, "Next year when I start teaching physical science, coming straight from middle school, this is how you need to take notes in high school" (Trevor's interview, 11/9/01). He continued to explain that he would rely on the input of teaching peers for designing the procedure, "How could you possibly train them to take notes a different way in each class? I would try to get as much feedback as possible about how they were taught to take notes in other classes. That would make a difference" (Trevor's interview, 11/9/01). The end effect was that Trevor made proportionally little direct use of his peer interns as a learning tool. He did use the subtext of peer commentary and discussions for his learning and he expected to have and use peer learning in his future teaching.

Interactions with students

According to the evidence in his journal, Trevor learned about the ninth grade students and about himself more than he learned about how to teach them. He began by writing, "I was amazed at how quiet these students were. I had always heard horror

stories about the students being rowdy and loud in the ninth grade, but these students aren't moving" (Trevor's journal, 8/13/01). Having observed what all experienced teachers recognize as the, 'honeymoon period' in beginning of the year student behavior, he immediately learned how brief a phenomena it was. He wrote, "I'm remembering what I said about these students being quiet a few days ago; that is completely different now. It seems once they are out of their chairs, their mouths are open" (Trevor's journal, 8/15/01). Next, he learned something about students and himself from interacting with students on the subject of graphing. "I was very surprised to hear her say that she had never done any graphing before. I was astonished to say the least. I found out for the first time how hard it is to explain something that I find second nature to someone who honestly doesn't have an inkling of how to do it. I really need to practice my ability to describe things in detail..." (Trevor's journal, 8/13/01). This concern on his part was echoed in another entry when he wrote, "Will this class help me to better understand how to explain things to my future students? I hope so. I can do a pretty good job explaining things to my friends here at UGA but younger students are completely different" (Trevor's journal, 8/17/01). In the same time period, Trevor learned some things about student assessment. During review for a quiz he observed, "The students look uninterested. He's in front of the class reviewing something that I know a lot of students were having trouble with a few days ago and they all seem to act like they know it!" (Trevor's journal 8/15/01). Two days later he was entering the grades from the aforementioned quiz and afterwards he wrote, "Out of 28 grades one was perfect and there were 2 other 'A's; Mr. Blair let them use their notes! I don't get it. They weren't rushing; they seemed to take their time... I am just amazed that some people don't 'get'

things even the second or third time around and they are the people that need a lot of help via reinforcement and practice. These kids; however, have been doing graphs for 3 solid days now. I'm not even teaching and I am frustrated; it's hard to know what Mr. Blair is feeling" (Trevor's journal, 8/17/01). Regardless of his attested frustrations, following a few days of intern class meetings with presenters he wrote, "I miss class! I am having the time of my life in these classes. I can't wait to get out there and start teaching!" (Trevor's journal, 8/22/01). His journal entries in the next months indicated that indeed, he did get in there and start teaching.

The first stumbling block he encountered in trying to take more ownership of the class was the ever present problem student. He wrote, "Justine, Justine, Justine. This name has become the bane of my existence in Mr. Blair's physical science class. She doesn't do anything she doesn't want to do. She turned in a blank worksheet because she didn't want to do it. She doesn't study, she doesn't take notes. She doesn't seem to care about anything really" (Trevor's journal, 9/14/01). It seemed that Justine did teach Trevor something about his own boundaries as a teacher as he wrote, "But lately she is becoming more of a nuisance. She is disruptive and keeping others from learning. That, I won't have" (Trevor's journal, 9/14/01). She also provoked him to raise the issue with his mentor. "I have asked Mr. Blair about it and I believe he is planning on having a conference soon. I would like to know what is said and what comes out of it" (Trevor's journal, 9/14/01). Unfortunately, there was no evidence that Trevor followed up on this student nor was there any evidence of how Justine's disruptions in class progressed. This seemed to be a learning opportunity missed. He may have dropped this ball in part because he was preoccupied with the teaching he would do a week later. He was not

terribly happy with his lesson and a subject that would concern him and that he would follow up on was introduced in this lesson, the use of overhead lecture notes. He recounted having trouble getting started and losing his sense of timing because of his mentor's unanticipated activities at the beginning of the lesson. However, he wrote, "I went ahead and started with the overhead" (Trevor's journal, 9/21/01). The students' response definitely didn't help him recover momentum. He recounted, "NOTES!?!?" they complained. 'Awww now, why do we have to take notes?!?' (Trevor's journal, 9/21/01). Trevor was not surprised at this reaction and felt that he handled it alright (Trevor's journal 9/21/01). His problems were not over though. Having gotten rattled, he confessed, "This is where I got lost. I don't know what happened, but my mind started going haywire. I couldn't organize anything on the overhead. I had it organized on the sheet in front of me, but couldn't reproduce it on the overhead" (Trevor's journal, 9/21/01). This unlovely experience had been almost a rite of passage for teachers and he seemed to overcome it. He shifted to a three-minute video clip on the reactivity of alkali metals, gathered himself and was able to continue after the video (Trevor's journal, 9/21/01). Almost a month went by before Trevor wrote about students in his journal again and then two events provoked another spate of commentary on his interactions with students.

Trevor wrote about two of his teaching chores in October. One of them showed him learning from interacting with students and the other revealed something about how his interactions might be limited by his preconceptions of power hierarchies in teaching. First, when Mr. Blair was absent he left the interns in charge of administering a review and a test. Trevor wrote, "Wow! What a class!" (Trevor's journal, 10/15/01). He

continued, “I didn’t mind reviewing at all, nor did I mind giving a test. However, I was NOT ready for the students’ reaction. ‘We have a test today?’ ‘We had a review sheet?’ With all of that going on, we had to jump in head first with an entire class of students that had not done the review sheet. None of them had even really attempted to finish the sheet. So the review time turned into ‘teach us again how to do everything that’s going to be on the test’ time” (Trevor’s journal, 10/15/01). He was also interested to note, “Another surprising development before the test was the amount of students asking to use their notes for the test. This should have surprised me, but I know that on the very first quiz Mr. Blair gave, they got to use their notes. I also know of other times where they have had their notes available to them on a test. This kind of conditioning evokes such responses. I would have never allowed the kids to use their notes. If they get to use the notes, what kind of assessment is that?” (Trevor’s journal 10/15/01). These students led Trevor to articulate some of his future teaching philosophy and they once again sharpened his understanding of what to expect of first semester ninth grade student initiative. About this same time he also undertook the task of preparing to do some required student interviews on misconceptions about a science topic. In writing about his plans and misgivings, Trevor revealed a possibly limiting preconception on his part. He wanted to interview Derrick and John as representative of two polar opposites. He was hesitating because, “The topic is going to be sexual reproduction. Not the actual event of copulation, but rather the processes that follow and how we become who we are. I think that both these kids are both ready to handle these questions on a semi-adult level....The only thing that really worries me is that John’s dad is the superintendent, I don’t know why, it just does bother me. I am constantly feeling in the back of my head that I should

watch what I say or do...especially in front of John” (Trevor’s journal, 10/5/01).

Unfortunately, he once again did not follow up this line of thought in his journal.

However, this entry indicated an awareness of power hierarchies. Further interviews unearthed more information about his expectations of interacting with students and more about his interacting with them while actually teaching.

After discussing some surprises about relating to students, Trevor went on to describe particular instances of learning from the students that he taught. First of all, Trevor found that his relationship with students was not what he expected it to be. “I thought that it was going to be a lot easier at Rocky Harbor than it is. I thought I was going to get along with the kids a lot better (Trevor’s interview, 10/12/01). He may not have been very aware of the gap that had widened between him and high school students. “Being called Mr. Nance, is sort of scary. When they say Mr. Nance I start to look for my dad. I don’t like being called Mr. Nance” (Trevor’s interview, 10/12/01). He did say that he thought that it was good to get adjusted to this sort of thing before he begins student teaching (Trevor’s interview, 10/12/01). He continued to be a little resistant to creating a formal distance from students throughout his pre-service science teaching experience. In his journal he stated, “I disagree with Harry Wong when he says that you can’t be their friend” (Trevor’s journal, 11/9/01). One of the student teacher relationships that Trevor zeroed in on briefly in his journal was that of Justine’s responses to the learning tasks in class. Interview probes into this relationship exposed his frustration and his lack of follow through on his concerns. “Justine is getting progressively worse. She is becoming unapproachable....she takes it as impolite if you ever speak to her. She is hampering the learning of others” (Trevor’s interview, 10/12/01). In his journal he said that he had asked

Mr. Blair about calling her parents for a conference (Trevor's journal, 9/14/01). During the interview he said, "I was really upset at Mr. Blair because it took him forever to do it but he finally did" (Trevor's interview, 10/12/02). Despite his concern, he did not ask Mr. Blair why it took so long (Trevor's interview, 10/12/01). As Trevor began assuming some teaching responsibilities, particular interactions with students directed his thinking on how he would behave as a teacher in the future. While a co-intern was teaching, he observed a student who was not taking the notes from the overhead and he followed up on the observation. "Jason wasn't copying. He was just sitting there tapping away for the whole class. Trevor recalled the following dialogue with Jason.

"And I was like, 'aren't you going to write this stuff down? Write down something Jason.'

"I don't want to."

"Well, this is stuff you need"

"I can't"

"Why?"

"I don't want to talk about it" (Trevor's interview, 11/9/01).

Later in the lesson the co-intern took the students outside for some data collection and Trevor took advantage of the opportunity to talk further with Jason. "I asked him why he didn't take notes and he said, "I can't write and listen at the same time" (Trevor's interview 11/9/01). As a result Trevor said, "So I tried to think of the best way without me giving them the notes" (Trevor's interview, 11/9/01). Trevor had also learned to hold back a little and let students handle some of their own issues. "Poor Lakeisha was trying to work and one of the guys kept messing with her. She said, "Shut up and get away from

me. I am trying to do this work. What's wrong with you, I am trying to do my work, leave me alone" I didn't even have to tell him to sit down, you know, because she had the authority" (Trevor's interview, 11/9/01). He also indicated that he had learned some things about what student behavior he was willing to tolerate. He said, "That is the only thing that makes me mad. When you are teaching and 4 or 5 people get up and walk around" (Trevor's interview, 11/9/01). He expressed another personal boundary when he stated that, "I don't care if they call out answers but if I call on somebody else, shut up. Let him have his chance to answer" (Trevor's interview, 11/9/01). Since he had done some teaching by this time it is likely that these statements resulted from what he experienced with students. It is notable that he did not site specific ways in which he had or planned to assert these boundaries for student behavior.

Afterwards

Trevor proceeded to do his student teaching at Rocky Harbor under Coach Zales and to employment as a first year teacher as his assistant coach. During his October 2001 interview Trevor reported the possibility that he might yet go into pharmaceutical sales rather than teaching because of the earning potential. A year later he reported, "I am loving the job, but I feel like I am always going a hundred miles and hour. The kids are great" (Trevor's telephone interview, 10/15/02). He felt very comfortable with his teaching peers and said that, "Everyone has been terrific. Everyone has really been helpful" (Trevor's telephone interview, 10/15/02). He laughingly reported that he was able to get around the issue of being called, Mr. Nance, "I'm Coach" He was happy with how both the coaching job and the teaching job were going and he seemed to have no doubts that this was the career for him.

Trevor's reflections on the pre-service science education block were similar to Helen's, although not as specific. He declared, "I would not have wanted to go into student teaching without that experience" (Trevor's telephone interview, 10/15/02). When asked specifically how it helped he replied, "Wow, that is hard to say because it helped everywhere. I had some things to start with, as a basis, copies of syllabi for instance and class rules. Also, some ideas for activities" (Trevor's telephone interview, 10/15/02). Trevor also found some of the less concrete results of his pre-service science teaching experience to be the most beneficial. "What made the most difference was to go into student teaching with some idea of what to expect students to be like. I think that it made a big difference to spend time with students in the classroom without being responsible for all of the teaching. I was really ready to begin teaching the class from day one of student teaching, especially since I already knew my way around Rocky Harbor" (Trevor's telephone interview, 10/15/02).

Trevor was able to speculate on what student teaching and his first semester of teaching might have been like without the pre-service situated learning block. "Wow, no. No way. I would have been overwhelmed by student teaching. Even with the block it is almost overwhelming. Without it, it would just be, well I would just not be where I am now with teaching. I mean, I came into student teaching ahead of the game and so I came into this year ahead of the game" (Trevor's telephone interview, 10/15/02). So, was it just that a student teacher needs more time student teaching? Trevor did not think so.

"Student teaching takes all that you've got. During the block, we were able to take some time to really look and really talk to people about teaching. That never happened during student teaching and that is not something that I would want to have to do without. It was

unique, very different from just more student teaching” (Trevor’s telephone interview, 10/15/02). Trevor seemed confident. “I think I am doing well. I certainly hope that I am. I know that these kids really matter to me and I believe that I make a difference for most of them” (Trevor’s telephone interview, 10/15/02). He seemed comfortable and confident that he was now the coach that students’ could look to for guidance.

CHAPTER 6

A STUDENT SEARCHES FOR A PRESCRIPTION

Initial teacher identity

Kate was a twenty-seven year old graduate student with a bachelor's degree in biology. Her demeanor was more formal and reserved than either of the other participants. This formality was communicated in the way that she presented herself. She was very slender woman whose dress appeared carefully coordinated even when it was casual. Her posture was very erect and she leaned slightly forward during interviews. Her wide-eyed attentiveness even in the casual setting of interviews seemed engaged and anxious, and this demeanor was maintained throughout the interviews. These impressions stood out due to the contrast with the casual demeanor of the other participants during interviews that would tend toward enthusiastic as they related spontaneous anecdotal data. The origins of this formal demeanor would inevitably be in her biography and were no doubt longstanding. Unfortunately, much of her personal and school biography remained a closed book to the researcher. Kate did not respond to open-ended questions well. She often asked for clarification to narrow the questions and seldom launched into a spontaneous or anecdotal response. For example, in the initial interview with Helen, the researcher initiated prompts 30 times in the 90 minute interview, but in Kate's initial interview, the researcher initiated 65 prompts in the 90 minutes. (Kate's interview, 10/01; Helen's interview, 10/01). Consequently, both Kate and the researcher worked harder during interviews and produced less insightful information. Although Kate related

less about her personal or school biography, her work biography was somewhat revealing.

Kate reported that she had no plans to teach while she was an undergraduate, and indeed, she worked for three years before returning to the university to begin working on a master's degree in science education (Kate's interview 10/01). She worked in museum education for a year and a half, working with kindergarten through seventh graders. She really liked working with these children, but she reported that it was monotonous. "I didn't get to do something new everyday or really get to know the kids. I didn't feel a connection and I really didn't know if they were learning. So that is why I decided I wanted to be in the public schools system" (Kate's interview, 10/11/01). After working in museum education she said that she went to work for the Centers for Disease Control (CDC). in respiratory diseases so that she would have some practical experience to bring to the classroom because, "That was one thing that I personally didn't get from my high school science. So, I went ahead and worked there for a while and then I started working in social work for a whole year" (Kate's interview, 10/11/01). Since she offered no explanation for why she proceeded into social work from the CDC even though she reportedly had already decided to go into the public schools, her career path into teaching remained somewhat ambiguous. Furthermore, she contradicts her previous report of the timing of her decision to become a teacher when she states that after all of this varied experience, "Like, all together, I thought, well, I think I'll be a teacher" (Kate's interview, 10/11/01). Later on in the interview she also contradicted her statement that she did not have any science teachers who had practical experience to bring to the classroom. She recalled her high school biology teacher, Ms. Lowe, who had been "a

nurse or something” (Kate’s interview, 10/11/01). Viewing contradiction’s, statements and gaps together, the picture that emerged of Kate’s vision of herself as a teacher was uncertain. Clearly, she invested time and effort in other careers first, apparently taking one and a half to three years to consider teaching before taking action to pursue it.

Kate implied that she had a narrow social background. “The social work really helped me with relating to people. Figuring out that they were different than what I had been exposed to” (Kate’s interview, 10/11/01). She had gone to high school in Michigan and came to Georgia where she graduated from a top high school in an affluent county. “Really there was just basically one culture in my high school” (Kate’s interview, 10/11/01). The county was a ‘White flight’ suburban county. This term refers to the migration of upper middle class and middle class Whites from the racially mixed inner city where it as it becomes increasingly expensive to socially segregate one’s lifestyle. In Button County, Parkland High School was repeatedly placed in first or second ranking academically throughout the nineties, when Kate was a student there. Kate stated that, “After working as a case worker for birth parents seeking adoption plans, I have discovered that to truly help people it is important to put their actions in context by learning about their lives and how they think. Many times actions that may be offensive or unwarranted begin to appear logical when there is an understanding of a person’s perspective (Kate’s journal, 11/26/01). So, it could reasonably be inferred that prior to working as a social worker, she may have had a more narrow perspective. Kate reported that, “I was really good [in high school] and I think of looking back at my class, I did all of the homework all the time. I think that I always thought, well, everybody does” (Kate’s interview, 10/11/01).

Kate entered into the teacher training program with certain expectations. These expectations revealed something about her initial understanding of herself as a future teacher. “I think that the thing that surprised me was that I imagined a lot of ‘If this happens in your classroom, then do this. When your student does this, then this is how you respond.’ I kept waiting for the ‘Oh this is what you are going to do.’ It didn’t come. But the block is doing all of that” (Kate’s interview, 10/11/01). Having not found these concrete instructions in previous education classes, Kate seemed to have transferred the expectation to the block. Furthermore, Kate had friends that were in their second and third year of teaching and they had advised her to expect little from teacher education. “They would just be like, ‘Kate , just go through this because once you get in the classroom, that is when you really start to learn and you are never going to look back in your notes and be like, ‘Oh what did Dr. so and so say when this situation came up?’” (Kate’s interview, 10/11/01).

One of the most useful tools for understanding the participants was their student journals. Kate’s journal was very different from that of the other participants, just as Kate was very different. Her journal entries have the day and date underlined on the first line with the second line indented, followed by 4 to 19 single spaced lines of type. As a matter of fact, 18 of the 37 entries ranged from 9 to 11 lines in length. This was a very formulaic journal. It was concise in reporting what was observed, performed or learned. The single entry that exceeded nineteen lines was the 31 lines on August 24, 2001 on the assigned topic of beliefs about teaching. In this belief statement she wrote, “I have a strong responsibility to convey science knowledge to students....I feel that as a teacher it is my job to know my content and my students....Another of my responsibilities is to manage

my classroom in order that the most possible learning occurs....One of my goals is to provide an atmosphere where students feel secure and cared about enough that managing the classroom takes very little time away from teaching science” (Kate’s journal, 8/24/01). She stated another of her beliefs about teaching two days before this entry. She wrote, “I feel ultimately a teacher is a facilitator of learning, a person who encourages a maximal amount of growth in science knowledge and in maturity. I will always remain a learner myself, as facilitating learning in others probably begins with facilitating it in myself” (Kate’s journal, 8/22/01).

The picture of Kate’s initial understanding of teacher identity that emerged from her biographical data, her school biography, her career track and her stated beliefs included the following:

- 1) Teachers should master content, convey content, and manage in such a way that content is not interrupted;
- 2) Teachers should model learning by being learners;
- 3) Teaching should be a prescriptive, structured process;
- 4) Students that lack motivation and initiative, or who are not high achieving White middle or upper middle class may be difficult to understand and teach; and
- 5) The vision that she held of herself as a teacher was uncertain.

Kate’s interaction with her mentor

Kate’s mentor was Ms. Brown, the teacher of the year in the school district. Kate was with for her Biology II and Anatomy and Physiology classes. These were upper level, elective science classes. She shared Ms. Brown’s classes with two co-interns, Josh

and Tracy. Kate's first account of working with Ms. Brown was of positive, hands on mentoring. "One thing that seems obvious, but that I otherwise would have learned the hard way, was that she asked myself and another intern to perform some trial runs of a new lab kit she was considering doing with the students. In doing the lab, Josh and I realized that the lab took a lot longer than indicated by the instructions. Planning ahead like this is very valuable for time allotment and in communicating directions to students" (Kate's journal, 8/9/01). On the same day Kate wrote, "Another thing I noticed was that Ms. Brown went over the answers to a pre-test she gave to her students on the previous school day. She discussed the results from the test to determine which units to begin the semester with and told the students that she would be changing her lecture even that day because of their performance" (Kate's journal, 8/13/01). Kate found this to be effective and to indicate to the students a true desire on Ms. Brown's part to help them succeed (Kate's journal, 8/13/01). Kate had clearly received a good impression of Ms. Brown. She saw her as effective and caring with students and as instructive with the interns. This was by far the most auspicious beginning of the mentor / intern relationships included in this study.

The positive beginning with Ms. Brown continued to be very stable and Kate remained secure in learning from her observations of Ms. Brown's practice throughout the semester. Furthermore, these lessons were often quite specific and instruction-oriented. For instance, on the first day that the interns were present for a lab, Kate wrote, "I learned a few things from her [Ms. Brown] and the students that I hope to remember in the future. One thing she told us was to expect some chaos, especially with a new lab" (Kate's journal, 8/16/01). Although Kate was tense in this situation, she wrote that, "Ms

Brown seemed really relaxed and comfortable with the chaos. I noticed this attitude helps even the more distracted students” (Kate’s journal, 8/16/01). Kate was duly impressed and wrote that judging from Ms. Brown’s success, “I will definitely try to implement her theory about how she teaches students to think about lab exercise. She has students design the labs themselves with guidance from her” (Kate’s journal, 8/20/01). Kate also experienced a similar sort of observational learning concerning the use of collaborative learning practices. She wrote, “I have noticed that Ms. Brown had students work together often; using stations allows students to get practice on problems without feeling like they are just answering questions at the end of the chapter.... I can definitely see myself using this approach to giving students practice because it is a little more active” (Kate’s journal, 9/10/01). Kate was very receptive to these concrete examples of teaching content and skills. This fit well with her prescriptive, content-oriented initial understanding of teaching science.

Kate’s initial teacher identity indicated that there would be a degree of alienation between students and her. This issue raised its ugly head when Ms. Brown was absent and she arranged for the interns to teach a lecture lesson and give a quiz to the classes. Kate had real trouble managing the class for her portion of the lecture. Fortunately, her confidence in Ms. Brown was such that she was able to debrief this experience with her. “I expressed to her some of the problems that I had in teaching them and she said that often students will misbehave instead of asking for help or in response to anyone they are unfamiliar with” (Kate’s journal, 8/31/01). Kate was comfortable asking Ms. Brown for specific guidance. She wrote, “I plan to show the questions to Ms. Brown for her input,” (Kate’s journal, 11/9/01), and, “Another thing I plan to do is to talk to Ms. Brown about

how I graded the reports and the rubric I developed” (Kate’s journal, 11/12/01). Kate’s reports of initiating specific active questioning and debriefing processes with her mentor were unique among the study participants. This was a real strength for Kate. It allowed her to obtain the specific type of guidance that she needed and expected.

Kate seemed to have developed true admiration for and trust in her mentor’s professional practice and viewed her as the primary valid authority. This was very apparent when Kate received written critique on her teaching of a classroom demonstration lesson. “Ms. Brown gave me a higher evaluation in all areas than Dr. Wallace. I find this discrepancy interesting. I think Ms. Brown knows the students better and what level of attention to expect” (Kate’s journal, 10/5/01). Kate elaborated on this in response to interview probes, stating, “I think I value more what Ms. Brown had to say. Not to disrespect the professors.... Just because, she knows them [students], and because I have seen them do well with her. I feel like if I can do what she is doing then I will be doing with them good” (Kate’s interview, 10/12/01). Additionally she stated that, “Ms. Brown is a teacher who has been teaching for 20 years, she has been teacher of the county or the district or something, whatever. All of the students love her; they want to be in the classroom. I would take her opinion of my teaching, her criticism more to heart than others, although, I wouldn’t discount the professors. I totally think what Dr. Wallace said was dead on. I welcome her input also. If I could say, ‘Hey I want one of you guys to watch me teach my first year and tell me everything you see that I need to do,’ I would pick Ms. Brown, but then I don’t know Dr. Wallace as a teacher of high school students” (Kate’s interview, 10/11/01).

The only tension in Kate's interactions with her mentor showed up in the area of classroom management. This tension arose early on, following her frustrating attempt to deliver lecture notes on the day that Ms. Brown was absent. When Kate and her co-interns asked Ms. Brown about the management problems they had, Kate reported that she replied, "She explained how she handled behavior with concern for the student. I think, however; that probably I will have to establish my own style, something that I will become a lot more comfortable with. There are things that Ms. Brown tolerated that I really don't see myself allowing, just a personal preference" (Kate's journal, 9/5/01). Regardless of this slight tension in where boundaries should be set, Kate still saw Ms. Brown as a master of classroom management. She stated that, "Watching Ms. Brown manage her classroom has taught me that discipline does not have to be a problem" (Kate's journal, 8/24/01). Classroom management was Kate's greatest concern from the beginning. The basis for this was clear in her initial understanding of potential alienation toward students who did not have an internal motivation to learn and achieve. She understood Ms. Brown to have succeeded with students, without classroom management problems, even though the students were less structured and focused than the "one culture" (Kate's interview, 10/11/01) of her own high school experience.

Kate utilized both direct inquiry and observation in an effort to uncover the prescribed way of achieving this kind of successful management. Concerning the instruction of classroom 'rules' she observed that, "She told them, "If you are in control of yourselves, she doesn't have to be in control" (Kate's journal, 8/24/01). She observed the way that Ms. Brown communicated staying on task through her ease with the chaos of laboratory activities (8/16/01). She asked about the control issues that arose when she

lectured for the first time (8/31/01). She inquired about the absence of class rules in Ms. Brown's syllabus, reporting that, "She was like 'I just deal with stuff as it comes up. If you say don't do this, don't do this, it is like giving them ideas of things to do. Just treat them respectfully and you probably won't have a problem'" (Kate's interview, 10/11/01). Regardless of her efforts to uncover the prescription for classroom management, Kate's interactions with students showed that the tension that she stated in her journal in August remained unabated. This unabated tension may have been critical to the major change in Kate's beginning to understand teaching as a created process rather than a prescribed process. The evidence was clear in the final interview of the semester, when Kate said that, although Ms. Brown's classes worked, she might not be able to imitate her style, "She does a great job, but for me maybe it needs to begin with a little more structure or something" (Kate's interview, 11/19/01).

Interactions with the other mentors

Kate's esteem for and confidence in her mentor actually interfered in some ways in the use that she made of interactions with other mentors. Although she expressed gratitude for the advice of other experienced teachers, she said, "I always end up comparing them to Ms. Brown" (Kate's interview, 10/11/01). She also said, "See, I think that I am just partial to Ms. Brown. I know her and she knows me and I am really comfortable with her and I know the kids are learning" (Kate's interview, 10/11/01). However, she did write in her journal about some of the presentations that the other RHHS teachers gave to the interns. She found watching Mr. Payne's demonstrations to be, "fun," (Kate's journal, (9/26/01). but discounted them somewhat by writing, "It seems they lend themselves to physical science and chemistry but not so readily to the life

sciences” (Kate’s journal, 9/26/01). One of Kate’s assigned tasks was to develop and instruct by demonstration, and her statement indicated that she was not receiving a prescriptive method for biology demonstrations.

One particular entry concerning the instruction of other mentors on the topic of lesson planning stood out as an anxiety producing experience for Kate. She wrote, “I had been really looking forward to the classes about lesson planning because it is essentially the heart of teaching. After the classes with Dr. Wallace and Dr. Case, I felt really overwhelmed. Planning sounds soooooooo time consuming and includes so much more than I realized....it sounds like it’s a whole system with notebooks, calendars, and more calendars!” (Kate’s journal, 9/28/01). A telling point in this entry came near the end, when Kate recorded her hope that the opportunity would arise to “talk about time management and realistic planning...in the future” (Kate’s journal, 9/28/01). It was probably really worrying for Kate, who was very structured, to feel that the instruction on this topic was less than realistic. Notably, the other participants in the study, who were not as structured as Kate, found Dr. Case’s presentation inspiring rather than overwhelming (Helen’s journal, 9/24/01; Trevor’s journal, 9/24/01). Another occasion when the presentations of other mentors were problematic for Kate occurred when Ms. Howard presented a lesson on lecturing. She wrote, “I felt somewhat discouraged after hearing Ms. Howard’s class about lecturing. She ended up fielding a lot of our general questions and she just seemed negative. It made me feel a little disheartened about teaching. Sometimes after hearing about teaching it feels so overwhelming and I wonder if I will last. I hope it is better than it sounds” (Kate’s journal, 10/10/01). Mr. Page’s presentation on job interviews provoked a totally positive response though, “Personally, I

think the practical ideas he shared about how to appear confident are the most beneficial to me because I always get nervous in job interviews and when I am talking about myself (Kate's journal, 11/19/01). It was interesting to note her language in this response. She wrote, "appear confident," (Kate's journal, 11/19/01), rather than 'be confident' or 'show your confidence,' although, this may have been purely a reflection of the tone of the presentation.

Kate was more conscious of cognitive interaction with the university through the assignments than the other participants seemed to be. For example, when she received differing feedback on her demonstration lesson, she considered Ms. Brown's input the most valid, but she also said that, "The thing I learned from Dr. Wallace was that, because I didn't even see that guy and girl, was that I need to be paying attention to everybody" (Kate's interview, 10/11/01). Ultimately, Kate expressed the desirability of having had both critiques. "I think any time you have more input you are likely to be better off. I totally saw what she [Dr. Wallace] was saying. I think having Dr. Wallace's evaluation will definitely impact the next time I go in front of the classroom, because I will look up more. I may not intervene as she would or when she would, but her evaluation showed me that I am a little oblivious to the kids sometimes" (Kate's interview, 10/11/01). Another assignment that caused some tension for Kate was the assignment to create a syllabus. She saw a contradiction between the elements of the syllabus as it was assigned and Ms. Brown's syllabus. "He [Dr. Oliver] gave me the impression that guidelines and procedures were the thing, but when I looked at Ms. Brown's, there weren't guidelines and procedures" (Kate's interview, 10/11/01). She had been given syllabi from many of the RHHS teachers as models, and many of them had an

extensive list of rules and consequences. However, Ms. Brown's syllabus did not have these and she knew that her classroom management was effective. She related her final decision, "So on my syllabus I tried to stay away from a lot of rules, but I did put some in there because that was what they said they wanted on the assignment, but I thought about that today as I was typing. I don't know if I would really do this" (Kate's interview, 10/11/01).

The high point of Kate's interaction with the other mentors involved with was Dr. Wallace's instruction about rubrics. Kate wrote, "I really started to appreciate the value of a specific grading rubric today. Several of the students had questions about their lab grades and it was really helpful to be able to show them the rubric I used to grade their reports. Pointing out how the rubric followed the lab question directly helped resolve almost all of the questions. I also realized that being organized and consistent in grading is something the students really pay attention to. Thanks Dr. Wallace for going over this in class because it really came in handy (Kate's journal, 11/14/01). All in all she believed that the multiple mentors and instructors were beneficial. "There may be draw backs, like consistency, but many perspectives is a good thing. It really is more well rounded. Each person had had a slightly different attitude. They don't really disagree on anything, but they are each different" (Kate's interview, 10/11/01).

Interactions with peers

Kate had friends who were second and third year teachers, and they were among the greatest peer influences on Kate's participation in the pre-service science teacher education classes. These peers were not science teachers and, although they were graduates of the university college of education, they had not participated in a situated

pre-service block of education classes. When Kate became frustrated or anxious, she was likely to consult these peers. This occurred prior to the pre-service block, when Kate felt a lack of prescriptive training that bothered her. On that occasion her friends counseled her that to, “just get through this,” (Kate’s interview, 10/11/01), that the classroom was where you really learned to teach, and that, “you are never going to look back in your notes” for guidance (Kate’s interview, 10/11/01). This advice impacted her expectations for the education courses in general, and since Kate was a very structured and concrete learner, it is likely to have undermined her confidence in the validity of the university instruction. She continued to take her concerns to these friends and to place a great store in their replies. For example, on the occasion of her receiving differing evaluations of her performance from Ms. Brown and Dr. Wallace, Kate consulted her friends and she reported that one of them advised as follows, “She said, ‘the mentor is who you should listen to because she knows the kids. An outside person doesn’t know how they learn every class is different. They tell you all these things [in teacher education], but you have to know your kids. The things they say never let them do, sometimes; I let them do because it works better” (Kate’s interview, 10/11/01). She also consulted her teacher friends about the seeming contradictions between the university instructor’s format for the syllabus assignment and Ms. Brown’s syllabus. The friend confirmed the validity of Ms. Brown’s approach according to Kate’s report that, “I did talk to my friend who is teaching, and she doesn’t have any rules” (Kate’s interview, 10/11/01). In summary, the her teaching friends had a diluting effect of her expectations of teacher education in general, but possibly a reinforcing effect on the situated training of the block, where their advice validated learning with the context of the actual classroom.

Kate also made conscious use of her co-interns in her classroom, and, to a lesser extent, the other interns in the program. The first time that she referred to acting in conjunction with her co-interns was during Ms. Brown's end of August absence, when the interns lectured. Kate's part of this did not go well, and she reported that the interns consulted Ms. Brown as a group to follow up on this experience (Kate's journal, 9/5/01). Tracy, one of Kate's co-interns, reported having consulted with Kate and Josh, the other co-intern, between the two classes about changing the presentation format because of the class management problems that they had experienced. Kate did not write about this consultation between the co-interns, maybe because according to Tracy's report Kate and Josh were not in favor of doing anything any different than the plan that Ms. Brown had left (Tracy's journal, 8/31/01). Kate did report that she and her co-interns consulted Ms. Brown together after attending Ms. Howard's presentation and receiving a very negative impression of teaching (Kate's journal, 10/12/01). Similarly, after teaching an inquiry based laboratory class, she wrote that, "I plan to talk with Ms. Brown and the other interns about this activity more as well as my interactions with the students" (Kate's journal, 11/7/01). She made observational use of her co-interns also. She said, "I think listening to the other interns [in Ms. Brown's class] helps because one of them, the girl, feels so comfortable with that [activity level] and she did fine, and then the guy who is with me, he is a lot more high energy in the way he comes across but he is also, I think he would feel more comfortable in a little more control, but we handled it in different ways" (Kate's interview, 11/19/01). She also collaborated with her co-interns, particularly Josh, with whom she shared several teaching assignments. For instance, Kate said, "So he and I taught the same unit, but just two different classes, and so I gave him the rubric I had

designed for the lab report and we were supposedly grading from the same rubric and it took me forever to grade twenty lab reports and he did his in like, forty minutes” (Kate’s interview, 11/19/01). Clearly, Kate was ready to utilize the co-interns and Ms. Brown as a teaching team of which she was a part.

Kate refers to interns other than those with whom she shared a mentor and class far less often. She did report that one set of interns did share their high opinion of their mentor, Dr. Case (Kate’s interview, 10/11/01). She reported only one focused interaction between herself and interns other than Josh and Tracy, when she critiqued another intern at his invitation. “One of them, [was critiqued by Kate] because he asked us. We had little evaluation sheets and just a certain number of people had to fill them out for each different activity. He asked me and another intern to fill them out together, so we did give him pros and cons, but otherwise, I don’t think so” (Kate’s interview, 11/19/01).

Actually, Kate indicated that she and her co-interns probably avoided critiquing each other, “I think it was probably that we were just being critiqued by other people and so, even I did that, I would just be really supportive of them and comfort them when they were nervous or put a lot into it” (Kate’s interview, 11/19/01). Although she did say, “I think they liked some of my activities. One of them was working on having this loud speaking voice and she just commented that even though I was quiet, I was able to project” (Kate’s interview, 11/19/01). The picture of peer interaction that emerged was again bounded by a positive stance toward the activities of the mentor’s classroom.

Interactions with students

Kate was prepared by her initial understanding of teaching to be alert to misunderstandings between herself and students with whom she did not share a cultural

background (Kate's interview, 10/11/01). The students in Ms. Brown's classes at RHHS seemed to fit into this category, as Kate reported, "There are only three White students in there" (Kate's interview, 10/11/01). When asked if being out of her comfort zone was a good experience, she replied, "Yeah, I might have seen Dangerous Minds too many times" (Kate's interview, 10/11/01). Clearly, she was anxious about interacting with these students. Her experiences during the first weeks of the semester reinforced her expectation and anxiety about students.

Kate was pushed out of her comfortable structured learning space beginning with the first class lab day, when she wrote, "The students I was working with did not respond well to my tense demeanor, and hopefully in the future I will have experienced some bumps and therefore have a more relaxed attitude" (Kate's journal, 8/16/01). She also found that her orderly and exacting approach was not well suited to some other teaching tasks. She wrote, "I had no idea how hard grading consistently would be...I also found it really challenging to be consistent from one lab report to the next" (Kate's journal, 8/22/01). In combination with her initial teacher identity, these comments revealed that she had been mentally well positioned for problems with students by the time she had the first encounter with teaching RHHS students on August 31, 2001.

Kate wrote, regarding her first attempted lecture, "Teaching was a whole different experience then I expected....I was not holding their attention and I was surprised at the disrespectful behavior of some of the students. I was even more surprised at my response to that. I realized that I really need to work on being patient, addressing students who are being distracting and students who are being unfocused (Kate's journal, 8/31/01). Josh elaborated more than Kate on this event, writing, "Both sessions were

pretty good for me, but not for my fellow interns. Not only were they not good, they were really bad. Our students are disrespectful and way too loud. They just don't care about a whole lot" (Josh's journal, 8/31/01). Tracy reported that she felt particularly bad for Kate because she really had to struggle to get the students to focus (Tracy's journal, 8/31/01). At this point, the first lab, the first grading experience and the first lecture experience have confirmed her expectation of alienation between herself and student work and behavior. For the remainder of the semester, she was very focused on classroom management and what to expect of students.

Kate had stated that during her experience as a social worker she had learned important lessons on dealing with and understanding the motivations of people with very different cultural backgrounds than her own. However, her journal writings about her interactions with students reflected an on-going struggle in this area. After observing Ms. Brown reviewing the students for a quiz, Kate wrote, " I have really learned from her not to assume that because I have been over a topic with students that they have a good understanding...obvious, right?... I think that I forget this easily because I have always been eager to learn about science..... I have to remember not to assume that all of the students are like me" (Kate's journal, 9/21/01). She had trouble finding a stance to take with students, she wrote, "I also don't know which battles to choose yet or how strict to be. " (Kate's journal, 10/1/01). Regardless of these difficulties, Kate felt a growing bond with the students, "I have really started to become attached to the students at RHHS but I still feel a barrier between myself and some of the girls. I am not sure why because I usually get along better with girls (Kate's journal, 10/12/01). The cultural differences continued to puzzle her. One of the students had decided to drop down out of the

advanced level math class that his previous math teacher had persuaded him to try and Kate was surprised by the role that race played in his decision. Kate reported that, “He said, “I am the only student in the class that is not White and that should tell you something” I was surprised that the student felt that only White students would be able to succeed in a harder class. It was an eye opener for me and motivates me to really discourage these misconceptions with my students in the future” (Kate’s journal, 8/22/01).

Kate really worked at learning to see the student’s perspective and at understanding what motivated them. Some of the tools that she found to be effective for this were the one-on-one interviews associated with university assignments. One such assignment was the identification of student misconceptions about science, and Kate wrote, “Even though most of our time together was spent talking about bacteria and viruses. I realized how helpful one-on-one time can be. The connection really helped me to feel better about relating to the students. This is something I definitely will take into my teaching career” (Kate’s journal (10/15/01). During another set of interviews designed to explore cultural understandings, Kate found that several things that were in opposition to her expectations of two female students. Her listed conclusions upon reflecting on these interviews were, “1). People may be different from how they seem. 2). People probably learn differently from how I learn” (Kate’s journal 11/26/01). She confessed, “Often I assume that the students will learn and behave the same way I learned and behaved as a high school student....After thinking about the interviews, students’ responses to me and my characteristics, I realized that my personality and learning styles can be obstacles to my relationship with students (Kate’s journal, 11/26/01). Several

clues existed in the data that, even before the cultural interviews, Kate had become very aware of this problem.

Kate really struggled with student / teacher relationships and she was really concerned about this. She said, “I just don’t do real good in front of the students” (Kate’s interview, 11/19/01). She reported seeking insights into the situation from Ms. Brown, “The girls weren’t responding well to me, and I was like, ‘Why?’ So Ms. Brown asked the kids and they said, ‘Well, she just wants everything perfect and everything just in line” (Kate’s interview, 11/19/01). Kate had some insights of her own into this problem with students during her mini-unit instruction. On the first day of the mini-unit she reported that teaching took a lot more out of her than she expected, “I guess I always thought that most of my energy would be spent in planning and grading, but today I was surprised to see how much presentation took” (Kate’s journal, 10/31/01). The entry for day two of the mini-unit was somewhat more dramatic, “I had all of my lesson plans typed out and all my supplies set out and organized. I introduced the animal and plant cell activity and had the students working nicely in groups, then two of the female students got into a really loud argument, which was escalating. I tried to get the girls to calm down, but they didn’t pay any attention to me” (Kate’s journal, 11/1/01). Ms. Brown came to the rescue in this instance.

The third day of the mini-unit included a lab and Kate wrote, “I had a tough time managing students and determining who was talking about the lab and who was just talking” (Kate’s journal, 11/2/01). She was pleased with her organization during this lab and with the activity, but she wrote, “My main issue is being able to attend to several things at once, the materials, the students presenting, student questions and students off

task. Multi-tasking is a true struggle for me and comes across as stress / frustration to the students” (Kate’s journal, 11/2/01). Kate’s experiences while teaching led her to shift further away from a prescriptive expectation of teaching, as she came to believe that one of her problems might be that the students were accustomed to Ms. Brown’s more low key, flexible style. She believed that the contrast in their styles made her seem excessively controlling by comparison (Kate’s interview, 11/19/01).

Afterwards

Kate did her student teaching semester in the same county, but not at the same high school from which she had graduated. The high school was very much like the one that she had attended. Following her student teaching she became employed as a biology teacher in the county, but in one of its most diverse high schools. The researcher unsuccessfully attempted to contact Kate for a brief follow-up interview several times near the end of the first semester and during the first month of the second semester. This proved to be inaccurate and during the last week of the second semester a follow-up interview finally took place.

The follow-up interview with Kate took place in her classroom. It was necessarily brief, because she had appointment with students after school to review for the semester final. The setting suggested the first insight into her teaching experience. It was not a lab equipped room and the walls were fairly bare, except for a poster set on one wall. Kate had made little imprint on the physical space of her classroom, she told the researcher the posters were left over from the last teacher.

In response to a general question on how the year had gone, Kate said that her goal for second semester had been to try to stay at school less than fifty hours a week.

She said, “It has been so much work all of the time. For the first semester I just never went home” (Kate’s interview, 5/02). She said that she was going to be coming back for the 2003-2004 school year, but that it was a recent decision. She had been considering a move out of state, but even then, she had not planned on leaving teaching. She did not make the enthusiastic statements about being a teacher that the other participants had made, but she did not make negative statements either.

Typically, interviews with Kate had required specific probes and that had not changed. When asked about her student teaching experience she said, “It was really different from RHHS. The mentor was much more structured and the students were not as active” (Kate’s interview, 5/01). Kate had been more comfortable in this environment. Looking back on her experiences at RHHS she believed that they had helped her to succeed at student teaching. However, her RHHS experience was more important to her during this first year because, “The students here are more like the students at Rocky Harbor. I really wouldn’t have been ready for this if I hadn’t been there” (Kate’s interview, 5/10).

Kate’s anathema at RHHS had been classroom management and student expectations. She wrote, “I want to imitate how Ms. Brown manages her students because her students are really learning” (Kate’s journal, 10/5/01). However, as the semester progressed she reported that she might not be able to tolerate some of the things that Ms. Brown did and that she might not be authoritative enough to carry through with Ms. Brown’s type of class management. In fact, now that she was teaching in her own classroom, she was not imitative of Ms. Brown. Kate said, “I found out during student teaching that more structure was a lot better for me. It made a real difference in me being

able to manage the classroom and do all of the things that I needed to do to teach” (Kate’s interview, 5/10). With the differences that she reported in the RHHS classroom and her student teaching classroom, which had she referred back to the most during this novice teaching year? “Both of them actually. For myself, I do things more like my student teaching mentor. That works better for me but when it comes to trying to understand the students, I refer to Ms. Brown’s students” (Kate’s interview, 5/01). For Kate, this has meant more individual quiet work than Ms. Brown utilized, augmented by one-to-one consultations with students.

Kate had not taken much note of the age of students taking elective biology courses under Ms. Brown at RHHS and those that take required biology. Looking back, she was quite sure that Ms. Brown would have had to have a more structured class with these younger students in a non-elective class. As a matter of fact, she said that the thing that would most improve the situation was for the students to see more levels of classrooms. When she was in high school she had been motivated to learn and succeed and truly loved science. She has come to see believe that, “Some people are in there because they really have to graduate and don’t really care what you are talking about” (Kate’s interview, 5/01). The interview ended a little abruptly because two students showed up for their tutoring appointment. Kate was still an anxious and non-spontaneous interviewee.

CHAPTER 7

DISCUSSION, INFERENCES, IMPLICATIONS AND CONCLUSION

Discussion of Helen's data

The picture of Helen's initial teacher identity had been internalized through time and amateur experience. The claims that emerged from her personal biography and school biography were:

- 1). Students are capable and should be challenged; students will rise to the teacher's expectations;
- 2). A teacher's confidence in her students will inspire the students toward self confidence;
- 3). Teachers are responsible for creating the students' learning experience;
- 4). A teacher's mastery of content should be such that it inspires the students' confidence in her teaching; and
- 5). Student learning has taken place when students can demonstrate what they have learned.

Helen's sense of self and of self confidence provided a foundation for her learning from this pre-service science teaching experience. As a student she did not see herself as gifted, but saw herself as able to rise to a challenge through hard work. This view had been communicated to her through her teachers and family. She credited the way that others had responded to her, their 'belief' in her, as the reason for her confidence as a learner. This self value was a strong two way support for her initial teacher identity. It supported her confidence that she would meet the challenge of teaching and it supported

her expectation that students would reflect the confidence that she invested in them. These values and experiences were translated and validated through early enacting of teaching her siblings. This experience built upon itself, allowing her to continue to mimic the behavior of teachers and to further her image of herself as a success at teaching. She had a philosophy about who she was and what she could do that served as a framework for building her teacher identity. As she worked through her experiences at RHHS she accepted or rejected models and messages based on how well they fit this framework. During the semester she underwent two notable shifts in how she could develop teaching based on this existing framework.

The first shift occurred very early in the semester. Helen had expected to learn about teaching from teachers and she was prepared to model their practices. This expectation was strongly incorporated into her initial teacher identity. By the time that she was in middle school she had learned how to follow modeled teaching. Helen's journal writing reveals some of her initial effort to accept her mentor's model. Initially, her negative impression of her mentor was very restrained. When both she and her co-intern wrote in their journal about the first planning period spent with their mentor, Martha recounted the initial bad impression left by Ms. Howard's anecdotal retelling of a previous year's conflict with outspoken and detailed criticism. Helen, who was younger, less experienced in teaching and an undergraduate, did not directly relate an account or comment on the story, but confined her written comments to stating that a negative impression had been left from the session (Helen's journal, 8/13/2001). She expected to have a model of teaching enacted by her mentor and her restraint indicated that she was trying to wait for it to emerge. A comparison between the first six journal entries of these

two co-interns continually shows Helen making many of the same observations about practice, class management, student performance and expectations for student performance that Martha makes, while being much more restrained in criticizing the mentor directly. However, by the end of the first seven journal entries Helen has shifted her focus of learning entirely away from Ms. Howard. She no longer used the mentor's activities as a point of view for her own understanding.

As Helen looked away from being directly mentored she turned toward the students as the focal point of her development. This was allowed by her initial understating of teaching since she expected to depend on student success as a bell weather of teaching success. She had said, "They would get annoyed but they got it. They understood it by the time I was through" (Helen's interview, 10/12/01). So naturally, she looked to student success to direct her in what to use and what to discard from the model before her. Helen had expressed a very humanistic understanding of success in referring to the esteem and confidence that she had relied on to format her own success. So she was not looking just for academic success in terms of grades, but also in terms of engagement and positive attitude toward students and student learning. Occasions when she found any parts of this success were judged suitable to incorporate into her initial framework. Occasions where no part of this success could be found directed her to look for a better practice. This form of evaluation is what seemed to lead her to discard Ms. Howard as a model. It was very interesting that she did not discard her based on a personnel critique but on the basis of student success as she understood it to be. In fact, she remains reticent about criticizing her mentor even under direct probing.

A second shift in Helen's focus for learning was seen in how she solved the dilemma of whom to use as a model. Her solution was to look elsewhere for ways to redesign activities, instruction planning and the classroom in ways that could comfortably be added onto her initial framework of teacher identity. She formatted her teaching models from an amalgam of the instruction from other mentors and the experiences of her peers. "I am just doing my thing and trying to figure out from everybody else, and from her as well, different things that I want to do" (Helen's interview, 10/12/01). Thus, Helen's initial teacher identity and its origin provided a very good foundation to build on during the pre-service science teaching experience. However, all might have been lost if there had not been, "everybody else"

Perusal of the data showed Helen drawing from her peers, all of the other mentors and their shared materials, the other classrooms, and from the artifacts of her own teaching to create her vision of herself as a teacher. These activities allayed her frustrations and reinforced her judgments. Helen had revealed that she had been molded by people that believed in her and by their expectations of her that she came to share. Quite naturally, she looked for people with whom she could share expectations. She had explained that a teacher with content knowledge inspired her to work harder, and, not surprisingly, she looked for those whom she could evaluate as capable and knowledgeable of teaching. Student response remained her benchmark in the search for models and methods meeting these criteria. Therefore, the trajectory for her teacher identity development was set not in the context of her mentor's classroom but in the context of the larger community of teaching at RHHS and mediated by observed or reputed student success.

Discussion of Trevor's data

Trevor's initial teacher identity was still very externalized and nebulous. He understood and accepted, with little or no critique and modification, the definitions of teaching and learning dictated by the social and political climate of his home and community. Claims that emerged from his personal and school biography were that:

- 1). Teachers hold a position at the bottom of a defined educational hierarchy;
- 2). The hierarchy that he recognized was dictated by the political actions of school boards and communities;
- 3). That coaches are closer to the power base of the hierarchy; and
- 4). That his initial teacher identity was nebulous and limited to defining roles.

He did not recount contemplating teaching as a career prior to his sophomore year at the university. Even then it was a fallback position provoked in part by his disappointment in his university performance. Therefore, much of his initial teacher identity existed only in the present reflection on past events. When he was living the events as a student he was not mentally casting himself as teacher as Helen had. This identity still had a very externalized basis and was, therefore, immature and superficial.

Like Helen, his school biography indicated that expectations were high. However, in Trevor's case the expectations were interpreted through schools, teachers, and students being held accountable for test scores by the community as a political body of the. Unlike Helen's biography, where expectations were communicated through personal beliefs, the expectations in Trevor's case were social demands, communicated at least in part through the offices of public authority. At various points, Trevor sighted school boards, principals, the Southern Baptist Church and the civic authority as the arbitrators

of accountability. “I grew up in a town where grades were really important to kids, parent, and school alike. The town received recognition when the school did well, and the kids received the praise from the parents. It worked both ways, too. If the school was faltering the teachers were always in trouble and some were even getting fired. The concept of straight A’s was a big thing for me in middle school and high school” (Trevor’s journal, 10/01). This excerpt from Trevor’s journal painted a rather hierarchical picture of who is accountable to whom. This authoritarian thread was woven throughout his data.

The tone of passing blame to some other level in the hierarchy showed up in other places in Trevor’s data. Trevor’s very first entry about his mentor went straight to the point of accountability to authority outside of the classroom even on science content when he stated his surprise at Mr. Blair’s raising the topic of evolution. In this reflection, he sighted both the school board and religion as authorities to whom he expected to be accountable for science content. The conservative religious fundamentalist discomfort he expressed by clinging to the emphasis on the use of the word, “theory,” in more or less its common sense rather than it’s scientific sense could even cast some questions on his content knowledge (Trevor’s journal, 8/13/01). There were two other occasions where his biographically based understanding of the hierarchical relationships among the participants in the education setting was explicit. First, he responded with extreme nervousness to the presence of Dr. Wallace in the classroom, even though his role is fairly passive during the class. Also, he was anxious about interacting directly with a student whose father holds a position of authority in the district administration (Trevor’s

journal, 10/5/01). The concept of accountability hierarchies shaped his perspective regarding his performance as a student and as a pre-service science intern.

Trevor implied that his secondary education had falsely led him to expect success in university science. He bemoaned his high school teachers' emphasis on rote knowledge and the failure of his high school teachers to prepare him to think critically and independently. He not only reported feeling that he has not done as well at the university because his secondary education failed to prepare him; he also felt that the university educators have failed to teach him in a way that would allow his success. He expected to be re-taking two of the science classes that he was concurrently enrolled in during the block. Why, because the instructor did not teach in a way that prepared him for the test. This was a contradiction. The cell biology instructor did not prepare him for the test, but his high school teachers taught to the test and overemphasized rote learning. It seemed that Trevor had learned to acknowledge the idea of teaching as something other than communicating rote content but that he had not internalized that idea. Trevor's school biography placed him in an ambiguous position. He was conditioned to acknowledge and submit to formal systems of authority and simultaneously he perceived that school authorities had betrayed him into the expectation of continuing academic success. The understanding that factors outside of himself are largely responsible for his performance was apparent in his early teaching experiences also.

Trevor was not very happy with his first teaching performance. Probably few teachers could say that they had been happy with their first efforts. However, Trevor attributed much of the difficulty to his mentor's management and organization. In one interview he referred to Mr. Blair as not having much 'power' in the classroom. The

choice of the word power was interesting for someone as politically aware as Trevor. Once again, Trevor's school biography placed him in an ambiguous position. He is conditioned to acknowledge and submit to formal systems of authority and finds himself without an aggressive mentor that making the learning tasks explicit. He said this quite literally at one point when he wished for someone who would really take him to task and "rip him up" (Trevor's interview, 11/9/01). This focused his learning in the pre-service science teaching block on an anxious endeavor to understand, or decode the ways in which approval from those in authority might be gained and a hesitance to look outside of those bounds. Although he was still looking for authoritative models, he shifted his search to those models outside of his mentor's classroom. This shift led him to access other members of the community of practice, and through this access he was able to begin to locate himself within that larger community. This was very important in reducing his anxiety.

This shift was directed by his initial teacher biography, which was really more of a student biography in Trevor's case, toward high school mentors both past and present. He accepted most of what came directly from the high school mentor teachers. His quest for formal approval carried an innate fear of formal disapproval, which may have contributed to his having made little use of the university professors as mentors. He made spontaneous connections between his experiences in the situated science education block and the past practice of his own high school teachers. He connected Dr. Case's lecture on planning to Ms. Powers planning when he was a student and he takes student / teacher relationship model from both Ms. Powers and another of his high school teacher, Ms. Owens (Trevor's interview, 11/9/01). He was even quick to refer to established teachers

outside of either the situated setting or his background, using both his botany instructor's cautions about liability and the comments of teachers with whom he has attended classes as active inputs into his ideas about his own future teaching. There was some evidence that this sort of interchange may have affected his thinking of himself as a teacher / coach. Trevor was clearly building a network of authorities on which to base his thinking and actions.

A second shift in Trevor's framing of his teacher identity occurred as the semester progressed. He began to turn his attention more toward students. Although Trevor did not relate much information about the mechanics of teaching and evaluating students, his student interactions were none the less valuable as he learned what to realistically expect from ninth graders and as he learned what he was and was not prepared to tolerate in the classroom. Since Trevor had not gone through secondary education imagining that he might teach, he had not tried to look at the activities of his own high school classrooms from the teachers' point of view. Certainly he had begun to do so through previous education classes, but most of these efforts were not contextualized. Those that were placed in a context, such as observation during education psychology, were time limited in a way that the present class was not.

This shift toward viewing activities from the point of view of their effect on students was the most important outcome of his interactions with students. For instance, he was very concerned and frustrated with Justine's behavior and this concern was multifaceted. He was concerned for Justine, for her affect on the tone of the classroom, for her affect on the learning of others and for his personal distraction. These concerns were not limited to a short time frame but extended through at least two months.

However, since he did not follow up on what is to be done and he did not comment on the outcome of these concerns, his learning about students remains passive. (Trevor's journal, 9/14/01; Trevor's interview, 10/12/01).

Trevor seldom dug into student motivations and only one time did he report student performance data. Furthermore, that one time was not concerned with assessing his teaching or an assessment of anything he taught (Trevor's journal, 8/17/01). This showed his limited use of the student interactions as ways to learn to teach and access student learning. However, Trevor had made several comments about the affective domains of student and teacher interaction that indicated that he was developing a more internal focus for his teacher identity. For example, in his discussion of the teaching in terms of the roles that the teacher played in the students' lives he focused on the nurturing aspects of a teacher's job. He expressed concerns about protecting students, guiding their development, understanding their behavior and performance in the context of their lives and being a positive role model.

Trevor made very little use of peers as a resource for learning. This was valuable to analysis only in the possible significance of the omission. Peers, by definition, shared his hierarchical status in the community of practice. This gave them no specific value to the efforts to decode success in the hierarchy or RHHS or of the university. Therefore, they failed to come to his attention as tools to achieve his goals.

There was one final reflection on Trevor's data that should be mentioned. He seemed to be focused as early as the November interview on being a student teacher under Coach Zales as well as on an assurance of employment at RHHS as a coach. He was not forthcoming about how this had been accomplished, and actually dodged directly

answering how he knew to expect this future job offer. He did say that he had not been interviewed ‘yet,’ but he was going to be working with Coach Zales in the upcoming school year (Trevor’s interview, 11/01). This may have been a ‘good ole boy’ phenomena from mutual connections between his university educated family and the coach, principal or a school board member. Whatever its roots, he remained reluctant to elaborate on the reasons but fully confident of his future. While not treating this slippery information as data concerning his developing teacher identity, it must be considered in analyzing the data. This security of a niche and the acceptance that went along with it would have removed some of the novice anxiety and discomfort and allowed a shift in his focus. This may have been a factor in Trevor’s happy race through the program with an eye toward fitting in and being accepted by the teachers rather than the students. It also may have encouraged him to be more superficial about the ongoing experiences because of focusing on a future role, especially since a defined role was such a large part of his understanding of teaching.

In the final analysis, Trevor seemed to see high school teaching as an insider pursuit, among students and teachers and he placed both his peers and the university staff firmly in the category of outsiders. Of these, the teachers had the status afforded by success and the authority of a position in a formal hierarchy and students, while of concern, were mostly out of the power loop as the ‘products’ of authoritarian practice. At times he had questions and needs of which he was conscious but did not take any action to utilize the resources available to get answers or to fulfill the needs. He questioned how student parent conferences play out and how science department budgets were managed. He desired a more intense a more active critique of his teaching. Remedies for these

concerns were accessible and yet he failed to report a search for them (Trevor's journal, 9/14/01; Trevor's journal, 9/26/01; Trevor's interview, 11/9/01). With little internalization of an initial teacher's identity and personal confidence assaulted by academic disappointments, the path that Trevor took toward defining his identity in the classroom was dependent almost entirely on seeking and role-playing mainstream science teaching behavior. However, once his 'niche' was secured, he was able to further his teacher identity to include a vision of himself as a protector and nurturer of students.

Discussion of Kate's data

The assertions made concerning Kate's initial understanding of teacher identity:

- 1) Teachers should master content, convey content, and manage in such a way that content is not interrupted;
- 2) Teacher should model learning by being a learner;
- 3) Teaching should be a prescriptive, structured process;
- 4) Students that lack motivation and initiative, or who are not high achieving White middle or upper middle class may be difficult to understand and teach; and
- 5) The vision that she holds of herself as a teacher is uncertain.

The issues with structure, content intensive orientation, and difficulty crossing the boundary into the student's world were present in her initial expectations of teaching and had been emphasized in at least some of her previous career experiences. These continued to dominate and undermine her classroom activities. On the positive side, Kate's conscious awareness and conscientious efforts, along with her mature

observational skills allowed her to interact differently with her mentor and with her co-interns to address specific concerns.

Kate utilized her mentor as a coach, critic, and model far more than the other study participants reported doing. There were probably several reasons for this. For one thing, Kate's mentor taught upper level electives, which allowed her to delve more deeply into content. This would be something that would appeal to Kate as a degreed biologist. Also, she knew from the beginning that her mentor was an award winning instructor. Finally, Ms. Brown's rapport and ease with the students was something that Kate anticipated having a difficulty forming. As a matter of fact, when speaking of her school biography, Kate said that Ms. Brown reminded her of her own high school biology teacher, "Ms. Lowe was cool. She did me such a great job. Ms. Lowe was fun. You know, she reminds me a little bit of Ms. Brown" (Kate's interview, 10/11/01). The validity that Kate attributed to Ms. Brown's teaching allowed her to regularly seek Ms. Brown's input through active questioning and debriefing. This was something that Helen had not reported and that Trevor had only very rarely reported doing.

Another notable difference in Kate's reported interaction with peers was her teaming with co-interns in teaching and in debriefing. Both Helen and Trevor did some collaborative planning and teaching with their co-interns, but they did not report taking questions and concerns to the co-interns and the mentor as a teaching team. Kate reported this several times. In the mentor's classroom, Kate's interacted actively and in depth with the mentor, the co-interns and the students. However, this bubble of in-depth interactions did not extend into the larger community of practice.

Kate's use of the resources outside of her mentor's classroom was much different than the other participants. Trevor had frequently pursued the model of other mentor's and so had Helen. This was very clear in their journal entries following the presentations of other mentors. They also sought guidance from the other mentor teachers at times other than during their presentations. Kate's journal only referred to three of the presentations briefly and two of the three references were negative. The university instructors are one resource that Kate used far more than the other study participants. She utilized the assignments, the criticism, and instruction of the university instructors in consciously acknowledged ways. The other participants were not nearly as conscious of the guided instruction that they received. Finally, Kate's interactions with students was reported far more than Trevor's had been and nearly as much as Helen's had been. However, these reports, unlike Helen's, were focused almost entirely on student management, whereas Helen's reports were more about student performance and affect.

The picture of Kate's developing teaching identity that emerges shows two important development trajectories. She began with an idea of content focus and framed the purpose of class management directed toward supporting content delivery. Toward the end of her semester, she placed more importance on the relationship aspects of management. She seemed to have come to understand the importance of establishing a comfort level and rapport between the teacher and the student as being necessary to overcome the student's resistance to content focus. Obviously, this change would have been delayed if Kate had been restricted in the amount of time that she was able to spend with students and the types of classroom activities that she was able to observe. Secondly, she moved away from the idea of teaching and managing in the way prescribed by even

an expert and respected practitioner and toward creating methods of instruction and management suitable to her own vision of teaching and her personal standards of classroom conduct. Her reported experience in student teaching and in her first year teaching indicated that she continued this developmental tack. The impression received during the brief follow-up interview with Kate was that she continued to have some concerns with student management. However, it was clear that Kate had chosen structured learning as part of the implicit curriculum in her classroom.

Discussion of the university's role

Each of these participants was able to construct a further understanding of their professional identity as a teacher even through they began from very different understandings of their initial teacher identity and they made very different uses of the resources incorporated into the situated cognition model of the pre-service science teaching block. Although there were minimal overt references to the university program or professors in any of the data sources, the university program was the unifying context in which their learning took place. The university context was fully embedded in the situated learning context of the high school, thereby appearing to participants as shadow to the apparent substance of the community of practice. Confirming common knowledge, appearances can be deceiving. The impact of the university, although embedded, was far more than shadow.

The university played all of the traditional overt roles. The professors and teaching assistant provided the expected feedback in the form of formal observations, evaluations of written assignments, and through notated responses to journal writing. The university professors also chose the reading assignments, the written assignments, and

some very specific performance tasks. Again, these activities fit the usual student expectations of the professor's role. Many of these activities were incorporated into lectures and discussions by the professors and university staff in usual and expected ways. However, unusually and unexpectedly, the professors and university staff were not dominant in the activities of lecture and discussion. Furthermore, as guest lecturers, the high school teachers were held in fairly loose topical constraints and allowed the freedom of their professional judgment and experience in choice of examples and materials for their presentations. Although they knew the reading materials and assignments selected by the professors, they were allowed to volunteer for presentations on selected topics rather than being asked to teach or lecture on selected material. This led to one of the covert roles of the university, the validation of the existing community of practice.

Constructivist activities and contextualization of student learning was implicit in the university program design. These activities ran as a parallel undercurrent to the overt activities of the university. Just as the autonomy of the guest lecturers validated the RHHS community of practice; it allowed a very open access to multiple mentors. Furthermore, which mentors were chosen in addition to the one in the assigned classroom was determined by the choices of the pre-service interns rather than by the university. While the assignments directed interns toward understanding the science and cultural context of the high school students, they also mediated purposeful professional interactions with students.

One of the constructivist goals of the professors was to create ongoing reflection on the part of the interns. This addressed through keeping a daily reflective journal of the time spent at RHHS. This assignment was other-than-usual to the interns. The

journals were very open-ended, directed only by a rubric based on teaching activities within the three domains of knowledge, affect and action. Therefore, the journal assignment proved vital to the interns understanding of themselves as teachers. It was clear that at times the journal writing functioned as an expression of their internal conversation with themselves. It was also apparent that it was used to indirectly query the university professors or graduate assistants that were reading, because of the questions that the interns sometimes included in their entries. This was very functional, as these questions would often be addressed in the margin notes of the journal readers. The participants spontaneously and unanimously expressed the value of journal writing.

The goals of the professors included contextualized practice. The shared physical venue and embedded format served this goal. Additionally, the frequently recurring appearance of the interns over an extended period of time in the science classroom was specifically planned to start first day of class and to be regular throughout the intern's semester. Thus, the relationship between the high school students and the interns began simultaneously with the more dominant student/teacher relationship between the regular classroom teacher and the high school students and well in advance of the teaching assignments of the interns. The interns were woven into the context of the classrooms well in advance of enacting formal teaching. Also, they were well positioned to formulate teaching on personal knowledge a specific set of students. Furthermore, this allowed the teaching assignments of the interns to be bounded more in the 'real time' of the teaching pace of the classroom rather than out of step with the usual activities of the classroom as the students had become familiar with it. Taken together, these conditions contextualized the interns' experience in very real practice.

Analysis of the data shows that the participants took the expected activities of the university professors and representatives for granted. They very rarely commented on these activities, although they were conscientious in their cooperation and performance of tasks. This fit the conditioning and expectations of ‘good’ university students. The activities that drew the attention of the participants were the unexpected and or covert activities of the university professors. Two out of the three participants had much more to say about the additional mentors that they chose than about the mentor to which they were assigned by the university. They responded less to general ideas of cultural context and science culture than they did to their understanding and/or ownership of students and of a content area.

The feedback

The reflections Helen made on the university program and the professors were woven into the fabric of interactions with the various elements that made up the community of practice at RHHS. For instance, when Dr. Oliver observed her teaching a lesson, Helen reported that afterwards Dr. Oliver said, ‘You have a great ability to avert problems’ (Helen’s interview, 11/5/2001). This reinforced her understanding that, “You have to know your kids” (Helen’s interview, 11/5/2001). Trevor’s few overt comments placed the university professors as outsiders in the venue of RHHS. He stated that he valued the feedback from the high school teachers the most; followed by that of his peers and he placed the feedback from university observers last in importance. Upon closer inspection though, Trevor felt the authority of the university intensely, and authority was a very important characteristic of his understanding of successful teaching. This apparent contradiction was not all that unique in Trevor’s data. Helen viewed the university

professors as resources and was therefore able to utilize them or criticize them with little inhibition. Trevor did neither of these things spontaneously and only criticized the university in response to specific probes about some particular element of the program. Of the three participants, Kate made the most balanced and mature use of the university professors instruction. In light of her graduate status and outside work experience this was not surprising. Kate was able to use the professors' instruction and critique and she was able to align it with the input that she received from her mentor and peers.

The assignments

Helen's initial response to questions about the usefulness of university assignments was not atypical of a student at the beginning level of any training. She interpreted some assignments as 'busy work' in typical student frustration at being required to practice the components of performance when they are anxious to create their own whole performance. However, with little urging, Helen was able to deconstruct the actual assignments and to identify the skills that she had gained. She learned about how to identify students' entry skill level in a far more precise way than by making assumptions about observed behaviors by designing and performing a pre-assessment (Helen's interview, 10/12/2001). In performing the assignment to identify students' misconceptions about science she commented that, "This also taught me how important it is to really get to know my students" (Helen's journal, 10/17/2001). For Helen, this was the ultimate indication of value.

Trevor did not voice frustration with the university assignments. He seemed to accept them as opportunities to gain approval. However, he also did not identify specific learning stemming from the university assignments. The university assignments

involving students forced Trevor to interact with them in more directed ways. By focusing on specific students' abilities or on specific students' behaviors in performing the university assignment he was able to extract more of an understanding of students than he would have been with his undirected casual interactions. This was not an insignificant achievement. Trevor's identity began fully located outside of his own actions. In this light, even a small move toward locating his teacher identity in any more intimate space was important. Kate's mature learning style and experience allowed her to utilize the university assignments in consciously acknowledged ways. All of the participants readily identified the student reflective journal as the most valuable university assignment.

The community of practice

The university program provision of a community of practice in which these interns were able to anchor their development was essential to the purposed of situated cognition. The university presence within this community of practice inevitably impacted the community of practice in ways yet to be discovered. One implicit influence of the university presence was the validation of the community of practice. The community of practice in its current formulation may not have been viewed positively by the professors at all times. Professionalism is not a quality that is distributed evenly across a group of practitioners. It is not even a quality that shows absolute daily consistency in the practices of any one professional. However, the validation of the community of practice as a whole unit was vital and realistic. The professors chose to contextualize learning in a present and ongoing authentic context rather than by providing piecemeal links to classrooms or previous experiences. This included taking the 'bad' with the 'good'. However, they used

the constructivist nature of the design to allow the interns to understand the practices through their own personal motivations and biographical contexts. Thus, the interns were allowed to determine ‘bad’ and ‘good’ by their own initial understandings.

Additionally, the professor’s validation of the community of practice provided the authenticity necessary for well-constructed understanding. Schools, educators, and students are bounded, restrained and / or empowered by the larger society. These factors play into the authentic activity of teachers in many pervasive ways that become subsumed in the daily practices of a learning community. The infiltration of these factors is not transferable to temporary, artificial or idealized models, but they are part and parcel of being a teacher. By providing and validating the practicing community of RHHS, the professors provided a way for the interns to construct a professional identity that could be functional in an authentic venue. Furthermore, this validation made the connection between the everyday lives of teachers to the professional training of teachers.

The retrospective view

The impact of both the explicit and implicit university instruction was more apparent to Helen as she looked back during her first year teaching on her training experiences. At this point she clearly identified her learning experiences with the conduct of the university classes. She said “When we would meet for Dr. Oliver and Dr. Wallace’s classes, we would share our experiences, we would talk about how each of our mentors worked with students, and the teachers that mentored us would speak to the class and you could about ask them about different topics. There was a lot more going on than just in my mentor’s classroom and lots of it fit with my ideas of teaching” (Helen’s telephone interview, 11/9/2002). Just as a professional musician can look back on the

many hours of running scales that were required by those under whom he / she trained or a successful artist might look back on the many posed still life sketches or anatomical drawings that were required in training, and finally appreciate the value of the routine; Helen looked back on her training and was able to state, “This gave me a lot bigger picture of teaching” (Helen’s telephone interview, 11/0/2002).

Trevor was also better able to acknowledge the contribution of the total program in retrospect. His reflections remain very general, although quite positive. He expresses comfort with his role as teacher and coach and readily credits the pre-service block experience for much of this. His comments on the importance of the program were oriented toward students, particularly in the affective domain. He was very focused on his role in the students’ lives. He had begun to move in this direction by the end of the pre-service block and as he completed his first semester as a novice professional, this was even more his dominant concern. This may be because he no longer has to deal with the anxiety of decoding the actions that will gain him approval and success in a program of study. Although Trevor said during his telephone interview that the low-key context was an important part of what made the pre-service block so useful, his actions during the program had exhibited a certain anxiety about succeeding in terms of grades and reluctance to wander very far from the identified mainstream. This anxiety would have been far more handicapping in the high stakes situation of student teaching. His comments indicate that he was less anxious during student teaching than he would have been without the block program he attended.

Kate was, as ever, the most reserved in her reflections. Still, she was easily able to identify the role that the pre-service block had played in her development. She learned

that content instruction could not be achieved independently of the student / teacher relationship. She had moved away from the prescriptive expectations and moved toward designing classroom management and instruction to fit the individual class or even the individual student. She learned to use her one-to-one relationship skills to bolster her large group skills.

The resources

The single most important contribution of the university professors to the development the professional identity of these participants was the program design itself. This design offered an array of resources for the pre-service students to utilize as learning tools. Furthermore, these learning resources were set in a contextualized venue that lowered the performance pressure on the participants and allowed them the freedom to select those resources that they were most able to understand and to select the starting point of their leaning in harmony with their present understanding of the profession and in harmony with their personal values. This allowed a truly constructive learning process to take place as all of the learning tools were filtered and chosen or rejected through the participant's previous experiences and understanding. A very simple comparison of the extent to which the data showed each participant's utilization of each of the interactive resources makes this apparent. The bar graph below illustrates the differences in the reported balance of use each participant placed on the learning resources available.

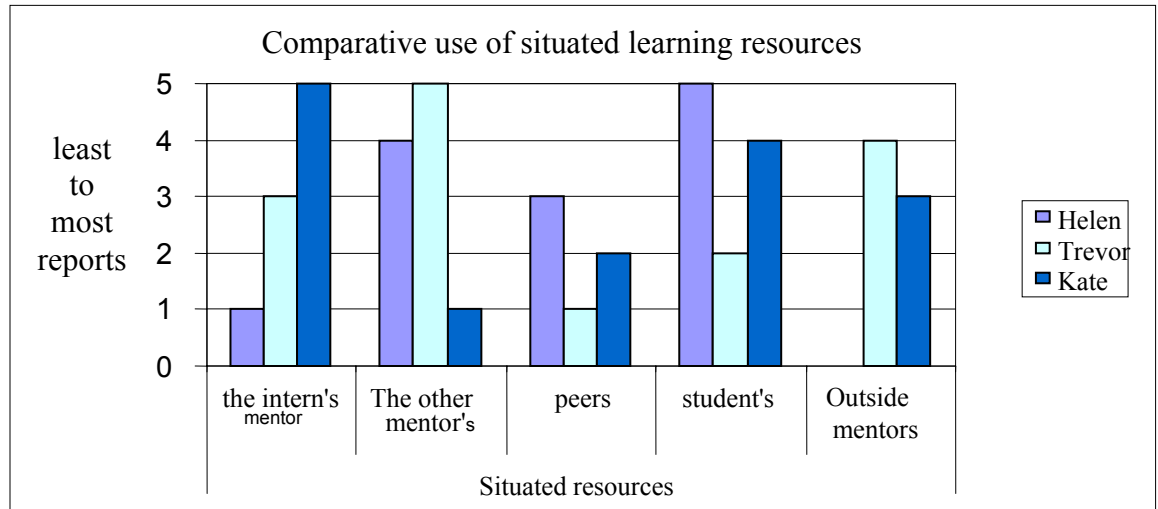


Figure 3: A comparison of the resources use of the participants

Inferences

One way that community is defined is through engagement in common practice. The placing of practice and practice development in the context of such a community involve a number of social negotiations regarding meanings, activities, and relationships. Even when these negotiations are subtle and silent they are revealed through developing practices. Developing practice in the context of community provides a stage on which the internal negotiations, and beliefs about self identity play out in decisions, actions, and relationships. Wenger (1998) put forth parallels between identity and practice as offering, "... a level of analysis that presents identity and practice as mirror images of each other" (Wenger, p.149). Figure 4 paraphrases these parallels.

Practice	Identity
● Negotiated meanings ● Community ● Shared history of learning ● Boundary ● Position	● Negotiated self ● Membership ● Learning trajectory ● Nexus of multi-membership ● Belonging defined globally / experienced locally

Figure 4: The Parallels between practice and identity (paraphrased from Wenger, 1998 p.150).

These parallels were useful in making inferences about the developing teacher identity of the participants.

How did pre-service teachers in the methods class perceive the move from student to teacher?

Participants in the study viewed the move from student to teacher with varying levels of anxiety depending on their initial teacher identity. The length of time that they had considered teaching as a career particularly seemed relevant to anxiety levels. Helen, who had considered herself a teacher from childhood, and had considered a teaching career off and on since middle school, had the least anxiety. Trevor, who defaulted into teaching as a career after cooperating with the assumption thought high school that he would be a physician, had the greater anxiety. Kate, who defaulted into a teaching career after having spent three years in other kinds of employment, and for whom the motivations to teach were of uncertain origin, had the greatest anxiety.

Research on teacher identity has stressed the relevance of identity formed as a part of school biography to the negotiation of subsequent teacher identity (Bullough &

Gitlin, 1995; Beijarrd, Verloop & Vermunt, 2000; Hawkey, 1997; Sumara & Luce-Kepler, 1996; Bullough, Knowles & Crow, 1992). Helen's data suggest that early portrayal of the teacher's role as a part of school identity eases the move into a beginning professional identity. This early portrayal constitutes a first nexus of multi-membership within the boundary of school culture and practice (Wenger, 1998). Conversely, Trevor and Kate indicate a later beginning of multi-membership and an increased anxiety in proportion with the delay. All of the participants referred to the student teaching semester as a 'high stakes' event and emphasized the 'low key' situation of the pre-service block, thus indicating the decreased anxiety expected to facilitate learning.

How did pre-service teachers' participation in collaborative, situated learning cast them into the teacher's role?

Each of the pre-service science teachers studied cast themselves into the role of science teacher through different means. Helen cast her self into the role as a sculptor of affective and academic learning experiences. This was shown in several ways. She began by evaluating her mentor through the relationship that she had with students and through her attested desire to nurture the learning of students. Then proceeded to evaluate and select information from other mentors based on the reputed relationship that they had with students and student achievement. Additionally, she evaluated herself through the same criteria. She monitored student behavior when she was teaching and compared it to student behavior when her mentor or co-intern was teaching and she made modifications to her teaching in accord with this student feedback. She monitored student performance on assessments of material taught by her mentor and she monitored student performance on material that she taught. She interpreted student success as confirmation of teaching

and student failure as an expression of their need for different methods. She planned and modified lessons based on observed student behavior and engagement. Finally, she defined herself as a teacher in terms of how she knew her ‘kids,’ and how they responded to her.

Trevor cast himself into the role of teacher by identifying a niche for himself as a teacher. Along the way to accomplishing this, he learned what kind of classroom he hoped to establish. He learned that many of the behaviors that he believed were essential for a leaning atmosphere were not automatic ‘good’ behavior. He learned that students’ behavior was an out growth of the organization and procedure of the classroom. In the process of this learning about himself and students he made progress toward a personalizing his definition of what it means to be a teacher. Moving his role definition of a teacher into a more personal space was an essential step. It will take further time on the task of teaching and more professional security for Trevor to make the next step of internalization of a teacher identity.

Kate had more problems casting herself into the role of teacher because of her expectations of concrete, prescriptive methods. She began with a content focus augmented by a commitment to copy the methods of her mentor as prescription for successful teaching. She quickly became uncomfortable in the role that she had cast herself. She identified her needs as being different from those of her mentor and her learning style as not fitting that of her mentor’s classroom. She was able to identify specific ways in which to adjust both the style of the classroom and her way of relating to students. These enabled her to move forward in developing a teacher identity that was less prescribed and more individual. Simply letting go of the expectation of prescriptive

methods was a very important step in Kate's beginning to create an individual teacher identity.

The different ways in which these participants cast themselves into the role of teacher were guided by the process of negotiation between emerging identity and other sources of identity, as depicted in the literature. These sources include the participants' personal biography, the situational identity developed in the culture of schools, the pre-professional identity developed in university study, and the beginning professional identity developed in earlier education courses. (Nias 1989, as cited in Bullough & Gitlin, 1995; Beijarrrd, Verloop & Vermunt, 2000; Hawkey, 1997; Sumara & Luce-Kepler, 1996; Bullough, Knowles & Crow, 1992). Kate's initial teacher identity was aligned with a traditional view of professionalism, where the professional criteria are knowledge, autonomy and responsibility (Furlong, et al, 2000, in Sachs, 2001). Trevor held the entrepreneurial view of managerial professionalism, embodied by product accountability (Sachs, 2001). Helen's view of professionalism was more democratic and inclusive (Apple, 1996; Preston, 1996; in Sachs, 2001). These different understandings of professionalism were rooted in their distinct individual biographies. Understanding the role in which they were casting themselves differently dictated that different means.

How were multiple role models reflected in the emerging identity of the teacher in training?

Access to multiple role models was pivotal for the participants in the study. Constant exposure to multiple styles in method, in student teacher interface, and even classroom atmosphere developed a strong implicit message about teaching as a created process rather than a prescribed process. The university's implied validation of the

community of practice at RHHS acknowledged that there was a range of practice that would be accepted in the culture of schools. This gave the pre-service teachers permission to criticize and / or to reject the practice of their assigned mentor without creating a role model vacuum. Paradoxically, it seems providing pre-service science teachers with multiple concrete models of teaching better establishes the abstract concept of teaching.

The participants entered into their learning with prior images of teachers, teaching, and learning (Cole & Knowles, 1993; Weber & Mitchell, 1996; Hawkey, 1997; Beijarrd, Verloop & Vermunt; 2000). Just as ancients interpreted a whale to be a big fish based on their prior images, these teachers interpreted their observations based on their prior images. The views of others and by others impacted the participants' view of themselves (Roseberry & Puttick, 1997; Friesen, Finney & Krentz, 1992; Bullough, Knowles & Crow, 1992). The provision of multiple role models allowed them to augment these prior images with new or additional images of their own choosing. This augmented set of images allowed comparisons and contrasts to refine their image of themselves as teachers.

One caveat for the impact of multiple roles models on these participants. They tended to accept or reject their mentor's practices as a whole. This was the naive response of untrained observers. Researchers have found that it is difficult for novices to deconstruct the practice of experts (Ethell & McMeniman, 2000; Bullough, 1989). Experienced practitioners know that their practices are not of one piece. The mentors as guest lecturers were aware that they had strengths to which they could speak and by implication they knew that their practice has weaknesses. The pre-service teachers were

not well prepared to deconstruct the observed practice of mentors. When they went in search of other models they chose among practices that had been picked apart and passed along through reputation in the social community of practice. Sometimes this played out as the mentor's as guest lecturers exhibiting their known strengths and sometimes it was through the sharing of information among pre-service peers. In these ways there were able to choose the management plan of one teacher and the planning strategies of another. However, pieces of practice that could have been culled from the classroom mentor may have been missed by pre-service students without the observational skills for the venue.

How is the integration of existing teacher identity and developing teacher identity constructed in situated cognition?

Study participants began with teacher identities at very different stages of development due to their personal and school biographies. Identity has been given the analogy of a personal story about self (Connelly & Clandinin, 1988; Bullough & Gitlin, 1995; Beijarrrd, Verloop & Vermunt, 2000). This analogy can be carried further by stating that a good story requires a thread of continuity to pull it together. The participants were able to locate their own thread of continuity among all of the resources and thus, were able to continue developing their teacher identity in continuity with their existing understanding of self and of teaching. Trevor was given access to the socio-political hierarchy that he was ready to recognize. Helen was given the access to student feedback that was her established benchmark. Kate was provided with an expert practitioner from whom she could try to form a prescription for teaching. Each of these participants was given a choice of mentors. In Helen's case, this allowed her to criticize and reject practices that were in opposition to her personal values without casting herself adrift. In

Trevor's case, he was allowed to passively reject many of his mentor's practices and was able to replace them with the practices of the coach. He had more confidence in the coach's practice even without seeing him teach, maybe because of his reputation, because of his socio-political position. This thread of continuity allowed them to integrate their further teacher identity into their existing identities. Kate chose to place her classroom mentor in preeminence throughout the semester's work.

A second extension of the analogy of identity as a story of self is identity is a personal story. Direct challenges to personal values and beliefs commonly result in a defensive posture. One cannot effectively defend a position and change their position simultaneously. The pre-service teachers thus adopted new identities in harmony rather than in disharmony with existing identities. Establishing these participants in a setting with a wide range of professional identities, allowing them autonomy in their selections of available models and resources, and directing their growth through non-invasive means lowered the defensive barriers to the development of teacher identity. Participants emphasized the value of the 'low-key' participation in the high school classroom prior to their student teaching placement. Their different uses of the resources available for honing teacher identity indicated their exercise of autonomy. Both of these things showed that their existing identity was not assaulted by being locked into a mold that did not fit. The multifaceted nature of this constructivist school-based learning experience was essential to the growth of participant identity.

The participants' existing teacher identity was shaped through their struggle with and experience with students and subject matter (Feiman-Nemser & Remillard, 1995). Their knowledge, developed in the context of practice was secured through practice.

Their knowledge was developed in context and secured through social practice (Billett, 1998). The integration of identity took place through overlapping roles in the community of practice. Their participation provided them with multiple audiences for their practice and allowed them to envision and refine goals through various means (Dannels, 2000).

Implications for science teacher education and research

The major implication of the study is that pre-service science teachers in their final year of training benefit from having a venue in which they can autonomously locate their development. The requirements of such a venue are authenticity, validity, and open access. This places the university educators under exacting demands as curriculum planners. It also challenges them to cross the border between university science education practice and secondary science education practice. Border crossings of this nature entail some risk for university educators. The White linen hem of the researcher could become dirtied by common practice. Furthermore, sharing the role of teacher educator with practicing teachers could undermine them as the chief arbitrators of academia. Of course a student of the border crossing phenomena knows that the potential gains would match the risks. In this case, personal and professional growth for the individual educator, access to new ways of knowing and interpreting science education, and a more authentic and inclusive foundation and stimulus for research advancement are to be gained. The gain for reformed science teacher education and practice is even greater as paths are opened up for teachers in training to become teachers in fact with a better understanding of the abstract of teaching.

A further implication is that the theory to practice connections for pre-service science teachers need to be more explicit. Even with an authentic venue, these

connections are not obvious to students at this stage of their professional development. These amateur practitioners lack a perspective on practice from which they can meaningfully deconstruct practice. The pre-service teachers need to be trained to make meaningful observations and deconstructions of practice. This training might be similar to the type of training given to field supervisors. This would aid their understanding and their questioning of observed practice and help them to see the purposes of some of the teacher's actions. Teaching at its best looks much like spontaneous student learning. When this sophisticated practice occurred, whether it was for five minutes or an entire semester it would be invisible to the untrained observer and it would look much like magic or luck. Training pre-service teachers in classroom observation might help them to find the "man behind the curtain," the wizard, in the skilled practice of an expert practitioner.

These pre-service teachers need autonomy when dealing with concrete activities, but when dealing with abstracts, like theory, they need solid connections. Just as extracting practice from observations could benefit from a the concrete training of observation practices, the readings and discussion of theories need to be tied to specific, concrete applications for the full benefit to be gained. This calls for making the link between a direct the theory and practice as explicit as possible. One of the problems with this is that in looking from the point of view of science education researchers, the connections are already apparent. To make them apparent and explicit to an amateur requires taking on a very different point of view. The program under study in this research made some headway into this process by inviting the point of view of the high school practitioners into the university classroom, and through the integration of science

curriculum with methods for teaching science was a move toward tightening the connection between theory and practice. However, there is still much room to experiment with making explicit theory to practice connection. One possibility would be to use case based research to link theory and practice.

The study also has strong implications for multiple mentorship, cohort pre-service programs and peer coaching. These elements of design provided the means for participants in the current study to augment their resources and learning tools. These elements appear in several reformed teachers education programs both in and out of science education. However, in combining all of these in one program it may be that the whole is once again greater than the sum of the parts.

The study has several implications for research in science education and reformed teacher education. One of the most important research implications arises in the area of the unaccounted for influence of the university's presence on the community of practice. The program under study intrudes more pervasively into the local community of practice more than traditional programs and even more than the student teaching semester. The impacts of the university presence on mentors, high school students, the local science department as a whole, and the administration of the school are unknown.

The study also has implications for research into reformed teacher education as a whole. The program under study is only one of a growing number of reformed teacher education efforts. There is fertile ground for research into the commonalities and differences among these programs in terms of their goals, means, theoretical basis, and results. There is a point in research where the accumulation of data from various researchers creates a sea change in the currents of understanding. Has this point been

reached in reformed science teacher education research? Only a compilation of reformed program research could answer this question.

The final implication is that situated cognition is a useful theoretical framework for science teacher education research. Situated cognition has not been used extensively outside of anthropology and psychology. Most of the applications outside of these fields are in vocational studies and in mathematics. In studying clinical practice the fields of social anthropology and cognitive psychology have a natural meeting ground. Situated cognition frames this ground in very useful ways. Social cognition also fits the constructivist epistemology that is predominant in science education by encompassing the social interpretation of meaning.

Conclusion

Pre-service science education students arrive at their final year of training with an understanding of what it means to be a teacher. This initial understanding is a product of their personal and school biography and forms the lens through which they will view their final year experiences. It must also be allowed to form the foundation of their development. Accomplishing this requires authentic practice with multiple points of contact in which they may locate their learning. Although many reformed programs with these ends exist, their commonalities and their full impact are not presently known.

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APPENDIX A:

Syllabus excerpt including instructions for the reflective journal assignment.

Reflective journal - Perhaps the most important activity of the semester is the keeping of a reflective journal. In this journal you will record what you are thinking, feeling and learning each day. Entries should occur daily or at least every class day. These entries will help you keep up with what you are planning to do once you are out in a school for student teaching or in your own classroom. The journal will be graded for both the *Curriculum* and *Methods* courses. In other words, both Dr. Keys and Dr. Oliver will be reading your journal. The first reading by the professors will require that you turn in the journal on August 31. The final journal will be turned in on November 30. The journal counts 20% of the grade.

Below is given a table which serves as a guide for creating the reflective journal. At a later point in the semester, the members of the class in conjunction with the instructors will decide how this table should reflect a scoring rubric for the reflective journal. However, for the moment, it is intended to suggest questions that you should pose for yourself as you create the reflective journal.

Across the top are three categories: knowledge, affect and action. These categories will guide you to reflect and react to situations in your life as a pre-service teacher. Knowledge is for those situations where *what you know* is most important. Affect refers to those situations in which *liking* or *feeling* is the dominate cognition. Finally, action refers to those situations in which *doing* is the most important issue. These categories frequently overlap in practice, but it is important to remember the potential for separation as you think about teaching.

Down the side are types of situations; six have been identified though there could certainly be others. These situations are largely self explanatory. But consider the following situation. During a class session you have just taught on *the age of the earth* a student has repeatedly challenged you about the different claims for the age of humanoid fossils which have been found around the world. You don't think he is addressing a religious question, but rather is trying to make claims about the meaning of evidence which does not agree with your beliefs. What cells of the rubric address this issue? There are probably many, but certainly the intersection of "knowledge" and "conducting instruction" (e.g., you need to examine your knowledge of the subject). Also the intersection of "affect" and "interactions with students." The questions which appear in this cell is intended to suggest one possible question that you might consider. There are others. Questions were only written for certain cells so as not to constrain your thinking.

Examine the table on the next page.

The general structure of the reflective journal should be constructed around the following rubric. This design is intended as a guide and may be modified as the semester progresses. There are numerous questions which might be asked in any given cell. You should think of questions for each cell.

Rubric for Reflective Journal			
	Knowledge	Affect	Action
Planning	What do I need to learn before I teach this topic?		What will I include in my mini-unit next week?
Conducting Instruction		How did I communicate enthusiasm for this laboratory activity?	
Evaluating Instruction and Learning	How did I know that The students Understood what I Was teaching?		Why did I pick the Specific topics for the test?
Professional Development	Where can I learn About new activities To help teach this topic?		Can I attend the meeting of the GSTA later this school year?
Interactions with Students		Why does Johnny not recognize that I am trying to help him?	
Interactions with Peers	What level of certification does my mentor teacher possess?		Did I remember to take the test questions to the biology teacher?

APPENDIX B

Scoring Rubric for the purpose of assigning grades to the journals

Scoring Rubric for the Reflective Journals ESCI 4450/4460 and ESCI 6450/6460 Fall 2000

Assigning grades for the reflective journals will involve examining the contents for evidence of four of the six "strands" identified in the rubric for the reflective journal given in the syllabus. The four strands which will be required are: (1) Conducting Instruction; (2) Evaluating Instruction and Learning; (3) Interactions with Students; and (4) Interactions with peers. There should also be entries which examine other strands, i.e. planning and professional development. Each of these strands should be addressed across each of the dimensions of Knowledge, Affect, and Action, as described in the syllabus. In addition to reflecting on "block activities" using current examples of Knowledge, Affect, and Action, you should also reflect on how you have changed and grown since previous entries/experiences.

A. Knowledge (25%)

1. **Conducting instruction** - Consistently identifies the knowledge base necessary to conduct high quality instruction.
2. **Evaluating instruction and learning** - Compares and contrasts different methods of evaluation.
3. **Interactions with students** - Includes writings that indicate more than superficial learning about students and their culture.
4. **Interactions with peers** - Includes writings that indicate more than superficial learning about teachers/colleagues and their culture.

B. Affect (25%)

1. **Conducting instruction** - Ensure that the journal includes reports of beliefs, values and interests about the teaching of science.
2. **Evaluating instruction and learning** - Ensure that the journal includes reports of the affective impact of evaluation on both teachers and students.
3. **Interactions with students** - Includes reflection on both positive and negative interactions with students and how those interactions influenced/affected the attitudes, values, and beliefs of the author.
4. **Interactions with peers** - Demonstrate through journal writings that the author is developing a sense of teacher identity (i.e. characteristics of who they want to be as a teacher) as related to interactions with colleagues.

C. Action (25%)

1. **Conducting instruction** - Journal writing shows evidence of reflection on teaching actions.
2. **Evaluating instruction and learning** - Establishes why ongoing assessment is necessary as a basis for teaching decisions.
3. **Interactions with students** - Describes alternative actions for teaching and communicating with students.
4. **Interactions with peers** - Describes alternative actions for communicating with peers.

D. Rationale Entry (25%)

1. Synthesizes key concepts and affective understandings into the rationale statement.
2. Provides evidence of growth in understanding of science teaching and learning across all areas of the original journal rubric.

(Instructions reprinted from the syllabus about the rationale entry.)

The final section of the reflective journal will consist of a rationale entry. **Your *rational for science teaching* should be constructed based on the criteria given below. It is to be typed, double spaced (approximately 12 pitch type) and about five or six pages in length. It should have contained at least the following items:**

- A. Your reasons for teaching science;**
- B. A delineation of broad goals for your science students and how these goals relate to the curricula that you plan to use;**
- C. A description of the learning environment you would like to provide for your students;**
- D. An account of the general types of science activities and interactions that you would like to see in the science classroom. Include teacher-student as well as student-student interactions. (Be as specific as possible.) Again, you must relate this to the science curricula that you plan to use.**

APPENDIX C

Trevor's journal entry for 9/14/03 and 9/17/03 as it appeared after coding.

"over your wall"

liability held to account (interview)*

give you cancer = a few million \$\$) I am really surprised there haven't been more lawsuits filed against teachers recently.

Student

Positive Positive Positive

September 14, 2001 *(* interview)* This name has become the bane of my existence in Mr. Blais' physical science class. She will not do anything she doesn't want to do. She turned in a blank lab worksheet because she didn't want to do it. She doesn't study, she doesn't take notes, she doesn't seem to care about anything really. She seems to have this huge chip on her shoulder and whenever I or anyone else seems to try to confront her in the most tactful way, she responds negatively. She walked away from me one day, she just turned and walked away. I had *noticed* that she seemed *upset* over something and I asked her what was wrong. She didn't even say a word, just walked off. I respect that because some people don't want to talk sometimes. But lately she is becoming more and more of a nuisance, she is disruptive, and keeping others from learning. *That, I won't have.*

probs. recognition but not analysed what lesson - what activity - other actors

concern affect

his boundary

never reports doing this

no answer?

I have asked Mr. Blais about it, and I believe that he is planning on having a conference soon. *(I would like to know what is said and what comes out of it. (This brings me to a question I hope you, the reader can answer: Will we be able to sit in on a conference, or will be able to have them on our own during our student teaching?))*

personal bio

September 17, 2001 - I am attaching a sheet to the end of this journal called the 21st Century Teacher's Credo. My mom emailed it to me the other day and I thought it was very interesting. I am not sure who wrote it, but I can assume it was a teacher. I have tried to find other such "credos" on the Internet, but I haven't had any luck. I did, however, find this one with a different ending. Instead of addressing the payment issue, it addressed the school prayer issue. "And...you want me to do all of this without praying?" I personally like this version better. *My religion is another predicament, and I personally believe in the*

parents wanted a do

praying

his religion your's. (interview)*

religious authority