EXAMINING THE COMMUNITY OF PRACTICE FRAMEWORK IN ENVIRONMENTAL AND SCIENCE LEARNING CONTEXTS WITH HISPANIC YOUTH

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Studies examining students often marginalized in the sciences are adopting sociocultural theories to explain learning as a social process. Some sociocultural theories contend that learning occurs as individuals participate in communities of practice (COPs) (Wenger, 1998). Instead of looking at cognitive or conceptual changes, these theories examine learning as a process of identity formation and transformation through participation and membership in COPs. Wenger (1998) defines three dimensions (joint enterprise, mutual engagement, shared repertoire) to help describe and identify COPs, as well as to illustrate what a sociocultural theory might look like in practice.

Few empirical studies, however, analyze the appropriateness of this theoretical framework. Rather, researchers generally assume the framework is appropriate and adopt it to explain particular aspects of learning. Additionally, environmental education research rarely employs existing learning theories to explain learning. Thus, this study critically examines the applicability and usefulness of the COP framework in explaining learning of students in science classrooms and in an after-school environmental education program, the Environmental Club (EC), by asking the following questions:

1) How do COP dimensions (joint enterprise, mutual engagement, shared repertoire) manifest themselves in science classrooms and ECs?

2) How does learning as participation, membership and identity formation manifest itself in science classrooms and ECs?

I examined two science classrooms and three ECs in south Texas, using a case study methodology. The data collected included classroom and EC observations; student focus group, individual student, teacher, and principal interviews; student journal entries; student drawings; and secondary data on schools. I manually coded interview transcripts and other data using the COP dimensions and student perspectives on community. I then determined where findings from multiple methods converged in each case and employed analytic induction to compare findings across cases.

Findings illustrated Wenger's dimensions manifested themselves in four of the five contexts. However, differences in contexts contributed to the way in which dimensions evolved and developed and consequently to how learning was manifested as a social process. The framework was applicable and useful for understanding learning as a social process when Wenger's dimensions evolved within the context, were agreed upon by participants and the researcher, and when the majority of participants felt they belonged to a COP. Findings imply that the applicability of the framework should not be assumed for all learning contexts but that it is useful for providing a sociocultural view of learning in environmental programs.

BIOGRAPHICAL SKETCH

Olivia Marie Aguilar was born in Dallas, Texas to Luis Aguilar and Zoila Krusemark in 1977. She was raised in a northern suburb of Dallas, Plano, Texas, which at the time of her infancy was a predominately rural community. The area of Plano, Texas grew into a large suburban and fairly affluent community, providing the area with quality schools. The Plano public schools contributed to the education, and in turn, the opportunities, Olivia received. These opportunities instilled in Olivia a passion for learning and for serving.

After graduating in the top 10% of her senior class, Olivia was accepted into Texas A&M University, where she received a four-year academic scholarship. Olivia worked to secure funding through scholarships from a variety of sources throughout her undergraduate years. She also worked as a care-taker for her roommate, a muscular dystrophy patient. Olivia worked her way through college with these sources and numerous summer jobs, one of which helped to determine her future career path.

In the summer of 1996, Olivia worked at a local green house, which led to the decision to change her major from Political Science to Horticulture Science. Despite her dislike of the sciences, her interest in working with plants was strong enough that she embarked on an educational path that required biology, organic chemistry, plant physiology and genetics (to name a few). Her enjoyment of these classes sparked her interest in science education for youth, wanting to understand how and why students became interested in science subjects. She completed her B.S. in Horticulture with a specialization in landscape design and stayed on at Texas A&M to work on her Master's. She stayed with the Horticulture program during this time, but turned her attention to youth and the development of their interests in the environment through participation in a youth gardening program.

Upon graduating with her M.S. in 2001, Olivia was accepted into the Teach for America program. Olivia felt that this position would allow her to pass on her own passion for learning to students that might not have had the same opportunities she was afforded by the schools she attended. After a short time with the program, Olivia decided to teach in Houston, Texas, where she was fortunate enough to secure a position teaching fourth and fifth grade special education classes. Throughout this time, Olivia noticed some inherent problems with the education system. She felt that teaching might not be the only way to address these problems and decided to pursue her Ph.D. She applied and was accepted into the Natural Resource Department at Cornell University, one of the few natural resource programs that also allowed for work in science education.

Olivia developed a research project that incorporated her interests in science education and environmental education, specifically as they related to underrepresented and underserved students. Within this project, Olivia also began to recognize other social factors at work within education systems and looked closely at learning theories evoked in science and environmental education. These issues formed the basis of this dissertation.

To my mom for providing motivation and my dad for providing inspiration.

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Finally, I want to thank the students, teachers, administrators and community members that allowed me to work with them on this project. The sites of my study were of significance to me before this study and are even more so now. The members of this community taught me much about life and will continue to be a source of inspiration for me. I especially want to thank Richard Gonzales and the Gulf of Mexico Foundation for their unending support and for making this project possible.

I have to thank my family and friends, without whom, I would not be the person I am today. I am truly grateful.

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CHAPTER 1

Introduction

My interest in this study developed out of my own experience as a person of color in the natural sciences. While I was always a strong student, my weakness was science. I never considered myself a "science" person, and when I entered college I enrolled as a political science major. However, during the summer before my sophomore year, I worked at a local nursery which proved to be a life changing experience. When I returned to school I decided to change my major to horticulture science and faced the challenge of taking science courses offered to undergraduates.

To my surprise, I was successful in my college science courses and found science to be a fascinating field. I continued to reflect on my personal trajectory with science and searched for ways to encourage youth, with experiences similar to my own, to engage with science. I believed that it was my work with plants in the outdoors that led me to appreciate the field of science.

My experience as an elementary school teacher affirmed that students of color in my school were rarely enthusiastic about science. However, I noticed, when I was able to teach the science sections I was most familiar with, I could better translate these lessons in ways that students found both interesting and understandable. Wanting to further explore this disconnect between students and science, I entered graduate school with the intent to study science learning through outdoor and environmental education activities. As I began to read the literature regarding science learning of minority youth, I realized this disconnect was gravely widespread and largely left unresolved.

The origins of this study arose from a standing concern about the disparities in science scores and participation in science classes between students of color and

Caucasian students. In 2000 the National Action Council for Minorities in Engineering released a book describing the disparity in the sciences at length (Campbell et al., 2000). In 2005, the gap between students in 4th grade closed for Black students, but remained the same for Hispanic students. In 2008, this disparity continues to exist. According to the Nation's Report Card (NAEP, 2008), the gap in science achievement scores between White students and Black and Hispanic students tested in 8th and 12th grade remains a persistent problem. In light of these issues, the demand for science education reform has been heard across the country.

In efforts to explain substandard achievement and lack of student engagement in science, science education researchers have persistently examined teaching practices, curriculum design, classroom structure and classroom content, among other issues. The research becomes even more varied when examining why some students might be marginalized on the basis of race, ethnicity and/or gender. I am particularly interested in theories which suggest that the problems related to minority student success in classroom science are attributable to school science's lack of relevance for many students' lives and the confined and meaningless context in which it is taught (Barab & Duffy, 2002; Brickhouse, Fusco, 2001; Lemke, 2001). Bouillion and Gomez remind us that research from critical science perspectives

> "…suggests the failures of science students who are female or of color can be understood as students' struggles to understand, gain access to, and find relevance in the culture and practice of science as framed by school" (Bouillion and Gomez, 2001, p. 881).

In an attempt to reform and challenge traditional notions of science education, those concerned with science learning have turned to the environment as a context for learning (Barab and Duffy, 2002; Boyer & Roth, 2006; Fusco, 2001; Bouillion & Gomez, 2001; Roth & Lee, 2004). These studies have found that programs centered on issues related to the environment offer various opportunities for participation and

provide space for students to make connections between science and issues relevant to their lives. Wanting to pursue these findings further, I decided to study the science learning of Hispanic youth in both science classrooms and an after-school environmental education program.

In order to compare both the science classroom and the environmental education program through a similar framework, I searched for theories of learning that could apply to both contexts. Until recently, the dominant paradigm in science education research was the use of cognitive learning theories to explain students' individual cognitive processes apart from the "noise" of their everyday life. Cognitive theories in science education research were often used to understand learning as the acquisition of science skills, concepts, and literacy (Eisenhart, Finkel, & Marion, 1996; Lemke, 2001). However, a caveat to this view of learning was that it often overlooked other learning taking place. As Brickhouse (2000) noted through her observations of many science classrooms, "it appears that what students are learning in science classrooms has very little to do with science" (p.443). Education researchers had to scrutinize very carefully to find the science "learning" they expected or hoped to see. On the other hand, the learning that researchers often failed to note was how students learned to answer in particular classrooms, behave for certain teachers or peers, or speak with certain groups of friends (Lemke, 2001).

Increasingly, researchers concerned with the complex issues that everyday life brings to the science learning process have turned to theories under the umbrella of sociocultural theories of learning (Lattuca, 2005), such as situated learning, situated cognition, activity theory and cultural-historical theory (Ash, 2008; Brickhouse, 2001; Reveles et al., 2004). Unlike traditional cognitive theories concerned with individual gains in knowledge and concepts, these theories are concerned with the person in context, as an entire system of learning. Additionally, particular sociocultural theories

of learning contend that learning is a social process that occurs as individuals participate in communities of practice with a specific physical, historical and cultural context (Lave & Wenger, 1991; Wenger, 1998). Instead of focusing on cognitive or conceptual changes in an individual acontextually, these theories examine individual identity formation and transformation through participation and membership in various contexts, or communities of practice, as a process of learning.

In contrast to science education, environmental education research has not made large strides in adopting alternative theories to examine learning (Dillon, 2003). In his seminal paper on future directions for environmental education research, Rickinson (2006) called for studies to address broader questions in the field, starting with how we define learning in environmental education contexts. He suggested that environmental education researchers have fallen behind in their approaches to critically examining both use and meaning of the term "learning" and in examining learning as a "process" rather than product. Additionally, Rickinson called for research that examined the usefulness of existing theories in environmental education. Others in environmental education have echoed these sentiments (Meyer, 2005; Dillon, 2003). Dillon (2003) further suggested that researchers interested in examining the theory of situated learning might benefit from applying it to an environmental education context.

Recognizing the sparse use of existing learning theories in environmental education research and the recent use of situated learning theories in science education, I turned to the community of practice framework for my study. Many studies have used a "community" framework or similar concepts to explain the function of communities of practice via a community of learners (Rogoff, 2003), communities of practice (Enyedy & Goldberg, 2004) or communities of knowers (Roth & Bowen, 1995) to attempt to explain how students learn as participants in

social activity occurring in classrooms. Yet, few of these studies actually analyzed or illustrated how they determined whether the framework was appropriate for the contexts under study. Rather many studies have used the framework to reform learning contexts or employed the framework to explain learning outcomes (Rogoff, 2003; Barab & Duffy, 2000). In fact, Bradley (2004) pointed out that, "There seems to be a lack of debate in the literature on communities of practice. Instead there seems to be an agreement that the concept works well and a majority of studies reiterate this in a wide variety of settings" (p.365).

While the number of studies using this framework as a model for classroom learning has grown rapidly, researchers have rarely tested their own assumptions of the value of a community of practice framework for their studies. During my initial attempt to use the community of practice framework to examine science learning of Hispanic youth I encountered difficulties with the metaphor. Two assumptions were made in this initial stage: 1) all classrooms could be viewed as communities of practice and 2) the practice of science classrooms would be learning science. After gathering preliminary data from four contexts (two science classrooms and two after-school environmental clubs), I questioned whether the community of practice framework was appropriate for all learning contexts.

Rather than discard the theory as inappropriate, I wanted to address reasons why the framework was inapplicable, reconsider the value of the framework for learning contexts (Bradley, 2004), and recognize the inherent value of the original intent of the framework to be used as a heuristic for learning (Lea, 2005). As other studies have assumed contexts could be studied as communities of practice or could be transformed into them (Ash, 2008; Barab & Duffy, 2000; Hogan, 2002), I returned to Wenger's (1998) words:

> "…an institutional boundary does not necessarily outline a community of practice. Careful scrutiny of its day-to-day existence may reveal that a work group, classroom, committee, or neighborhood does not actually constitute a community of practice. It may consist of multiple communities of practice, or it may not have developed enough of a practice of its own" (p.119).

Consequently, this study has evolved from examining questions about *participation and learning through the community of practice framework*, into a critical examination of the *usefulness of the theory* of communities of practice to explain the learning of students in science classrooms and after-school environmental education programs.

Research Questions and Objectives

The overarching motivation behind this study was to understand disinterest and lower achievement in the sciences among underrepresented students through a learning theory lens. Because recent studies have begun to show how participation in environmental activities can contribute to new and meaningful ways to participate in science learning (Bouillion & Gomez, ; Boyer & Roth, 2006), I was interested in studying students in both science classrooms and an after-school environmental education program. Wanting to provide a common discourse to which others could have access, I adopted Wenger's (1998) community of practice dimensions, which have been used in multiple fields and disciplines, to analyze both science-focused contexts. The purpose of this study evolved, then, to address both the call for theory in environmental education and a dearth of literature that critically examines the applicability and usefulness of the community of practice framework for various learning contexts. To accomplish this, I asked the following questions:

1) How do Wenger's community of practice dimensions (joint enterprise, mutual engagement, shared repertoire) manifest themselves in both science classrooms and an after-school environmental education program?
2) How does learning as participation, membership and identity formation manifest itself through Wenger's community of practice framework in science classrooms and an after-school environmental education program?

Conceptual Framework

In educational research we often question how learning is taking place and seek to evaluate the strength of this learning through various measurements. What we do not often discuss, however, is what we actually mean when we use the term learning. What is learning? This question has been asked by early philosophers, such as Aristotle and Plato, and continues to be debated today. In searching of an answer, researchers look to theories to help organize and explain facts and ideas on the matter. Theories of learning evolved as a desire to organize laws of cognition.

> "A scientist, along with the desire to satisfy his curiosity about the facts of nature, has a predilection for ordering his facts into systems of laws and theories. He is interested not only in verified facts and relationships, but in neat and parsimonious ways of summarizing these facts. Psychologists with a penchant for systems find a theory of learning essential because so much of man's diverse behavior is the result of learning" (Hilgard & Bower, 1966, p.2).

Therefore, we also look to learning theories in order to improve how and what we teach.

I approach this study with an understanding that culture, context and learning cannot be separated or isolated from each other in a study of learning. This view is synonymous with sociocultural learning theories. Both situated cognition and situated learning, through which the community of practice framework evolves, can be found under the umbrella of sociocultural theories (Lattuca, 2005). To critically analyze my sites as communities of practice and my notion of learning, I turn to Wenger's (1998) community of practice dimensions. Wenger's book, *Communities of practice:*

Learning, meaning and identity (1998), provides both an organized and accessible framework to study learning as participation. Additionally, his dimensions, while used predominately in workplace studies, allow for a common discourse around concepts that can be understood in a variety of settings. Discussion around the conceptual framework is limited here because it is discussed further in Chapter Two.

The community of practice concept was introduced in Lave and Wenger's work (1991) and further developed by Wenger in his 1998 work. A community of practice is a place of learning where practice is developed and pursued, meaning and enterprise are negotiated among members, and membership roles are developed through various forms of engagement and participation. Each community of practice involves a unique system of 1) *mutual engagement*, 2) *joint enterprise* through negotiated meaning, and 3) *shared repertoire* (Wenger, 1998). The *joint enterprise* refers to how members negotiate their response to the conditions and goals of the community of practice. *Mutual engagement* involves the sustained interaction of people within a community of practice and the roles and relationships that arise from this interaction. Finally, *shared repertoire* consists of signs, symbols, tools and language that are used as resources and have meaning specific to the community (Wenger, 1998). All of the components work together to determine the practice, and the practice, in turn, works to refine the components. Wenger (1998) argues, "it is the collective construction of a local practice that, among other things, makes it possible to meet the demands of the institution" (p.46).

Each local practice is embedded in a specific context with temporal and social characteristics. The meaning of the practice is continually negotiated through "participation and reification", both of which Wenger contends play a role in the development and transformation of identities within the community. Participation is the actual engagement in practices, and identity formation is an inherent source and

byproduct of this participation. The practice is therefore a central component around which the rest of the dimensions evolve. Wenger emphasizes that the examination of practice through the lens of a community is fundamental to our understanding of meaning making, learning and connections to other contexts.

Research Design

To address the research questions, I looked at both science classrooms and an after-school environmental program, the Environmental Club (EC), at the same school, as well as individuals within these contexts as units of analysis. Therefore, purposeful sampling methods were used throughout the data collection process to provide information-rich cases at multiple levels: school, class, and individual (Patton, 2002).

I chose to study sites in south Texas, due to its largely Hispanic population and my familiarity with the region. A preliminary year-long study (August, 2005-May, 2006) helped to determine which schools, associated with the EC, should be used as case studies for this objective. I provide a thorough description of participant selection and methods in Chapter 4.

Environmental Club

The EC is affiliated with a non-profit organization focused on the well-being of the Gulf of Mexico ecosystem and its inhabitants. One of the program's goals is to bridge coastal communities from the United States with coastal communities from Latin America around a common concern for the Gulf of Mexico through both English and Spanish. The environmental education program addresses other social and academic issues through an informal, after-school setting at approximately ten schools along the Gulf of Mexico. Details concerning the EC are discussed further in Chapter Three.

Participants

Participants varied for each research question; however all participants were from schools involved in the EC. I selected schools based on their characteristics relating to a) stability of environmental education program, b) science teacher presence in environmental education program, c) similarities on the states' school report card, d) presence of a Hispanic population, and e) proximity to each other (Table 1.1). A discussion concerning the details of participant selection is provided in Chapter 4.

Methodology

Researchers have often used qualitative methods to study and interpret the processes people use to make sense of phenomena or events in their everyday, natural settings (Denzin & Lincoln, 2003). Because this study was interested in the phenomena of a developing learning framework in science-focused settings, qualitative methods suited the research questions concerned with participants' understandings of the development and existence of communities of practice (Wenger, 1998). In determining which methodological approach might best address the research questions, I found the case study to be the most appropriate. The case study method allows for an in-depth exploration of an individual, an activity, an event, or a process over a period of time with a number of methodological tools (Stake, 1995).

Specifically, this study aimed to understand the holistic process of individual learning within a community of practice. Yin (2003) acknowledges that case study methodology is compatible with understanding a holistic, real-world phenomenon. Additionally, situated learning posits that the unit of analysis cannot be solely the community of practice or the individual; therefore, I used embedded case study methodology to look at individual student cases within each context (Table 1.2). During the 2006-2007 school year, a total of 5 case studies were developed through

qualitative methods for each science-learning context observed: two cases from one science classroom and the EC at Surfside Middle School, two cases from one science classroom and the EC at Tidal Wave Middle School, and one case from the EC at White Sands Middle School.

Table 1.1
School and EC Characteristics

School/ Environmental Club	*Surfside Middle School*	*Tidal Wave Middle School*	*White Sands Middle School*
School location	Coastal Plains, TX	Coastal Bluff, TX	Coastal View, TX
District category	Non-Metro Stable community	Non-Metro Stable community	Non-Metro Stable community
School size	>800 students	275 students	325
School academic performance	Academically acceptable	Academically acceptable	Academically acceptable
School demographics	56.5% Hispanic 36.7% Caucasian 2.6% African-American	47.1% Hispanic 44.9% Caucasian 5.8% African-American	39% Hispanic 54.5% Caucasian 3.4% African-American
Club size	15 regular attendees 25 general attendees	5 regular attendees 15 general attendees	6 regular attendees 10 general attendees
Club demographics	100% Hispanic	40% Hispanic	50% Hispanic
Club existence	3 years	4 years	First year
Club language (predominately used)	Spanish	English	English

Table 1.2
Embedded Multiple Case Study Design

Context	Surfside Middle School	Tidal Wave Middle School	White Sands Middle School
Science Classroom	Case 1 Student A	Case 2 Student C	
Environmental Club	Case 3 Student A and B	Case 4 Student C	Case 5

Data collection

Trochim (2001) maintained that case study methodology could be employed in a variety of ways using a number of different data collection methods. Over the course of the school year, I visited students, teachers, principals and club participants in their everyday school and club settings. The data collected included: student focus group interviews; individual interviews with students, teachers and principals; non-participant observations of science classrooms; participant and non-participant observations of an after-school environmental club; student drawings and autobiographies; and secondary data, including demographic and socio-economic data of the schools and their surrounding city, to provide descriptions of the difference in contexts (Table 1.3). Field notes were recorded after each site visit.

Due to the need for a thorough and dense description of contexts, observations of the situation were necessary. Furthermore, focus group interviews were used to examine community characteristics. As Madriz (2003) notes, "The singularity of focus groups is that they allow social scientists to observe the most important sociological process--collective human interaction" (p.365). Moreover, focus group interviews allow for the researcher to have access to more information than individual interviews in a limited amount of time and can sometimes take the attention off of the researcher,

Table 1.3
Data collection timeline

	Methods collected in minutes																	
Date collected	Classroom Non-participant observations			EC non-participant observations			Classroom focus group interviews			EC focus group interviews			Individual student interviews			Individual teacher/ principal interviews		
	S	TW	WS	S	TW	WS	S	TW	WS	S	TW	WS	S	TW	WS	S	TW	WS
October 2006	50	50																
November 2006	50	50					50	45										
December 2006	50	50				40	50	45										
January 2007			50		25	40												
February 2007	50	50		40	25		50	40	30	30	30		30 25	30		60	75	
March 2007	50	50						40				40						
April 2007		50	50	30		30	50	45	30	35	30	30	30 30	30		60	50	40
May 2007			50	30			50	40	30		30	30	30 20	30				40
Total hours of data collected	11.6 hrs			4.3 hrs			9.9 hrs			4.25 hrs			4.25 hrs			5.4 hrs		

(S= Surfside Middle School, TW= Tidal Wave, WS=White Sands)

allowing for greater interaction between members of the group (Madriz, 2003). I interviewed individual students and collected autobiographies to further explore identity and the trajectories of these individuals in the various communities to which they belonged (Wenger, 1998). I also collected student drawings of their learning contexts. Finally, secondary data were gathered to provide rich supplemental description for each case. A thorough description of the data collection methods for each objective is provided in Chapter 4 (Table 1.4).

Observations, interviews, and drawings focused on Wenger's (1998) community of practice framework dimensions (Table 1.5). In order to understand the joint enterprise, I asked questions concerning the classroom and club activities, purpose, and goals. To examine the mutual engagement, I asked questions about membership, participation and roles. Finally, in looking at shared repertoire, I asked questions about tools, symbols and words/language used (Table 1.6).

Similar to Roth's (1995) approach to understanding a science classroom as a community of practice, I felt it was important to examine both emic and etic perspectives (Pike, 1967). As Lave and Wenger (1991) note, the term "community" implies, "…participation in an activity system about which participants share understandings concerning what they are doing and what that means in their lives and for their communities" (p.98). Thus, participation in a community of practice implies that members should be able to understand the purpose of their activity and should therefore be able to articulate their participation and its purpose. While Wenger (1998) later argues that the notion of community does not need to be reified to exist, nor do members have to agree on their belonging to the community, I believe that an emic perspective of the students' views on "community" could help us understand how they define communities, how they perceive their own group, and how they interact with

Table 1.4
Methods used across contexts

Context	Focus Group Interview Methods	Individual Interview Methods	Observational Methods	Biographical Methods
Surfside	Instrument: Focus group interview with script; student drawings of the context Study sample: Two science classes and the EC Frequency: 5 interviews (50 min) with two science classes; 3 interviews (30-35 min) with the EC (13 total for 10 hrs)	Instrument: Semi-formal interviews with script Study sample: Principal, Science teacher, and two students Frequency: 1 with Principal (1 hr); 1 with teacher (1 hr); 3 with each student (20-30 min) (8 total for 5 hrs)	Instrument: Non-participant observations for the classroom/ Informal participant observations for the club Study sample: Two science classes and the EC Frequency: 5 observations (50 min) in each class; 3 formal observations (30-40 min) in the EC (13 total for 10 hrs)	Instrument: Autobiography entries with predetermined prompts Study sample: Two individual students Frequency: 3 entries for each student (6 total)
Tidal Wave	Instrument: Focus group interview with script; student drawings of the context Study sample: Two science classes and the EC Frequency: 5 interviews (50 min) with two science classes; 3 interviews (30 min) with the EC (13 total for 10 hrs)	Instrument: Semi-formal interviews with script Study sample: Principal, Science teacher, and one student Frequency: 1 with Principal (50 min); 1 with teacher (75 min); 3 with student (30 min) (5 total for 3.5 hrs)	Instrument: Non-participant observations for the classroom/ Informal participant observations for the club Study sample: Two science classes and the EC Frequency:5 observations (50 min) in each class; 2 formal observations (25 min) in the EC (12 total for 9 hrs)	Instrument: Autobiography entries with predetermined prompts Study sample: One individual student Frequency: 3 entries for the student (3 total)

Table 1.4 continued

Context	Focus Group Interview Methods	Individual Interview Methods	Observational Methods	Biographical Methods
White Sands	Instrument: Focus group interview with script; student drawings of the context Study sample: One science class and the EC Frequency: 3 interviews (30 min) with one science class, 3 interviews (30-40 min) with the EC (6 total for 3 hrs)	interviews with script Study sample: Principal, Science teacher, and one student Frequency: 1 with Principal (40 min); 1 with teacher (40 min) (2 total for 1 hr)	Instrument: Non-participant observations for the classroom/ Informal participant observations for the club Study sample: One science class and the EC Frequency: 3 observations (50 min) in the class; 3 formal observations (30-40 min) in the EC (6 total for 4 hrs)	

each other. Additionally, the students' perspectives on their membership and participation in a community of practice could further help an outsider to understand the community of practice dimensions and help make a stronger claim about the relationship between the dimensions. Thus, in order to gain an emic perspective, I asked explicit questions about students' interpretations of the notion of community, what communities they felt a part of, and what practices they undertook in these communities.

Table 1.5
Community of practice dimensions and associated questions

COMMUNITY OF PRACTICE	Science Classroom Observations	EC Observations
Joint enterprise -evolution of practice -purpose of practice	What is the purpose/goal/activity and common practice of the community? Who determines this? How is it expressed?	What is the purpose/goal/activity and common practice of the community? Who determines this? How is it determined? How is it expressed?
Mutual engagement -membership -engagement -participation -roles	How do students and teachers participate in the classroom activities/discussion? In what types of roles are students engaged? In what types of roles are teachers engaged? What does full membership look like?	How do students and leaders participate in the club activities/discussion? In what types of roles are students engaged? In what types of roles are leaders engaged? What does full membership look like?
Shared Repertoire -tools -language	What artifacts/symbols/words are used to give meaning to this community?	What artifacts/symbols/words are used to give meaning to this community?

Table 1.6
Methods used for research questions

	FG	I	O	D	S
Community of Practice					
Joint enterprise	X	X	X		
Mutual engagement	X	X	X	X	
Shared repertoire	X	X	X		
Learning as a social process	X	X		X	

(FG= focus group, I= individual interviews, O= observations, D= drawings, S=secondary data)

Data analysis and validity procedures

Data analysis and validity procedures are discussed in more depth in Chapter 4. Briefly, I included interviews and observations, reflections and research notes from site visits, student drawings, and student autobiographies in cases for all five contexts. Data were reviewed and coded along Wenger's dimensions, as well as the dimensions of "identity" and "community". In addition, the limitations imposed by methods, study contexts or study parameters are discussed within the study.

Organization of the dissertation

This dissertation includes an introduction, three main chapters, each concerned with an analysis of the community of practice framework, and a conclusion. Each main chapter is meant to be submitted as a stand-alone journal article. Table 1.7 provides a summary of the questions, findings and implications for each chapter.

The second chapter examines sociocultural theories of learning as a shift from traditional cognitive theories of learning used in science education. I provide a detailed description of Wenger's community of practice framework and explain how learning might be understood as a social process through this framework. I then examine the specific dimensions developed by Wenger (1998) in two science classrooms. The chapter discusses the usefulness of Wenger's dimensions in describing the existence of a community of practice in the classroom and the appropriateness of the framework for understanding learning as participation, membership and identity formation in the two science classroom contexts.

Chapter 3 examines the community of practice framework in the context of an after-school environmental education program. I begin with a discussion concerning the need for a greater use of learning theories in environmental education research. I also describe various theories currently used in environmental education studies. I then

Table 1.7
Research questions and findings for each chapter

Major Chapters	Overarching Questions	Research Questions	Findings	Implications
Ch. 2	Are Wenger's community of practice dimensions (joint enterprise, mutual engagement, shared repertoire) helpful in identifying the existence of communities of practice in science classrooms and an after-school environmental education program? Is Wenger's framework useful for examining learning as participation, membership and identity formation in science classrooms and an environmental education program?	How are Wenger's dimensions manifested in science classrooms? How are these dimensions understood by classroom participants? How useful are Wenger's dimensions for describing learning as participation, membership and identity formation in science classrooms?	dimensions were helpful in describing classroom practices dimensions did not ensure a community of practice dimensions helped identify the development of communities of practice learning viewed as a social process in contexts where framework was applicable learning viewed as competence in practice	caution against prescriptive use of framework other contextual factors could affect development of dimensions learning can be understood as a social process
Ch. 3		How are Wenger's dimensions manifested in an environmental education program? How do students participating in the environmental education program understand these dimensions? How useful are Wenger's dimensions for describing learning as participation, membership and identity formation in an after-school environmental education program?	dimensions were developed in all ECs dimensions were helpful in describing EC practices and dynamics framework appropriately applied to all ECs learning viewed as a social process in all contexts learning viewed as a process of identity trajectories in all ECs	caution against prescriptive use student and group needs should be considered when developing a purpose/practice room for EE theories to contribute practice might drive participation
Ch. 4		How were Wenger's dimensions and learning as a social process manifested in both science-focused contexts?	development of dimensions likely due to a number of contextual factors ECs more conducive than classrooms to the development of dimensions learning could be viewed as a social process when the framework was applicable	sociocultural theories provide more opportunities for understanding learning of students traditionally marginalized than traditional learning theories

examine the usefulness of Wenger's dimensions in identifying communities of practice in three different Environmental Clubs (ECs) and the appropriateness of the framework to describe a social process of learning in these contexts. The chapter ends with a discussion about the value of the community of practice framework in studying learning in environmental education programs, as well as the value other theories in environmental education might bring to our understanding of learning in these contexts.

In the fourth chapter I examine and compare results from the study on science classrooms and the ECs (Table 1.7). The purpose of this chapter is to look at ways the theory was both beneficial and insufficient throughout the study in explaining the existence of communities of practice and the framework's ability to account for learning in both science classrooms and the ECs. The paper also looks at factors contributing to the applicability of the community of practice for various contexts, including physical structure, classroom and school culture, access to peer groups, and reasons and opportunities for participation in the ECs. I end with a discussion on the implications this study has for an understanding of learning as a social process. The final chapter includes possibilities for future research related to the original objectives of the study. It discusses implications for further studies in multiple contexts using the community of practice framework as well as implications for research in environmental education contexts.

CHAPTER 2

How useful is the community of practice framework, if we are not looking at a community of practice?

Abstract: This paper examines how Wenger's community of practice framework is both applicable and useful for understanding learning as a social process in two science classrooms. To do this, I first examine how Wenger's main dimensions, joint enterprise, mutual engagement, and shared repertoire, are manifested in both classrooms. I then look at how the dimensions help to explain learning as participation, membership and identity formation within the classrooms. Findings indicate the dimensions were helpful in describing classroom practices but their existence did not ensure a classroom community of practice. Instead, dimensions helped to identify how communities of practice developed or were inhibited in the classrooms. When the community of practice did appear to be an appropriate metaphor for a classroom community, learning as a social practice was easier to identify.

Education researchers have increasingly turned to sociocultural theories of learning in efforts to understand the science achievement of students often marginalized in the sciences and to re-examine our traditional concepts of learning. Until recently, the dominant paradigm in science education research was the use of cognitive learning theories to explain students' individual cognitive processes apart from the "noise" of their everyday life. Before that, behaviorist theories dominated our perceptions of learning (Kirshner & Whitson, 1998). Both cognitive and behaviorist theories evolved from the psychological sciences. However, over the past two

decades, fields such as anthropology, sociology and education have also contributed to our understanding of learning through a sociocultural lens.

Cognitive theories focused on mental processes or informational processing to depict the learning of individuals (Benjafield, 1992). However, the theories did not account for external factors that might influence learning. For instance, Lave (1998) found that a number of cognitive studies provided little detail, if any, in their descriptions of the subjects and contexts studied. While cognitive scientists were concerned with the replicabilty of their studies in the lab, researchers from other fields were having difficulty studying the same concepts outside of the lab (Lave, 1998). Consequently, these theories often separated the individual learner from the context in which he or she learned.

Another problem some researchers had with cognitive theories was that they often overlooked other learning taking place, by dichotomizing what learning was and was not (Chaiklin & Lave, 1993). As Brickhouse (2000) noted through her observations of many science classrooms, "it appears that what students are learning in science classrooms has very little to do with science" (p.443). Education researchers have often had to look and scrutinize very carefully to find the "learning" they expect or hope to see. On the other hand, the learning that researchers often failed to pay attention to was how and why students entertained particular questions, how they learned to answer questions in particular classrooms, behave for certain teachers or peers, or speak with certain groups of friends (Lemke, 2001).

Increasingly, researchers concerned with the complex issues that everyday life brings to the science learning process are turning to theories under the umbrella of sociocultural theories of learning (Lattuca, 2005), such as situated learning (Barab & Duffy, 2000), situated cognition (Brickhouse, 2001; Reveles et al., 2004), activity theory and cultural-historical theory (Boyer & Roth, 2006). Some sociocultural

theories of learning contend that learning is a social process that occurs as individuals participate in communities of practice with a specific physical, historical and cultural context (Lave & Wenger, 1991; Wenger, 1998). Instead of focusing on cognitive or conceptual changes in an individual acontextually, these theories examine individual identity formation and transformation through participation and membership in various communities of practice.

The community of practice concept was introduced by Lave and Wenger (1991) and further developed by Wenger (1998), among others. Wenger introduced the community of practice framework as a mechanism to define and illustrate a sociocultural theory of learning (Greeno, 1998; Lave & Wenger, 1991; Lemke, 2001) through three dimensions: *joint enterprise*, *mutual engagement* and *shared repertoire*. In light of the breadth of theories that have recently brought attention to the sociocultural dimension of learning, using a framework currently applied in a variety of contexts, from the workplace to science classrooms, could aid in an understanding of the theory as well as the learning that takes place across multiple disciplines and contexts.

In an attempt to further understand how Hispanic students were participating and learning in various science-focused contexts, I turned to the community of practice framework. Like others, I embraced this framework because of the contemporary perspective it provides on learning, its focus on identity and participation, and the space it provides for examining central, peripheral and marginal positions within and between social units. For example, Ash (2008) designed a classroom using community of practice principles to examine how students make sense of biology through language, writing and thought. Barab and Duffy (2000) described how both cognitive and anthropological views of situated learning and similar theories helped to construct practice fields or communities of practice in which

students move from legitimate peripheral participants to participants of the larger community domain. Brickhouse (2001) used the community of practice framework in her examination of young, African-American women's identity formation with science in urban and suburban school contexts. Roth, McGinn, Woszczyna, and Boutonné (1999) examined classrooms as communities of practice to understand how artifacts, social configurations and physical arrangements mediated discourse, and Hogan (2002) examined two science-learning contexts through the framework to determine how students were following trajectories to greater identification with environmental practitioners.

All of these studies have provided useful insight regarding the use of the community of practice framework in educational research. However, in a preliminary study attempting to understand classrooms as communities of practice, I encountered difficulties with the metaphor and its usefulness in explaining learning as a social process. Rather than discard the theory as inappropriate, I wanted to address reasons why the framework was inapplicable and reconsider the value of the framework for learning contexts (Bradley, 2004). Thus, as other studies assumed contexts could be studied as communities of practice or could be transformed into them (Ash, 2008; Barab and Duffy, 2000; Hogan, 2002), I reflected on Wenger's words:

> "…an institutional boundary does not necessarily outline a community of practice. Careful scrutiny of its day-to-day existence may reveal that a work group, classroom, committee, or neighborhood does not actually constitute a community of practice. It may consist of multiple communities of practice, or it may not have developed enough of a practice of its own" (p.119).

It is in this vein that I explore the applicability and usefulness of the community of practice framework for describing participation, membership and identity in science-focused contexts. In this paper examining the value of the community of practice theory in various science-focused contexts, I provide rich,

descriptive data on mutual engagement, joint enterprise, shared repertoire, and the perceptions of community and practice from members in two science classrooms. To do this I ask the following questions: 1) How are Wenger's dimensions (joint enterprise, mutual engagement, and shared repertoire) manifested in science classrooms? 2) How are these dimensions understood by classroom participants?; 3) How useful are Wenger's dimensions for describing learning as participation, membership and identity formation in science classrooms?

Wenger's community of practice

According to Wenger (1998), the community of practice is an introductory concept meant to illustrate what a social theory of learning might look like (Greeno, 1998; Lave & Wenger, 1991; Lemke, 2001). In fact, experiences in these communities might be so inundated in our every day lives that we might not even immediately recognize our participation in them. A community of practice is a place of learning where practice is developed and pursued, meaning and enterprise are negotiated among members, and membership roles are developed through various forms of engagement and participation. Learning involves the means by which one participates, engages, negotiates and formulates one's own identity in the process and as a product. The practice is therefore a central component around which other community of practice dimensions evolve. Wenger (1998) emphasizes that the examination of practice through the lens of a community is fundamental to our understanding of learning as a nexus of practice, meaning, community and identity.

Each community of practice involves a unique system of 1) *joint enterprise*, 2) *mutual engagement* and 3) *shared repertoire* (Wenger, 1998). The *joint enterprise* is a negotiated response to the conditions, circumstances and

mandates of an institution. It is not a static entity or statement of purpose, but rather a process that concerns how members interpret and respond to these institutional demands. The enterprise shapes and is reflected in practice. However, "The enterprise is joint, not in that everybody believes the same thing or agrees with everything, but in that it is communally negotiated" (Wenger, 1998, p.78). Thus, while agreement is not necessary, members must consistently reconcile their understanding of what is acceptable and what norms they will collectively be held accountable for. The joint enterprise also provides for a unique community, as each is subject to its own history and make-up, and therefore, its own interpretations and response. According to Wenger (1998), learning through this dimension would involve engagement, alignment, struggle and reconciliation in an effort to understand and define the enterprise.

Mutual engagement involves the sustained interaction of people within a community and the roles and relationships that arise from this interaction. This dimension goes beyond social categories, networks and physical location. For instance, Wenger (1998) notes that because people work together in the same office does not make them a community of practice. Rather they are a community of practice because of the relations built in that office and the meaning that arises from their interactions with each other. In order to be a member of a community, one must be engaged with that community, and engagement requires an understanding of the community's enterprise. From Wenger's (1998) perspective, learning through mutual engagement would involve learning how to interact and "establishing who is who, who is good at what, who knows what, who is easy or hard to get along with" (p.95). Finally, *shared repertoire* consists of signs, symbols, tools, styles and discourses that are used as resources for both negotiation of and mutual engagement with the practice. The repertoire symbolizes what is routine, what is common knowledge,

and what is shared knowledge. Shared repertoire can be adopted by the community or it can be produced within the community. Regardless, it will have meaning specific to that community of practice (Wenger, 1998).

Together, the three dimensions determine the practice, and the practice, in turn, works to refine the dimensions. These three dimensions function as integral components of a community of practice and help to identify a process of learning that involves participation, membership and identity formation. As Wenger notes, "…practice entails the negotiation of ways of being a person in that context" (Wenger, 1998, p.149). Therefore, understanding the evolution of these dimensions and the practice they refine helps us understand how an individual might form identities within a context. Identity then becomes a product of participation in a community of practice and simultaneously influences the practice.

Because this notion of identity is dependent on engagement with others, it allows for various levels of participation, including non-participation and multiple levels of membership, including core, peripheral and marginal. One can identify as a full, core member if he/she feels competent in the practice and other members recognize him/her as competent. On the other hand, if one is not fully competent, fully engaged or fully acculturated, he/she may participate from a peripheral or even marginal location. All three locations help to define each other. Where full participation is measured by a level of competence, degrees of non-participation allow for development of competence. However, the larger institution might also establish measures that prevent opportunities for full participation of some of its members, thereby institutionalizing marginalization. The reciprocity between participation and non-participation is important as it affects both identity formation and membership by helping individuals recognize their location in society, what

they deem important enough to understand, what they feel is negligible enough to forget, and what they devote their attentions to and how (Lemke, 2001; Wenger, 1998).

Finally, we return to the dimension of community. While the term "community" is often debated in educational research (Riel & Polin, 2004), Lave and Wenger (1991) note the term "community" implies, "…participation in an activity system about which participants share understandings concerning what they are doing and what that means in their lives and for their communities" (98). Thus, participation in a community of practice implies that members should be able to understand the purpose of their activity and should therefore be able to reify their participation and its purpose. In his own work, Wenger describes how and why members belong to their work community, without ever asking them about their own perceptions of a community in the work place. Like Roth's (1995) approach to understanding a science classroom as a community of practice, I feel it important to provide both emic and etic perspectives (Pike, 1967) on the concept. I argue that if identification with a community is crucial to understanding learning as a social process, then so is an individual's identification as a member of that community. Additionally, the students' perspectives of their membership and participation in a community of practice would further help an outsider to understand the community of practice dimensions and help make a stronger claim about the relationship between the dimensions.

Contexts and Methodology

Site selection

For this study, I examined four science classrooms at two schools serving predominately Hispanic youth. Both schools participate in the same after-school environmental education program. I chose this geographic location based on demographics and my familiarity with the region. A preliminary year-long study (August, 2005-May, 2006) helped to determine which schools should be used as case studies for this project. Using homogenous sampling (Patton, 2002), I selected schools based on their characteristics relating to: a) their involvement with the environmental club, b) stability of environmental club, c) science teacher presence in environmental club, d) similarities on the states' school report card, d) presence of Hispanic population, and e) proximity to each other. Thus schools that had been involved with the environmental club for 3 years or more and whose clubs were under the co-direction of a science teacher were examined. These schools also had the same academic ratings on their states' school report card, were similar in demographics and were within 60 miles from each other. While the homogenous sampling process might have limited the type of results found, it allowed for a greater focus on students and contexts with similar demographics and backgrounds.

School settings

Surfside Middle School, Coastal Plains, TX

According to statistics and category groupings from the Texas Education Agency (TEA), Coastal Plains is considered a Non-Metro Stable community:

> School districts that are not in any of the above categories (major urban, major suburban, other central city, other central city suburban, independent town, non-metro: fast growing) yet have a number of students in membership that exceeds the state median.

In the 2006-2007 TEA report, Surfside Middle School was noted as an academically acceptable school. In 2006-2007 the school population consisted of 56.5% Hispanic students, 36.7% Caucasian students, and 2.6% African-American students with 3.1% of the student population having limited English proficiency. In terms of socioeconomic status (SES), 54.8% of the student population was considered economically disadvantaged. The school served more than 800 students (Table 2.1).

Tidal Wave Middle School, Coastal Bluff, TX

Coastal Bluff was also considered a Non-Metro Stable community, according to the TEA. In the 2006-007 TEA report, Tidal Wave Middle School was considered an academically acceptable school. In 2006-2007 the school was composed of 47.1% Hispanic students, 44.9% Caucasian students, and 5.8% African-American students with 2.9% of the student population having limited English proficiency. In terms of SES, 65.3% of the student population was considered to be economically disadvantaged. The school served approximately 275 students (Table 2.1).

Table 2.1
School demographics

School	*Surfside Middle School*	*Tidal Wave Middle School*
School location	Coastal Plains, TX	Coastal Bluff, TX
District category	Non-Metro Stable community	Non-Metro Stable community
School size	>800 students	275 students
School academic performance	Academically acceptable	Academically acceptable
School demographics	56.5% Hispanic 36.7% Caucasian 2.6% African-American	47.1% Hispanic 44.9% Caucasian 5.8% African-American

Class selection

Stratified purposeful sampling allowed me to sample on two levels. I first chose classes from the two schools using homogenous sampling based on the teachers' participation in the EC and the overlap of students in the science classrooms and the EC. Following preliminary work, I also used confirming/disconfirming case sampling (Patton, 2002) to focus on particular science classrooms. The weakness in this approach was that it allowed for potential bias in findings, as the sites were already determined to show differences.

I studied two eighth grade science classrooms from Surfside. I also studied two seventh grade science classrooms at Tidal Wave. However, due to space limitations, I chose to describe only two of the classes studied based on intensity sampling, where the sites described depict rich examples of findings on the existence of communities of practice (Patton, 2002).

Methodology and data collection

The purpose of this study was to critically examine practices and interactions in science classrooms so that we might determine if Wenger's (1998) dimensions were applicable in their designation of communities of practice and useful in their ability to describe learning as participation, membership and identity formation in these classrooms. Due to the questions being asked about student participation in science contexts and the lack of control over school settings, I employed case study methodology for this study (Yin, 2003). I was especially interested in understanding a phenomenon, learning as participation, through various perspectives using multiple methods (Stake, 1995). During the 2006-2007 school year, case studies of the science classrooms were developed using qualitative methods. Further details regarding these methods are discussed in Aguilar (in progress), but are described briefly here.

I studied the science classroom contexts as a non-participant observer. Over the course of the school year, I examined students, teachers, principals and students in their natural settings. The data collected involved classroom observations, student focus group interviews, student drawings, teacher interviews, principal interviews, and secondary data, including demographic and socio-economic data of the schools and their surrounding city. These data were used to provide descriptions of the differences in contexts and dimensions associated with communities of practice.

Observations of both science classrooms were audio-recorded approximately 5 times throughout the school year, for a total recorded 9.2 hours. During these recorded observations, I also noted non-verbal actions, such as student and teacher movements and interactions. I conducted student focus group interviews five times at Surfside Middle School and six times at Tidal Wave Middle School throughout the school year, for a total of approximately 8.5 hours. Each interview consisted of three to six students, who remained consistent participants throughout the study. Individual interviews with the science teacher and the principal at each school were conducted and audio-taped once during the school year for a total of approximately 4 hours (Table 2.2).

Observations, drawings, and interviews focused on Wenger's (1998) communities of practice dimensions (Table 2.3). In order to understand the joint enterprise, I asked questions concerning the classroom and club activities, purpose, and goals. To examine the mutual engagement, I asked questions about membership, participation and roles. Finally, to examine shared repertoire, I asked about tools, symbols and words in the classroom contexts. I also asked explicit questions about participants' interpretations of the notion of community, what communities they felt a part of, and what practices they undertook in these communities. Asking these questions helped to introduce the difficult concept of communities of practice and

helped me to gain an emic (Pike, 1967) perspective of membership and participation in these contexts. As Wenger (1998) noted, participation in communities of practice gives rise to a person's understanding of who they are and where they are located in a social world. These questions were intended, then, to expose both the complexities of participation in the science classrooms and identity formation that might be occurring in these contexts. To understand emic perspectives of community, I first asked students about their conceptions of communities and what communities they felt they belonged to.

Table 2.2
Data collection timeline

	Methods collected							
Date collected	Classroom Non-participant observations		Classroom focus group interviews		Individual student interviews		Individual teacher/ principal interviews	
	S	TW	S	TW	S	TW	S	TW
October 2006	50	50						
November 2006	50	50	50	45				
December 2006	50	50	50	45				
January 2007								
February 2007	50	50	50	40	30 25	30	60	75
March 2007	50	50		40				
April 2007		50	50	45	30 30	30	60	50
May 2007			50	40	30 20	30		
Total hours of data collected	9.2 hrs		8.5 hrs		4.25 hrs		4 hrs	

(S= Surfside Middle School, TW= Tidal Wave Middle School)

I followed with questions concerning the school and classroom as communities and asked similar questions during all focus group interviews to determine the trajectory of students' feelings about their classroom.

Table 2.3
Community of practice dimensions and associated questions

COMMUNITY OF PRACTICE DIMENSIONS	Science Classroom Observations and Interviews
Joint enterprise -evolution of practice -purpose of practice	What is the purpose/goal/activity and common practice of the community? Who determines this? How is it expressed?
Mutual engagement -membership -engagement -participation -roles	How do students and teachers participate in the classroom activities/discussion? In what types of roles are students engaged? In what types of roles are teachers engaged? What does full membership look like?
Shared Repertoire -tools -language	What artifacts/symbols/words are used to give meaning to this community?

All interviews were semi-formal and slightly unstructured, but a script was prepared for each interview so that I could ensure that I addressed all dimensions and could keep the interview on track if it strayed away from the major topics. I repeated similar interview questions throughout the school year. The repetition of questions attended to the dynamic and evolving states of all three dimensions in the production of practices through participation in addition to the trajectories and on-going processes of identity formation. In addition, I asked students to depict and explain roles and membership in the science classroom context through drawings during the focus group interviews. This provided students another means through which they could articulate a difficult concept. I also thought that a physical depiction would provide further

insight into the location of students (i.e. core, peripheral or marginal) in the classroom. Finally, I gathered field notes and reflections from each visit to a science classroom.

Analysis

I used multiple steps for analysis during the research process. First, a thorough understanding of theory was used to determine the dimensions to which the data would correspond, including joint enterprise, mutual engagement and shared repertoire. I prepared a detailed plan for each stage of data collection to ensure consistency among cases. Throughout this study I employed a variety of methods in an attempt to develop rich, descriptive cases, and to strengthen claims of validity. I employed data triangulation across methods within cases and across cases throughout the study (Patton, 2002). I recorded notes and researcher reflections after every data collection session and reviewed before subsequent data collection visits (Creswell, 2003). I used the notes and reflections to determine questions for the next visit. Adopting the practice of member-checks, I frequently checked my interview findings with respondents, reviewing the previous interview's responses at the beginning of each interview, to ensure an accurate understanding of our discussions (Creswell, 2003).

After interviews were transcribed, I gathered transcripts, observations, reflections and drawings for each of the four cases. I initially reviewed and highlighted interview transcripts, observations and reflection notes for the three main dimensions (joint enterprise, mutual engagement, and shared repertoire) making notes about other themes that might be present and possible questions that might arise in the data. After multiple readings, themes related to identity, trajectory, community, and practice began to appear regularly, and I coded for these as well. I coded for data segments rather than terms or single words (Linehan and McCarthy, 2001), as the intention was not to reduce data to single identifiers

but rather to develop a rich understanding of the community of practice dimensions. I also matched drawings with their respective interviews and examined the dimensions students were asked to represent in their drawings. Once all data were coded, I analyzed where the dimensions, found through the multiple methods, converged in each case to determine which dimensions were most strongly supported. I compared findings, first, within each case to look at the strength of dimensions from each method of data collection. I then employed analytic induction to compare findings across cases (Patton, 2002).

Findings

My purpose in this section is to illustrate how science classrooms might be viewed as communities of practice through the development of a joint enterprise, mutual engagement and shared repertoire. In the interest of space, the segments presented are limited to two cases: one that shows little support for the use of the metaphor in describing participation and membership and one that shows the most support for the existence of a community of practice. I limit segments to excerpts from transcripts and observations I felt best summarized the dimensions in question.

Key:

O: researcher

(…) discussion about the same topic

(…) (…) discussion between topics

*inaudible words or phrase

Ss: several voices

F: unidentifiable female voice

M: unidentifiable male voice

Surfside science classroom

The Surfside classroom was set up with the teacher's desk in the front of the room and 5 rows of large lab tables that allowed students a spacious area to work within. Students in the last row were far from the teacher's desk in front. However, the teacher made a concerted effort to move about the classroom during instruction. Students did not typically work in groups unless they were participating in labs.

In the classroom sessions I observed, the mode of teaching often fell into a traditional question and response type of instruction (Rogoff, 1995). There was very little group interaction during instruction. Students worked individually and were not encouraged to talk among themselves. During every observation at least a few minutes of class time was spent disciplining one or more students, always males. The interactions I observed in class were similar to those Hurd (2004) described in his study of Mexican-descent youth. He argued that the "acting out" by predominately male students served as a form of non-engagement with the school and classroom practice and was a cultural practice that enabled participation in a larger social structure (e.g. membership with other males, the larger community).

Community of practice dimensions at Surfside

Discrepancies often arose when examining the dimensions at Surfside. The recognition of the classroom as a community was strongest in the middle of each semester but wavered between the semesters. There was also tension and conflict when students attempted to articulate the classroom enterprise. While students seemed to agree on what the practice *should be*, there was discussion about what the practice actually *was*. Students also argued about how they participated in the practice.

Community

Discussing the concept of community provided insight into students' emic perspectives on their belonging to a community of practice. Student focus group and teacher interviews revealed that students' perception of their class as a community of practice changed over the course of the year. Further, this change often supported the findings from other dimensions (joint enterprise, mutual engagement, shared repertoire).

In the first focus group interview the students agreed that both their school and science classroom were examples of communities, with Leslie responding "Because we are all like working together to pass science." During the second interview, students were more willing to take part in the discussion and identified their school and classroom as communities, as well as their city and families. I then asked them to discuss what these communities might have in common.

Luis: People work together.
O: People work together, right.
Jose: To survive
O: To survive, yeah?

While Wenger claims that a community of practice does not need to be reified to exist as such, students seemed very perceptive about what a community of practice might be and reasons it might be useful. For instance, Jose's statement that the purpose of a community was to survive is relevant to the notion that a joint enterprise is meant to deal with institutional demands and conditions.

However, in the same interview not all students were willing to consider the classroom as a community.

O: Okay. Okay, so these are some practices that like we as a community at Surfside do. Okay, so, let's talk about then something smaller like the science classroom…do you think the science classroom would be a community or not?
Ss: Yeah, yes
Stephen: No
O: Stephen you wanna tell me why you don't think it is?
Stephen: not enough people
O: Not ah, not enough people?
Stephen: Yep

Stephen's response seemed to be based on a previous response to how a community was defined as "a lot of people". However, it was also interesting to see here that he disagreed with his peers. My observations from this classroom indicated that Stephen seemed to be isolated in class, keeping to himself. Later in the semester, though, I noticed Stephen befriended two other boys in the class, after which he was more inclined to answer that the classroom was like a community in focus group interviews.

During my observations before the third interview, I noticed a few students in the class who did not look familiar. This led me to ask questions about how this affected the students' classroom. Most of the students in the focus group voiced annoyance and frustration with the new dynamic of the classroom, stating that the

class had “gotten worse” and that they were “slacking off more” and getting “off task” as a result. Luis was the exception; he felt the class was the same and he continued to behave the same way he had in the past.

O: So do you think it feels like a community?
Leslie: I don't know. I guess yeah. Probably, I don't know.

When I asked if they felt like their classroom was a community during the third interview, I recorded a change in Leslie’s feelings about the class as a community. In previous interviews she was often the first to say the class was a community because people worked together. In this interview she seemed to waver on her answer. A number of things could have been changing for Leslie in this community, including the new members or the distraction they were causing and its effect on what she perceived to be the practice. When asked how the community had changed, Leslie was the first to answer “It’s gotten worse”. In her view, there seemed to be less of a community, possibly because there was more “slacking off”. Leslie was also typically a “good student” who cared about her grades and worked hard in her classes. The fact that the new disruptions did not support her goals might have conflicted with her idea of the classroom as a community. The teacher’s interview, conducted a couple of weeks earlier indicated similar concerns.

O: And so then in the classroom you kind of mentioned it already, that there was kind of a unit?
T: I think so and they kinda stick up for each other. Now within that room you have your definite cliques and who’s not gonna work with whoever and you know that kind

of thing. But middle school is such a tough time because the kids are judged by, you know, how everybody looks at them and how you dress, and you belong to this group. You know, without even saying. It's such a horrible time, you know anyway. And so they have a real hard time getting out of their little clique, you know?

(…)

T: Like in (this class) has dramatically changed, they have given me several more kids from uh, one kid from the behavioral unit, removed a kid to the behavioral unit, sent me a couple of kids that are really low, low, low, low, low, and ooh, and the dynamics have changed in there. And one of my really sharp kids moved. And you can just see the whole demeanor in the class has changed. They look at it, and they think, "Hmmm".

O: So how would you describe that period?

T: Ooh, now I would describe it as an angry class…I mean because it's just so, because everybody's just so… now I've got, it's just been so many kids in and out of that class. It's bizarre. I'm really worried about that class now, because kind of like that cohesiveness is kinda. I don't know I've got my kids over here that are my rough tough kids and then I've got my kids over here that are low and kinda belong to the weird group or whatever they wanna call them, you know. And then I've got all my ESL (English as a second language) kids that these guys aren't gonna conflict with. And then I've got a couple of kids that fit into the popular athletic, you know kind of crowd. I'm kinda worried about that class.

The teacher at Surfside was clearly concerned about her students. She took an interest in their well being and adjustment. However, her attempt at protecting some students seemed to isolate them from each other. Instead, students were kept from engaging as a whole community.

Finally, excerpts from the fourth and fifth interview illustrated the continued inconsistencies around the community dimension in this classroom. Stephen changed his mind about the notion of community in the classroom in both interviews.

O:…For those of you who felt like the class is a community before, do you still feel that way or have you changed your mind?
Stephen: Changed.
O: Okay, so what do you think now?
Stephen: Everybody works together.
O: And so you feel like it is more of a community now than it was at the beginning?
Stephen: (nods yes)

Again, observations indicated that Stephen, previously isolated in the back corner of the room, now sat next to a couple of students he befriended in the front of the room.

The last group interview occurred during the last week of school. Many of the lockers were already empty and there was very little "work" to do in classes. The weather was warm and students talked about their summer plans. During this interview, several students no longer felt their classroom was a community.

O:…I also want this, for us to kind of reflect on the whole year and see how we've changed, like throughout the year in science class and how things in the science class have changed. So I'll ask you guys first, what do you think about the idea that your science class is a community today? Do you feel like it might be or not?
Stephen: No.
O: No, okay. Why don't you think so?

Stephen: I don't know.

O: Well what makes a community?

Stephen: Working together.

O: Okay. So do you feel like maybe in class people don't really work together as much?

Stephen: *

O: Okay. That's fair. All right Daniel what about you?

Daniel: I'll say the same thing as him.

O: Same thing, you don't think it's like a community?

Daniel: Yeah, because I * like … now that school's almost over, people skip class.

Luis and Leslie felt differently. They believed the classroom was still a community. Despite Leslie's uncertainty about the community in the middle of the school year, she seemed to think that the classroom community had progressed throughout the year. My observations also noted Leslie befriending some of the "new girls" who arrived after the Christmas break. When I asked about why she might have changed her mind, she responded:

Leslie: Because we like learned to be friends and like think about like we are all about little groups and we just work together better when we are like that.

O: Okay so you feel like you work together with people that you sit close to and have made friends with, okay.

Luis: (nods yes)

O: Same thing? Luis is saying the same thing.

Finally, I asked students about instances when the classroom felt like a community and when it did not. The students agreed that the classroom felt most like a community when they could talk with their friends or work in labs. They did not feel part of a community when they had to work on their own or as Stephen mentioned,

Stephen: Whenever your friends aren't there you're just by yourself, doing science work. (Pause) All by yourself and lonely.

The teacher's response to a similar question also reflected these sentiments.

O: And so the other thing I wonder then is like, maybe it depends on how they participate as to whether they think (it's a community).
T: I think so. And I think it would depend on what group they...belong to
O: belong to?
T: yeah,
O: So that's what I want to ask you about.
T: because if they're, if they're insecure, if they're not part of that crowd or whatever they would definitely feel, I would think, like its not a community, because they don't want to get next to those kids.

The above excerpts illustrated that the students' emic perspective on the notion of community varied throughout the semester, but provided insight into the dimensions, joint enterprise, mutual engagement and shared repertoire. It also showed how the emic understanding of community could affect one's participation, membership and identity within the community.

Joint Enterprise

Based on open-ended interview questions about practices, goals and the purpose of the classroom, I determined that students varied in their views on joint enterprise. Most students also felt there was a difference between what the enterprise should be (i.e., normative practices) versus how the enterprise was lived out in the classroom.

O: So if this is my community and let's say if it was a community of practice what might the practice be? Like what might the common goal be or what might everybody be working towards?

Leslie: Learning science.

Jose: Science projects.

(…)

O: So if this was a community of practice maybe the goal of people or maybe everybody works on learning science and doing science projects. What else can you think of?

Jose: Doing paper work.

O: Doing paper work. Okay. You mean like homework?

Luis: Reading books, reading science books.

When I asked students about a common practice in the science classroom during the first group interview, they listed practices of the classroom that were very typical of all classroom activities. However, my own observations of the classroom did not necessarily depict what they described. When the discussion turned to participation in the listed "practices", we began to see discrepancies in what students considered to be the practice of the science classroom community and what was actually practiced.

O: Do you think everybody does paperwork. You guys said one of the purposes is to do paperwork. Does everybody in class do their paperwork?

Several: No.

O: No. Okay do most people?

Jose: No.

(…)

O: Okay so … Jose what you're saying is the purpose should be to do your paperwork and to learn science and to read your science book, but what do most of the students do?

Jose: Talk.

Luis: Play around.

(…)

O: (Let's talk about) what the practice should be and what the practice is. Okay so what should it be?

Luis: To learn science.

Leslie: To do homework.

O: To do homework, that's what you guys said before. Okay what else?

Luis: Read books.

Leslie: To understand it.

Jose: Do science projects

(…)

O: …Okay so that's what the practice should be. So what is the practice then? What is it actually? What do you guys really do?

Leslie: I talk and fool around.

O: Talk, fool around.

Luis: Get in trouble.

O: Get in trouble. Anything else?

Jose: Write notes.

In the second interview, when I asked what the students practiced in class, a disagreement arose between Jose and Luis that reflected the tension between the negotiations of practice in the classroom.

O: Doing work? Like what kind of work?

Stephen: Paper

O: Paper work, alright.

Luis: Listening…social (*)

O: Listening?

Jose: Talking.

Luis: To the teacher.

Jose: We don't do that.

Luis: Yes we do, well you don't.

O: You don't Jose?

Jose: No, it's boring.

Here I sensed that students in this classroom were not in agreement about their classroom goals or enterprise. Instead, I found that Jose identified with a group that participated in a practice with which Luis was not willing to partake. Jose showed that he was not interested in the classroom practice because he found it boring and he did not agree with Luis's notions of the practice. While Luis's

responses seemed to involve engagement with the teacher, Jose did not believe this to be accurate for the group. Luis then changed his answer so that the community, "we", did not include Jose.

Another discussion about what the practice of the classroom should be versus what was actually practiced ensued. This time, when asked what the practice should be, students used terms like "learning", "talking", "doing work", "getting smart", and "explaining stuff". When "learning" was repeated, I asked the students what they "learn". The students responded with science phrases and concepts that were recently covered in class: "the moon phases and everything", "ah water and how the temperatures change and cold and…", "waves, tides", "the waves and all that". Students also relayed, again, that "learning" was only part of the practice. The other part of the practice consisted of "talking, "making the teacher mad", "getting in trouble" and "playing around".

These responses seemed to support my classroom observations that noted time in class was often spent disciplining students or quieting them down. Students sometimes interrupted the teacher by engaging amongst themselves or asking questions irrelevant to what she was discussing. The students often succeeded in "making the teacher mad".

The final segment from the third group interview touched on issues of joint enterprise and shared repertoire. As I asked the students about teacher practices and how the teacher might be contributing to the practice, another issue of conflict between interpretation of practices and actual practice arose.

Leslie: Well I mean no, yeah, you're supposed to like ask questions but I mean.
O: That's what I'm wondering. Are you encouraged to ask questions, or do you feel like it's more, you should just be quiet and listen?

Ss: No we're supposed to ask questions.

O: Ask questions okay. Do you think that and I'm asking because of my observations in your class. How many people really ask questions?

Luis: None.

Jose: Maybe about one or two.

Leslie: Many people who don't.

Jose: Just the people who really want to learn

The enterprise was highly contested in this classroom. For some the enterprise involved wanting to learn, but this was not the enterprise of the entire community, symbolized by the lack of students asking questions. Examining this dimension provided a sense of the tension between the "normative practice", characterized by what should occur in the classroom and "lived participation" characterized by what actually occurred in the classroom (Linehan & McCarthy, 2001).

Mutual engagement

Interviews illustrated that students often felt engaged as a class when they could identify with a group of friends. However, while students co-existed in the classroom, whole class engagement was rare.

When I asked about how people participated in the classroom, Leslie immediately initiated talk about the different roles people played. The rest of the students concurred with her and mentioned the roles "good", "quiet", "get in trouble", "class clowns", and "polite". While these were often associated with student types, Leslie offered another perspective on these different roles.

Leslie: There's a few that want to learn and there's a few that don't. Well maybe they don't, they just refuse to.

O: Okay….how do we know that maybe some people don't even want to learn or refuse to learn?

Ss: Sleep

O: They sleep? They put their head on their desk or something?

Ss: Yeah

O: Okay.

Luis: Or listen to music.

O: Oh really?

Jose: Yeah

Luis: They try, they try to hide their earphones. (BELL RINGS)

Daniel: They go, they go like if I (inaudible) go like this…(inaudible)...listen to music (inaudible)…go like this (indicating they put their head down on the table so that the headphones can't be seen).

Both this excerpt and the previous excerpt illustrate that engagement differed according to students' personal objectives. The excerpts also begin to show evidence of non-participation, in the sense that some students were not engaging with the other class members nor with the practice that these students believed should be the enterprise of the classroom.

Issues that surfaced in the third interview were particularly useful in understanding mutual engagement of this classroom. This interview occurred after my interview with the teacher, which revealed that students tended to work in small peer groups.

O: Does everybody work together or do you kind of work together in your groups of friends?

Ss: In groups of friends.

O: In groups of friends, okay. So then that might change then, do you feel like you're community with everybody in your class, or are you just a community with the people that you work with?

Leslie: Just the people that you work with.

O: That's what you feel like?

Luis: Just a certain kind of people.

O: Certain kind of people?

Jose: Sometimes, it depends.

This illustrated an important characteristic of the classroom. As the year progressed it became clear that students did not actually work together as a class. Instead, they appeared to work together with their friends. So, while they identified the classroom as "we", they considered their own community to be that of their friends or close peers. This result was further supported through my observations.

Thus, the mutual engagement dimension appeared to be lacking or was underdeveloped. Engagement in this classroom consisted of engagement with separate peer groups within the class.

Shared Repertoire

There were visible signs of what students perceived as both a desire and refusal to learn (shared repertoire). For instance, one excerpt above indicates that the students perceived other students who raised their hand in class to answer questions, as the type of student that wanted to learn. On the other hand, students

who used headphones or laid their head down were perceived as not wanting to learn. These students showed behaviors associated with non-engagement and non-participation.

When I asked questions about shared repertoire I had to probe the students and use my own observations to start the conversation.

O: Like I know that you guys uhm do kind of, have a routine in the in class. Like when you get in there, what's the first thing you do?
Daniel: Well sit down and get our notebooks and write the purpose.
O: The purpose. Right. Do you have that in all your classes?
Ss: no/no/no, just this one
(…)
O: So what's … in the notebook?
Leslie: It's like what we do today and then like
Daniel: It's like all we learn
Leslie: Yeah, all that stuff
O: Yeah? The purpose, what you learn, what you do. Is it like the only thing that you write your notes in and stuff?
Ss: Well
Daniel: She also puts TAKS questions on the board
O: Oh, okay and you put those in the notebook?
Daniel: (simultaneously) and so (inaudible)… and like we need to draw stuff that she puts there
(…)
Leslie: It's like our notes for science and we study it
O: Do you actually go back and study it before your tests?

Leslie: No

Jose: No

Ss: No (laughs)

O-Nobody does?

Leslie-We're supposed to.

This segment is insightful on two accounts. First, Daniel recognized that the students took out their notebooks everyday and wrote the TAKS (Texas Assessment of Knowledge and Skills standardized test) question in their notebooks. This process was routine for the students and illustrated that part of the practice and shared repertoire entailed acknowledgement of the importance of TAKS. Also, Leslie's admittance that the students did not actually use the notebook to study revealed differences between the teacher's meaning for the notebook and the students'. The students did not study the notebook, but continued to use it as a symbol for the classroom.

The shared repertoire in this classroom ranged from signs communicated via body language and action to tools used daily in the classroom. Students seemed to understand the visible signs of their peers. However, they did not use the shared tools (e.g., the notebook) in the way the teacher intended.

Summary of dimensions

Using the community of practice dimensions was telling for this classroom, but in a way that pointed to a lack of mutual engagement and a constant struggle to identify the joint enterprise (Table 2.4). Among the students, there were discrepancies over what the practice of the classroom should be, versus what was actually practiced. Through my interview with the teacher, it was clear that a big part of the practice for her, mandated by the larger institution, was teaching to the

state standardized tests. My own observations did not help to define the practice, as I noted very little interaction among the students and was mostly present for lessons in which the teacher assumed the role of knowledge transmitter and authoritarian.

Also engagement that most resembled membership seemed to be smaller peer groups within the classroom. Students who belonged to a group of friends in the class seemed more inclined to associate community concepts with the classroom, as illustrated by Stephen's inclination to view the classroom as a community after he had befriended two other students in class. Thus, membership was not a function of the enterprise or practice. Instead, membership was understood at a broader level of peer group association and belonging.

Learning as participation, membership and identity formation

An examination of learning as a social process was difficult in the Surfside classroom, where Wenger's dimensions were in contention and students did not always agree upon the notion of their classroom as a community of practice. Still, despite the inability to clearly identify the joint enterprise, an examination of Wenger's dimensions did provide insight into participation, membership and identity formation within the larger context of the school (Table 2.4). Participation was represented more by signals of non-participation in typical "school" practices. However, since I could not clearly identify the enterprise, I had difficulty identifying a competence of practice in the class that would define membership. Through clips of conversations regarding Luis "being smart" and Leslie being a "good student", I could have identified these students as competent members if the practice of the classroom involved academic success. Neither of these students, however, appeared to have core membership in the classroom. Other students in

the class did not show any signs of adopting the competence that Luis and Leslie seemed to possess, as noted by Jose's comments about not talking to the teacher and not asking questions. Therefore, because qualifications for core membership were ambiguous, it was also unclear whether there were marginal members in the classroom.

Instead many members appeared to be non-participants in the classroom, or rather did not participate in normative practices like "asking questions" and "doing work", which might have been part of the enterprise. This could suggest institutionalized non-participation, in which non-participation as the practice was a form of either "compromise", "strategy", or "cover" (Wenger, 1998) by the students. Although the excerpts from students did not indicate the concern for testing, my observations and discussions with the teachers indicated the level of stress associated with testing at this school. Therefore a possible explanation for this behavior could be that non-participation was the students' compromise for the strenuousness of testing.

Still, non-participation might have posed conflicts for some students. For instance, although Leslie seemed to adopt practices of non-engagement in classroom discussions, in the last interview this behavior appeared to be in conflict with her identity. Also, while Luis often seemed to be the most engaged with the teacher in classroom discussions (and very little at that), the teacher noted, "I think Luis is very successful because he doesn't mind volunteering answers or participating no matter what anybody else thinks. He doesn't seem to see it. I don't think he feels like he would be a part of this group or this group. Those are social issues that come from, come into the classroom, and probably things that happen in PE (physical education) and other places that I don't even have a clue what's going on." Thus, despite difficulties examining identity trajectories in this classroom, interview segments

provided insight into the tension that arose between students' identities and their participation in the class.

Table 2.4
Surfside classroom community of practice dimensions

COMMUNITY OF PRACTICE	Surfside Classroom
Joint enterprise -evolution of practice -purpose of practice	Students disagree over class goals/activities/purpose. There is a dichotomy between what students feel should be practiced and what is practiced. Non-participation appears to be the normative practice, as negotiated by the students.
Mutual engagement -membership -engagement -participation -roles	Non-participation in normative classroom activities is common. Student roles are indicative of student stereotypes. Engagement is dependent on peer group belonging. Membership is difficult to discern.
Shared repertoire -tools -language	Items include: "Big Idea", TAKS (standardized test) warm-up, and notebook. Meaning of artifacts for teacher and students differs.
Learning as a social process	Difficult to discern due to the difficulty in defining a classroom enterprise with which students were engaged.

Tidal Wave science classroom

The classroom structure at Tidal Wave involved small lab desks that sat two, joined together in various group formations. Students always sat in groups of two to four members depending on the desk arrangement. The classroom at Tidal Wave was much smaller than Surfside's classroom, so that even with the teacher's desk in front, the students in the back were still only within a few strides from the front. The teacher

ran the classroom by the clock, and did not allow for much flexibility beyond the time she appropriated for the day's activities.

The classroom sessions I observed were characteristic of a collaborative community (Squire et al., 2002), where students seemed to take responsibility for their learning as well as for the learning of their peers. Lab work always consisted of students working in teams of three to four students, each with their own job, which was determined by a drawing at the beginning of each lab. Students chose between recorder, cleaner, and manager. This allowed for students to participate in various roles throughout the semester and created a team approach to most work done in the classroom. This team approach to work was further emphasized by the commonly repeated phrase, "one for all, all for one", which the teacher prompted when students cleaned up after their class activities. I observed very little disciplining by the teacher, and when it did occur, the teacher approached the individual she directed her actions to, making it difficult to overhear.

Community of practice dimensions

Unlike students' responses at Surfside, students here were in general agreement about the community dimension throughout the year. One student had difficulty identifying the classroom as a community at the beginning of the year, but through interviews I was able to follow his trajectory on the concept.

Community

The first interview at Tidal Wave followed similar questions to the interview at Surfside, with answers concerning the community concept similar to the answers at Surfside. However, here, students agreed over time that the classroom was a community and did not revert to previous answers.

During this first interview Danny was not certain the classroom was a community. When I asked why it might not be viewed as a community he offered the following:

Danny: You don't get along with everybody in the classroom like Sammy. We don't always agree with what you have to do.
O: Okay and I think those are good points. Okay so Danny is saying like the classroom might not be like a community because you don't always get along with everybody and you don't always agree about what you want to do. Is that right...?
Danny: Yes

The other focus group participants did not feel the same way and they continued to claim the classroom was a community throughout the year. By the fourth interview things changed in the classroom for Danny. This interview took place during the month of standardized testing and the students had been in the classroom for approximately eight months.

O:…What do you guys think? Do you feel like the science classroom is, can you consider it a community?
F: Yes.
Laura: Yeah, it's gotten stronger.
Monica: it has gotten stronger.
(…)
O: …Tell me why you might consider it a community.
Danny: People working together for the same thing.
Laura: It's a lot of different people,

Sarah: It's people working together for the same thing to help each other...

Kevin: Interact.

Laura: I'll say it, succeed.

Laura: At the beginning of the year everyone in our class was strangers.

O: Really you didn't know each other?

Several: * weren't really friends and I didn't know him. I knew who he was…and then I talked to him… and I still don't like her (laughing)…

Finally, in the last interview of the school year, the students believed their classroom was still a community.

O: So how do you feel today, being almost the last day of school?

(…) (…)

Laura: We know each other now.

(…) (…)

O: …Okay one question I want to ask you is, do you think that it's changed since the beginning of the year? So, does anybody feel like…

Danny: Since like the first month of the year?

O: Yeah?

Danny: Yeah. It's changed a lot

O: Okay, how?

Danny: Because I didn't know anybody the first month of school.

Monica: He didn't talk.

O: Okay. You were new to the school.

Danny: Yeah.

O: Okay.

Monica: Actually, he looked like a goody good. Yeah. Looks completely different.
O: Okay, so you think it changed because you didn't know anybody and now you feel like a lot closer to people?
Danny: Yeah. Now I know people and I talk to them and I get in trouble over talking to them.

The community dimension evolved from one that not everyone agreed upon, to one that was agreed upon by all focus group participants and defined. The students believed they were part of a community because they knew each other and knew how each person contributed to the community. Even Danny, who at first did not see the class as a community, towards the end of the year felt a part of the classroom community.

Joint Enterprise

Through focus group interviews and observations, I found that the joint enterprise at Tidal Wave involve much more than the typical, normative practices. Students negotiated a social enterprise in this classroom as well.

When I asked about the enterprise or purpose of the science classroom in the first interview, students voiced the more typical classroom goals, like "to learn", "to learn about science", and "to pass". However, one student's response varied,

Monica: To work together and get along. Communicate more. To learn about science.

I highlight this response because it became a common thread throughout the year for this classroom and was indicative of how they would continue to identify the enterprise, as well as membership, as illustrated below.

During the second interview we discussed more specific activities that might contribute to the larger classroom enterprise.

O:…but something else I thought was interesting was the other day when you guys were making your magic mats. Do you guys like using those?
Ss: Yes, they are a lot of fun.
(…)
O: So I thought that was really interesting because you don't get a grade for it, do you?
Ss: No.
O: It's not a homework assignment?
Ss: No.
O: So you just do it in class?
Laura: It helps us study.
O: And it helps you study?
Laura: Kind of like the review game in a way.
O: Yeah. Does it, do you use it to study?
Ss: Yes.
Danny: I don't.

This clip illustrates how students have engaged in classroom practices in ways the teacher has provided, for instance, the magic mat being used as a study aid. It was also considered a "fun" study aid, and what's compelling here was that all of the students in the interview, with the exception of Danny, claimed to use the "magic mat" to study. This could be indicative of the types of students in the interview group (predominately females), but it also seemed to represent the type

of practice that was accepted in the classroom, one in which studying was actually a common practice by students. My observations indicated that both of these activities involved collaboration among students. While the teacher did not specify how students were to make their magic mats, they tended to work with their table partner or with other table groups near them. Thus there were physical examples of working together, which contributed to the enterprise.

During the third interview students demonstrated a deeper level of understanding around the purpose of the science class. Where before, students listed "learn science" and "pass" in addition to the social purpose of "get along" and "communicate more", this excerpt illustrated that the seventh grade students were beginning to see science in a way that could relate to life outside of school.

O: …What is the purpose of the class?

Danny: Lean about science.

(…)

Laura: Well I guess part of the purpose is maybe to help us decide what our career is going to be when we grow up, I don't know. Umm because the thing that I want to be, it's like it has to do with science, a lot so I guess it's to help us with our careers.

O: Okay, does anybody else feel that way?

Kevin: Yeah.

Monica: I feel that way. I just think there's going to be like a lot of questions as we're growing up and that a lot of it, a lot of science can help us with trying to understand (inaudible).

O: Yeah absolutely... Did you say understand life?
Laura: Or get things that don't really (inaudible)
Monica: Seem natural.

The fourth interview took place during the month of TAKS testing. Thus, when I asked about the purpose of the science class in this interview, students offered, "to have fun", "to pass" and to "pass TAKS".

O: To learn, and to have fun. Okay, anything else? So, so far I have pass, to pass TAKS, to learn, to have fun.
F: But to do all of these things while having fun. Like multitasking because when we do our labs and we are with other people. I enjoy it.
F: But it's not all about the labs, because we do labs every so often. But it feels fun to do labs.
F: To get along and with who is in your class. Learning

Strangely during this interview the words "fun" and "TAKS" were used in the same context. However, this school made attempts to create prizes and fun competitions for students and classes that performed well on practice TAKS tests. Students also raised the notion of "getting along", again as part of the classroom enterprise or purpose.

The last interview took place during the last week of school. Not surprisingly, the students seemed a little less enthusiastic about their responses. The students considered the aim of the class to be simply "to try to pass". There was not much elaboration on this, nor were there any additions. At this point, the

interviews might have become boring for the students or they might have wanted to be in their classrooms with their peers watching movies instead.

Through clips, it appeared that the enterprise of getting along, communicating, learning, having fun, and passing contributed to a community dependent on students' abilities to work together. In "Communities of Practice" Wenger (1998) describes a work groups' members feeling a responsibility to be personable towards each other. The same seemed true for this classroom. The classroom developed its own behaviors and norms that were acceptable and with which each member could judge each other by, in addition to their own actions. I will next show how this practice affected mutual engagement and vice versa.

Mutual Engagement

Interviews and observation at the Tidal Wave classroom illustrated that mutual engagement was common and that students often worked in groups or as a whole class during activities. A drawing exercise depicted that student roles were understood in the context of the joint enterprise.

During the first interview I asked students about participation to gauge how students engaged in the classroom.

O: …okay so one thing I want to talk about is do you think everybody in your science class participates in the same way. Or do you participate in other...
Ss: No
O: Well that was quick all right. Why not?
F: Because some people try harder than others. (several)
O: Okay. You don't have to name anybody. Okay, some people try harder than others. Danny do you have anything to say?

Danny: Some people like work together more than other tables would, let's put it that way.
O: All right. Anybody else?
F: Some people get along a lot easier and they can cooperate easier…

The idea that working together was dependent on how well students got along was echoed in subsequent interviews. During the third interview, after students immediately identified the classroom as a community, we began to discuss why some students might not be considered legitimate members of the community.

O: Okay here's the question all of you immediately say um yes you're a community and the reason why is because you work together. Do you think anybody in the science classroom might feel differently?
Danny: Robert because he's never in there.
O: Yeah I don't even know who that is.
Danny: Yeah he hasn't been here.

This follows Wenger's (1998) suggestion that those in a community of practice will know if they belong and who else might belong to the community. In this case, Robert might not have been considered a member because he was physically absent. However in the segment below, there is evidence that presence in this classroom did not constitute full membership.

O: Well let's, okay what about science class though, does everybody, do you think everybody works together?

Monica: Uh huh, possibly.

Laura: Yeah.

Danny: Well what about Patrick and the new kid, Michael, or not the new kid but the new kid to our class?

Monica: Good point.

Danny: We don't really work with them.

Monica: They don't really work with us.

Laura: They work together, they just like work together like, like they're individuals by themselves…

(…)

Monica: They'd rather work with each other or work themselves.

Laura: Well I guess because they're not used to this school, they just moved here a couple weeks ago so maybe…

Previously, the students stated that the practice of the community involved working together. Here they have pointed out that two new students did not work with "us", instead they were "individuals", which juxtaposed the two new students against the rest of the class's behavior. Monica claims that the new students were not working with the group on their own accord, which seemed to place these students in a marginal position within the classroom.

During this interview I also asked students to draw where different community members might be located in the practice. I used this method to elaborate on students' interpretations of core, peripheral and marginal membership. This drawing called for different types of students, type A and type B people, to be characterized and placed in the classroom. Together we decided that "type A is somebody who works hard and tries hard, and tries to get good grades"

and type B was a "person who slacks off" and "doesn't try hard". Still, the students really struggled with this exercise. My explanation of what I was expecting from them might have been unclear, but through the discussion surrounding the exercise, it became apparent that students were not comfortable with labeling their peers either A or B. One student created her own category of type C, "the people that don't try quite as hard but they do try". After the addition of the new "type", some of the students' drawings changed, incorporating only A's and C's into the picture without B's. When I asked about the location of these people in the drawing, I learned about student roles and the enterprise of supporting each other's learning.

Monica: I put the C people like in the front row so if they're like not paying attention or something, the teacher can catch them and tell me to pay attention and I put the A people in the back because, because they try harder, they're going to *.
Kevin: I'm all along. This is an A back here and this is a C.
(…)
Sarah: I put my A people in the back and I put, I mixed up my A, my C and B because now if they don't pay attention then the other person can say, "hey pay attention".

Using this exercise helped illustrate how student roles varied based on efforts to do well and pay attention in class. However, the last comment above reiterates that membership in the classroom also involves the role of helping one's peers.

The last interview took place close to the last day of the school year. Again, I repeated questions and not surprisingly, the students seemed a little less enthused about their responses.

O: What about if I were to ask you, does everybody in class work towards the same goal or have the same purpose, what would you say?

Monica: No.

Danny: I'd say yes, but some don't try as hard.

Kevin: Yes. Thank you.

O: Okay to pass, to learn science. Okay, you would say yes, but some don't try as hard. Laura is saying no.

Laura: Yeah, because the people don't really…

Monica: They don't work at it because they don't have too.

O: Because they naturally get good grades?

Danny: Or they really don't care.

O: Or they don't care.

Monica: Or they can pass without even trying.

There was not any mention of helping these students or much defending of these students as there was in previous interviews. Again, students might have been exasperated with this question or the timing of the school year might have affected their focus to passing the class rather than discussions about community. Another possibility is that they might have been disappointed that despite their efforts to help throughout the year, not every class member changed their ways.

Mutual engagement at Tidal Wave was consistent, making it easy to discern requirements for membership, which were in line with the joint enterprise of "helping each other" and "working together". Roles were dependent on students' efforts in class, as well as their ability to help other students.

Shared Repertoire

During the second group interview, we spent a significant amount of time discussing the various games played in the class and what might be considered the tools and symbols shared and recognized among the members of the class, including the "magic mat" and the "review game". I also asked students, "…what would be some other things you know when you come to your classroom either you have to do or you have to use that maybe not everybody else would know?" In response, they quickly listed items, games, and assignments specific to their classroom. For instance, they immediately noted that they have a warm-up everyday. They knew they had to do it because it was on the agenda, which was also on the board every day. The agenda also signaled to them whether it was going to be a "fun day" or "boring work day".

Another important symbol to the students was the "cybg" (caught you being good) raffle.

Monica: That cbgyf raffle or whatever, that we do that almost everywhere.
Laura: Yeah, "caught you being good".
O: Is that something else somebody might not know? Okay and how do you get to be in the "caught you being good raffle"?
A: You have to be good through the whole entire (year), if you have more than…

Here the student trails off, but shared repertoire was visible in the way of a school-wide reward system. The general idea was that students participated in the raffle from class to class, giving them more opportunities for rewards, connecting all students in the school through a shared practice. Through this effort, among others, the school encouraged community building.

In addition to the daily tasks, like writing the agenda and doing the warm-up, shared repertoire at Tidal Wave involved activities and games that were of a collaborative nature. Thus, many of the tools used in this classroom to engage students in the "normative" practice of "learning science", actually engaged students in the collaborative, social enterprise they negotiated.

Summary of dimensions

The classroom at Tidal Wave seemed to easily fit the metaphor of a community of practice. There appeared to be substantial meanings associated with the three dimensions at Tidal Wave Middle School (Table 2.4). Joint enterprise involved "helping each other" and "getting along", which was only encouraged by the shared repertoire of classroom group activities. In return, the classroom activities encouraged engagement among members. It was also clear to both members and an outsider (myself) which participants were members. As Wenger suggested, there should be a sense of what communities we belong to and the others that belong to these communities.

In order for one to belong to a community of practice, one must be engaged and involved in what the community deems important. The students at Tidal Wave played a significant role in determining what was important for that community, thus defining practice and membership in that classroom. It was easy for the students of this classroom to identify the members of the community, their positions in the community and why they held these positions. In order to be a member of the classroom, one had to "work together" and "get along" with other members of the community. This made it extremely difficult for an outsider or newcomer to enter into the community. For instance, a student who entered this class in February was still not accepted as a core member at the end of the school year in May.

Thus, Tidal Wave appeared to exist as a community of practice in which the joint enterprise was influenced by consistent mutual engagement and supported by shared repertoire of a collaborative nature. This led to an identification of the means for membership and consequently the reasons for marginalization.

Learning as participation, membership and identity formation

Understanding that the enterprise involved "helping each other" and "getting along" aided my understanding of learning as a competence of practice with the enterprise (Table 2.5). An example of this learning was evident through Danny's trajectory in the class. At the beginning of the year Danny was hesitant to identify the classroom as a community because not everybody was able to get along. By the end of the year, however, he was a full-fledged member who even "got in trouble" for talking to other members. The fact that he would get in trouble for participating in a way that contributed to the practice, almost seemed to encourage his identification with the group. Perhaps he was able to reconcile his identification as a trouble maker with his identification as a member of the science class.

Finally, the convergence of Danny's identity with the practice of the community, exemplified how identity could be formed and/or transformed in a community of practice. This signified Danny's movement from peripheral to core member in the community as the year progressed. At first, as a new student, Danny did not know many people. He also professed to not being good at science. Over the course of the year, Danny slowly changed his mind about the science classroom as a community and by the end of the year he felt like a core member, and was reified as one by the others' comments.

Table 2.5
Tidal Wave community of practice dimensions

COMMUNITY OF PRACTICE	Tidal Wave Classroom
Joint enterprise -evolution of practice -purpose of practice	Students agree on both normative activities, like passing and learning science and developed practice of "helping each other" and "getting along". This is negotiated by students and teacher through classroom structure and activities. This is reified by shared repertoire representing collaboration.
Mutual engagement -membership -engagement -participation -roles	Students are often engaged in group work. Student roles based on effort and ability to help others in class. Engagement is dependent on student's ability to work with each other and "get along". Membership is determined by students' abilities to get along and work together.
Shared repertoire -tools -language	Items include: "One for all, all for one"; "Ask 3 before me"; review game; lab roles; "cybg" raffle; daily agenda; TAKS warm-up
Learning as a social process	Learning is understood as a developed competence of the negotiated enterprise, "getting along" and "working together".

Summary of Findings

I hoped to examine whether the community of practice framework might be applicable in addressing science classrooms as communities of practice and whether it would be useful in examining participation, membership and identity formation as learning in these classrooms. Using dimensions set forth by Wenger, through both emic and etic perspectives, I found that examining the interactions of these dimensions was consequential to my understanding of learning through the community of practice framework. Findings suggested that learning could be understood as a social process (i.e., as a developed competence in the classroom enterprise) when dimensions were developed within the contexts and identifiable by the participants. On the other hand, when dimensions were not agreed upon by participants and were unclear to both insiders and outsiders, the community of practice framework was neither applicable nor useful for understanding learning as a social process.

Discussion

Similar to Linehan and McCarthy (2001), I found that a thorough examination of local contexts was necessary to understand both the application of the community of practice framework as well as what the framework implied in terms of learning as a social process. This became apparent when one classroom did not properly fit the community of practice metaphor. While Wenger's dimensions proved helpful in describing the contexts of each classroom, including both normative practices and the everyday practices that were negotiated, they did not necessarily provide a picture of a working community of practice.

As Linehan and McCarthy (2001) have also pointed out, understanding the local practice and how classrooms could function as communities of practice is often problematic. A number of authors have been highly critical about the lack of attention paid to discourse and language in the community of practice framework (Myers, 2005; Gee, 2005). Other studies have found problems with the framework's inability to address issues of non-identification with the community of practice (Hodge,1998) and have criticized the work for failing to accommodate or account for any subtleties, alterations or conflicts that might arise in a community of practice (Lea, 2005; Gee, 2005; Myers, 2005).

I found problems with the ambiguity of community boundaries. I encountered a context at Surfside that could fall outside the lines of a community of practice or could be viewed as a dysfunctional community of practice. I could not clearly identify the practice or the membership status in this classroom, due either to a lack of a community of practice configuration or to the various forms of a community of practice I could be examining. Wenger (1998) provides a number of community of practice types and forms, so that it becomes difficult to discern when and where we are dealing with a community of practice.

Also, because each member brought his or her own experiences and own means of negotiation to the situation, agency of individual members appeared to play a role in the development of the joint enterprise, resulting in different types of communities. Thus, much like other types of curriculum reform, a prescriptive approach to building a community of practice in a classroom will not likely result in predictable outcomes (Squire et al., 2002). Therefore, I caution against using the community of practice as a prescriptive for reform, without first understanding the agency of members and the context of the broader institution.

Still, despite problems with the actual formation and development of communities of practice, the dimensions were helpful in understanding various classroom functions. As Enyedy and Goldberg (2004) argued, whether or not there was a normative purpose, classroom functions associated with the community of practice framework still existed. Normative practices did not fully define the joint enterprise in either classroom. Instead, the enterprise was negotiated in ways, sometimes unintended (i.e., Surfside) or in ways unexpected (i.e., Tidal Wave). It was through the examination of Wenger's dimensions and how they either contributed to or deterred the development of communities of practice in learning contexts that I found the framework to be most useful. As Lea (2005) noted,

> "It is this perspective that of a heuristic, which I argue [here] does not seem to have been taken forward in the recent literature concerned with teaching and learning in higher education. Instead, the focus has been on the benign nature of communities of practice, where there is a simple and smooth transition from peripheral participation as a novice to full membership at the core of the community's endeavour" (p. 184).

Thus, despite the framework's inability to account for a functional community of practice in both science-focused contexts, there is value in the framework to account

for both the smooth and benign and complex and contentious struggles to develop communities in classrooms (Enyedy and Goldberg, 2004).

While Roth (1995) addressed the importance of emic perspectives in research with sociocultural theories, the insider views are rarely considered in research, with the exception of researchers describing their own experiences as participants in would be communities of practice (Bradley, 2004; Hodge, 1998). My findings indicated that where both emic and etic perspectives were able to consistently and collectively identify the enterprise or practice, it was also easier to determine members of the community and means of engagement. Under these agreed upon conditions, students were then able to express identity in terms of the practice. For example, at Tidal Wave students repeatedly mentioned that the enterprise in their classroom was one of working together and getting along. They were able to determine members of the classroom and participation in the community on the basis of this enterprise. They could also identify their own trajectories in terms of the enterprise.

On the other hand, when the emic and etic perspectives did not concur on the practice, or where there were discrepancies among the practice, there also seemed to be less of an understanding about membership and engagement was minimal. Identity was also discussed in terms of a broader student practice rather than in terms of the classroom practice. At Surfside students articulated that the practice should be learning science and passing, but my observations indicated a classroom practice of knowledge transmission by the teacher and non-participation of the students.

Implications

This study can begin to shed light on the specific dimensions Wenger associates with communities of practice and how they might be further developed in various contexts. Also, in light of the difference in findings between the two

classrooms, future research should examine more closely why the dimensions joint enterprise, mutual engagement and shared repertoire appear to be more substantial in certain contexts than others. Specifically, future studies could examine the impact standardized testing, school/classroom culture, school belonging, school leadership, teacher practices and beliefs can have on the development of classroom practices. Additionally, successful interaction rituals (Olitsky, 2007) and identities of non-participation should be further researched for a better understanding of reasons for engagement with classroom practices.

Finally, I recognize that the community of practice framework is not without flaws, especially concerning the understanding of discourse, identity and power relations within a community of practice (Barton and Tusting, 2005; Enyedy and Goldberg, 2004; Linehan and McCarthy, 2001). These issues arose during various interviews, mostly in the teacher-student dynamic and principal-teacher dynamic. Like Enyedy and Goldberg (2004), however, I argue that the teacher is not in a complete position of power. Findings indicate students have clearly negotiated the practice to help meet their needs. However, it seems the broader context of school also shapes these needs. This implies that teachers cannot fully control the enterprise of their classroom. It should also signify the importance of considering how both the larger school community and the classroom are meeting the needs of students.

During the course of this research I have seen a number of studies that continue to contribute to our comprehension of sociocultural theories of learning and the community of practice framework. I am encouraged by these studies and hope that this work can further contribute by describing limitations of the framework in certain contexts as well as how the contexts have played out successfully. Further, I hope these results can bring awareness to how communities of practice can guide our understanding of learning as a social process in science-focused contexts.

CHAPTER 3

Using the community of practice framework to examine learning as a social process in an after-school environmental education program for Hispanic youth

The field of environmental education research has called for a greater analysis of "learning" using existing theories. One theory that has been suggested is situated learning. This sociocultural theory of learning contends that learning is a social process that occurs as individuals participate in communities of practice (Wenger, 1998). This study aims to enhance our understanding of the usefulness and applicability of the community of practice framework through examining learning as a social process in an after-school environmental education program. Results indicate the framework was useful for identifying the environmental education programs as communities of practice. The framework was further applicable in describing learning as changes in identity formation as a result of participation with the programs.

In a seminal paper on future directions for environmental education research, Rickinson (2006) calls for studies to address broader questions in the field, starting with how we define learning in environmental education contexts. He suggests that environmental education researchers have fallen behind in their approaches to critically examining both use and meaning of the term "learning" and in examining learning as a "process" rather than product. Additionally, Rickinson calls for research that examines the usefulness of existing theories in environmental education work. Others in environmental education echo these sentiments (Meyer, 2005; Dillon, 2003).

Dillon (2003) suggests that researchers interested in examining situated learning, a theory offering a sociocultural understanding of learning, might benefit from applying it to an environmental education context. Theories of situated learning

provide an alternative to traditional views of cognition that depict learning as an individual and isolated phenomenon (Kirshner & Whitson, 1998). Instead, sociocultural theories, including situated learning (Lave & Wenger, 1991), situated cognition (Brown, Collins & Duguid, 1989) and cultural-historical activity theories (Engeström, 1987), all share the premise that the culture and history of contexts must be accounted for in an examination of learning (Lattuca, 2005). Additionally, sociocultural theories of learning contend that learning is a social process that occurs as individuals participate in communities of practice (Wenger, 1998). Instead of looking at cognitive or conceptual changes in an individual, these theories examine individual identity formation and transformation through participation and membership in various contexts, or communities of practice, as a process of learning.

Most of the research involving sociocultural theories is found in the areas of math and science education, where researchers are concerned with the connection between the classroom domain and student experiences (Brickhouse, 2001; Duffy & Barab, 2001; Roth, 1995). Educational researchers adopt these theories because of the contemporary perspectives on learning, the focus on identity and participation, and the space the theories provide for examining central, peripheral and marginal positions within and between organizational units. However using this framework in classroom studies can be problematic (Aguilar, in progress; Roth, McGinn, Woszczyna, & Boutonné, 1999; Linehan & McCarthy, 2001) due to the classroom practices, absence of an "old-timer", and institutional boundaries, as Lave and Wenger (1991) warned.

I propose that an examination of the community of practice framework in environmental education contexts might improve our understanding of the applicability of the framework to multiple science-focused contexts and contribute to theoretical underpinnings in environmental education research. Not only does this framework look closely at questions of participation (Reid & Nikel, 2008), it also

looks at learning holistically, accounting for lived experiences beyond a studied context. As Dillon (2002) notes,

> Environmental education is uniquely placed to offer science education a range of perspectives on knowledge and situated learning that assists those in the science education movement who wish to challenge existing orthodoxies (p.1112).

Further, unlike classroom contexts, informal environmental education contexts offer flexibility and allow for different approaches to teaching and a broader context in which to teach, and are not traditionally constricted by institutional standards and testing. Environmental education programs can also address the everyday lives and culture of students, using the students' local, physical environment.

Therefore, in an attempt to further understand how students are participating and learning in an after-school environmental education program, I turn to sociocultural theories and the community of practice framework. As part of a three paper series, this paper addresses, more specifically, the call from the environmental education research field for a greater examination of learning theories in our work. In addition, I hope to contribute to our understanding of the applicability of the community of practice framework in various science-focused contexts. Using Wenger's (1998) community of practice concepts, I ask these questions: 1) How do Wenger's concepts (joint enterprise, mutual engagement, and shared repertoire) manifest themselves in an after-school environmental education program?; 2) How do students participating in the environmental education program understand these concepts?; 3) How useful are Wenger's concepts for describing learning as participation, membership and identity formation in an after-school environmental education program?

Theoretical framework

Environmental education researchers continue to call for a greater examination of theoretical underpinnings and clarification of epistemologies in our research (Meyers, 2005, Dillon, 2003; Rickinson, 2006). In fact, Rickinson (2006) claims, "I would still argue that environmental education research remains a field that fails to take questions of learners and learning sufficiently seriously" (p.447). In addition, it is also important for researchers to make explicit whether they are using theory to reform curricula or using theory to understand phenomena. In an attempt to answer these calls, I adopt sociocultural theories of learning, specifically situated learning and the community of practice framework, to examine learning as both a process and product of social engagement and interaction.

Other theories and/or frameworks examining environmental education practices include Michael Brody's (2002) "learning in nature" and Falk and Dierking's (2000) "free choice learning". Both of these involve an examination of social factors in the learning context and their effect on learning. Brody (2002) acknowledges Falk and Dierking's (2000) premise that learning is both a product and process of the interaction between the personal, social and physical realms. Still, despite an attempt to account for the social context, Brody's first iteration of "learning in nature" focuses on knowledge systems, scaffolding and conceptual change as a product of learning. He attends to the change of "understandings, values and beliefs" built on past experiences and understandings after a visit to Yellowstone National Park. In a third iteration of "learning in nature", Brody (2005) includes acting, thinking and feeling affects through physical, personal, and social realms and time. In this iteration, Brody (2005) defines meaningful learning in nature as a result "of direct experience(s) over time in which personal and social knowledge and value systems are created through complex cognitive and affective processes" (p. 609). Brody makes significant progress in

examining the affective and social processes that contribute to learning; yet, questions concerning the product of this type of learning persist.

Brody's "learning in nature" is largely based on the premise of free-choice learning, that is "life-long learning that is intrinsically motivated and largely under the choice and control of the learner" (cf., Falk and Dierking, 2000; Falk, 2001) (Falk, 2002, p. 62). Free-choice learning focuses on learning opportunities offered outside of formal learning structures. Because we are naturally inclined to want to know more about the topics that interest us most or that are intrinsic to how we live our lives, Falk and Dierking (2000) argue that free-choice learning occurs in many venues in our lives. The term characterizes learning as "free-choice, non-sequential, self-paced and voluntary" (Falk, 2001, p.7). While these characteristics help to describe a process of learning that can take place anywhere, similar to Brody, they do not describe the product of this type of learning. Instead, the framework offers a valuable perspective on the infrastructure for learning outside of the classroom (e.g. in the context of museum visits, extracurricular activities, and playground games) and that is based upon the choices of the learner. Such learning can be examined using sociocultural theories.

Both "learning in nature" and "free-choice learning" attend to social factors contributing to learning, but seem to focus on knowledge, information, and understanding of concepts by an individual that can be gathered in various contexts under various motivations. In other words, it is the process of learning as a sociocultural activity that provides a cognitive or affective product for an individual student (e.g. science content knowledge, understanding and beliefs) in these learning frameworks.

In contrast, this study examines the sociocultural activity and the sociocultural effects of this activity as learning. I do not argue that concern about cognitive concepts is not important, but rather that other aspects of learning are often overlooked when the focus is on conceptual outcomes. For instance, researchers often find that what they are examining in classrooms is not necessarily the learning of concepts but rather how students learn to interact with each other and the teacher, and what the appropriate norms are for the classroom, the school, and their peer groups (Brickhouse, 2001). All of these processes are dependent on social circumstances and affect students' personal identities both in the classroom and across multiple contexts.

One approach in environmental education research that does examine learning as both process and product is the ecological psychology perspective. Chawla (2008) and Barab and Roth (2006) both use this perspective, based on Gibson's (c.f. 1979) work. Chawla uses ecological psychology to frame how children might participate in environmental learning and action through communities. Chawla discusses the community concept in terms of an entire ecological system, including plants and animals in addition to persons and culture. She argues that the benefit of the ecological psychology approach is that it encompasses the agency of the child learner and the context of participation and development, and it offers an examination of the child in his or her physical environment. Instead of a straightforward constructivist approach, ecological psychology claims that experiences are not only socially mediated, but also physically reconciled. For instance, Chawla (2008) sites that participation in one's community is essential for learning, but that community consists of trees, plants, and animals, in addition to people, that help to shape the experience of participation.

According to Chawla (2008), one of the experiences people share is that of affordances. Barb and Roth (2006) expand on this concept of affordances to define an affordance network as:

> "the collection of facts, concepts, tools, methods, practices, agendas, commitments, and even people, taken with respect to an individual, that are distributed across time and space and are viewed as necessary for the satisfaction of particular goal sets" (Barab and Roth, 2006, p.5).

It follows then, that those who share the same set of goals develop affordance networks with each other, on the condition that they have the appropriate "effectivity sets", or behaviors and skills used to realize their affordances. The coupling of the two systems allows for an accumulation of effectivity sets and an overlapping of affordance networks, leading to greater potential for further action and life-long learning.

What is important to note here, is that all of the perspectives mentioned above are concerned with a framework that can be used to design curriculum for environmental education settings in which students actively take part. While the ecological psychology perspective is very much in-line with a sociocultural approach, explaining the process of learning as participation in affordance networks, it does not appear to account for spaces in which individuals do not share goals or effectivity sets. Instead, participation and development of affordance networks is intentional. Because I am interested in comparing why and how student participation in multiple science-focused contexts, both intentional and unintentional, I return to situated learning and, specifically, communities of practice. Using the same framework across contexts will provide a deeper understanding of how and where the framework might be useful for understanding learning as a product and process of students' lives.

Community of Practice

In light of the breadth of theories that have recently brought attention to the socio-cultural dimension of learning, adopting a framework that is currently used in contexts, from the workplace to science classrooms, can contribute to an

understanding of the theory as well as the learning that takes place across multiple disciplines and settings. Therefore, I use Wenger's (1998) community of practice concepts to critically analyze after-school environmental education programs as communities of practice and our notions of learning. Wenger's "Communities of Practice" (1998) provides both an organized and accessible framework to study learning as participation. Additionally, using his dimensions can provide a common discourse through which concepts can be discussed and debated across fields of study. Below I briefly summarize the dimensions and function of identity formation in communities of practice in this chapter.

The community of practice concept is first introduced in Lave and Wenger's work (1991) and Wenger further develops it his 1998 book. A community of practice is a place of learning where practice is developed and pursued, meaning and enterprise are negotiated among members, and membership roles are developed through various forms of engagement and participation (Figure 2). Each "community of practice" involves a unique system of 1) *mutual engagement*, 2) *joint enterprise* through negotiated meaning and 3) *shared repertoire* (Wenger, 1998). The *joint enterprise* refers to how members negotiate their response to the conditions and goals of the community of practice. *Mutual engagement* involves the sustained interaction of people within a community of practice and the roles and relationships that arise from this interaction. Finally, *shared repertoire* consists of signs, symbols, tools and language that are used as resources and have meaning specific to the community (Wenger, 1998). All of the components work together to determine the practice, and the practice, in turn, works to refine the components.

These three dimensions function as integral components of a community of practice and help to identify a process of learning that involves participation, membership and identity formation. As Wenger notes, "…practice entails the

negotiation of ways of being a person in that context" (Wenger, 1998, p.149). Thus, understanding the evolution of Wenger's dimensions and the practice they refine helps to guide an understanding of how an individual might form identities within a context. Identity then becomes a product of participation in a community of practice and simultaneously influences the practice. Because this notion of identity is dependent on engagement with others, it allows for various levels of participation, including non-participation and multiple levels of membership including core, peripheral and marginal. Membership is often determined by a competence of practice. The practice is, therefore, a central component around which the rest of the dimensions evolve. Wenger emphasizes that the examination of practice through the lens of a community is fundamental to our understanding of meaning making, learning and connections to other contexts.

After-school environmental education program

All participants for this study are from schools involved in the Environmental Club (EC), an after-school environmental education program. The EC meets as an informal, after-school club at approximately ten schools along the Gulf of Mexico. One of the program's goals is to bridge coastal communities from the United States with coastal communities from Latin America around a common concern for the Gulf of Mexico through the use of both English and Spanish. According to the director of the program, the EC meets its educational goals through community involvement and field trips. Students are exposed to environmental concerns and problems of the Gulf of Mexico and their own community through "hands-on" activities, like beach clean-ups, visits to watershed sources, and analysis of water from local watersheds. The program also engages students in civic activities like community festivals and parades.

Each club's field trips and activities vary depending on scheduling, proximity to sites, and community support.

Students in all ten clubs function under the guidance of the program director. Additionally, each club site requires two faculty sponsors, one who facilitates science understanding (usually the science teacher of many of the youth participants) and one who can facilitate the use of Spanish. The EC generally meets once a week during the school year at each participating school, depending on the availability of the clubs' sponsors and the program director. Participation in the program takes place after school, usually in a classroom at the school's campus unless the students are on a field trip. Club sizes range from 10-35 students, with sometimes sporadic attendance due to other after-school activities (e.g., band and athletics).

The program is not without its challenges. The curriculum changes from year to year in order to accommodate the changing needs of participants and grant requirements. The demand not only for the program but for the program to meet the multiple needs of a growing membership has become an issue, as the program director has had to split his time among many clubs. This creates some inconsistency among the clubs as the program director is less available for each club meeting. It also puts more pressure on the teacher sponsors to have activities for club meetings when the director is unavailable.

Participant Selection

I chose to examine the EC for this study, due to the clubs' demographics, the involvement of science teachers from the school, the program's educational goals, and my familiarity with the geographical location of the clubs along the south Texas coast. Specifically, I was interested in Hispanic student participation in the club, as this would help me to look at the learning of students often marginalized in the sciences.

Also, including sites with at least one common factor, the teacher as leader of the club, allowed me to look more closely at contextual differences rather than pedagogical differences. While the ECs were run entirely differently than the science classrooms, this was an inherent aspect of the EC rather than a change in teaching philosophy. Finally, I was interested in the programs' goals because of recent studies that illustrate environmental education programs are able to incorporate content relevant to students' lives.

While use of the term Hispanic is often problematic, because it characterizes ethnicity in oversimplified terms and does not account for race, it becomes even more complex in this south Texas region, where many students are multi-ethnic and multi-racial. Therefore, I used the Texas Education Agency (TEA) statistics and identity categories to describe the larger context of each school. I cautiously used surname to broadly describe the ethnicity of club members, recognizing this might not accurately describe how students identified themselves. The exception was my description of one club's ethnic makeup as entirely Hispanic, which resulted from an interview in which students discussed ethnicity. It is important to note, however, that the demographics of the students in the EC's differed from club to club and did not necessarily represent the demographics of their school at large.

A preliminary year-long study (August, 2005-May, 2006) helped to determine which schools associated with the EC should be used as case studies for this aspect of the study. Using homogenous sampling (Patton, 2002), I selected schools based on their characteristics relating to: a) stability of environmental club, b) science teacher presence in environmental club, c) similarities on the states' school report card, d) presence of Hispanic students, and e) proximity to each other (Table 3.1). Due to changes in the site during the middle of the study, only two of the ECs chosen had been established for at least three years. Finally, as one school showed signs of

organizational and attendance problems, I used opportunistic sampling to recruit another school into the study**.** While the homogenous sampling process might have limited the ability to extrapolate from the study results, it allowed for a greater focus on students and contexts with similar demographics and backgrounds.

Club settings

Surfside EC, Coastal Plains, TX

During the 2006-2007 school year, 15-25 students regularly attended the EC. The group was split almost evenly between female and male participants. All of the students in the club were Hispanic and predominately Mexican, according to interviews. Spanish was the predominate language used by the students and English was the predominate language used by the teacher co-leader during club meetings. When the program director attended, he often addressed the group in both Spanish and English. A student in the club typically served as a translator for students with limited English proficiency. Because the EC encouraged a bilingual dialogue, it was a popular activity among ESL (English as a Second Language) students at this school. In fact, approximately 60% of the ESL students in this school participated in the EC (principal interview). The participating students were in grades 7 and 8, but club alumni from the high school also attended the meetings fairly often.

The science faculty sponsor at Surfside had been involved with the club for a few years before this study. As the club director's commitments grew, his presence at this club was less regular. Thus, the teacher often initiated her own club activities and field trips, which focused on science in the outdoor local environment. The field trips included visits to a nuclear power plant, a local wildlife refuge, and bodies of water within the students' local watershed. EC members also sampled water quality along the watershed and kayaked in a local river.

Table 3.1
School and EC characteristics

School/ Environmental Club	*Surfside Middle School*	*Tidal Wave Middle School*	*White Sands Middle School*
School location	Coastal Plains, TX	Coastal Bluff, TX	Coastal View, TX
District category	Non-Metro Stable community	Non-Metro Stable community	Non-Metro Stable community
School size	>800 students	275 students	325
School academic performance	Academically acceptable	Academically acceptable	Academically acceptable
School demographics	56.5% Hispanic 36.7% Caucasian 2.6% African-American	47.1% Hispanic 44.9% Caucasian 5.8% African-American	39% Hispanic 54.5% Caucasian 3.4% African-American
Club size	15 regular attendees 25 general attendees	5 regular attendees 15 general attendees	6 regular attendees 10 general attendees
Club demographics	100% Hispanic	40% Hispanic	50% Hispanic
Club existence	3 years	4 years	First year
Club language (predominately)	Spanish	English	English

Tidal Wave EC, Coastal Bluff, TX

During the 2006-2007 school year, approximately 5 students attended the EC regularly, but occasionally attendance reached up to 15 students, most of whom were female. The EC at Tidal Wave was ethnically diverse, consisting of both Hispanic and Caucasian 7th grade participants. Spanish was sparsely used in the club, and there were no ESL members. Many of the members were involved in athletics and band, so attendance was often sporadic and inconsistent from member to member.

The 2006-2007 school year was the science faculty co-sponsor's first year participating in the club. However, the Spanish faculty co-sponsor for the club had been involved with the club since its arrival to this campus. The program director was able to attend this club more frequently than some of the other clubs. When he could not attend, club was typically canceled or students discussed upcoming field trips and events, which consisted mostly of community functions often in conjunction with other ECs. Activities included beach clean-ups, a community parade focused on trash pick-up, two community fairs, and a trip to a local wildlife refuge.

White Sands EC, Coastal View, TX

The EC at White Sands was in its first year of existence during this study. Due to other site issues, I did not begin to use this site until the middle of the school year. The club was ethnically and racially diverse with only one male attending regularly. Spanish was rarely used, except for the few occasions when the Spanish teacher co-sponsor translated key words from English to Spanish. There were no ESL members involved in the club. The club consisted of between 5 and 10 students, with six students attending regularly, all of whom were eighth graders.

Despite it being the club's first year, the Science teacher co-sponsor at White Sands had experience with the EC at another school. Thus, she was familiar with the

director of the program and his methods of running the program. The director attended club meetings fairly often as it was a new club. When he was not in attendance, the students generally prepared for future events, which included field trips similar to the other ECs.

Study participants

Focus group students

Students from all selected ECs were asked to participate in the study. The return rate of consent and assent forms was high for all EC's, and most students from the ECs were able to participate in at least one focus group interview. However, a few students did return their consent and assent forms, which may have created a bias in findings.

Individual students

From the three ECs studied, I chose three students to participate in individual interviews. Using intensity sampling (Patton, 2002), students were chosen based on: a) participation in the Environmental Club, b) the researcher's ability to communicate with the student, c) willingness to participate, and d) parent's consent. Students were not chosen until the end of the fall semester during the 2006-2007 school year, to ensure their full and consistent participation in the EC. This selection method did allow for bias from these participants, however due to the limitations presented by consent and assent forms, the irregularity of attendance at some clubs and the attempt to try to control for teacher/instructor in both contexts, the choices for individual student subjects were extremely limited. Two students, Susana and Luis, were chosen from Surfside Middle School. Both were eighth graders and were born in Mexico. One student, Monica, was chosen from Tidal Wave Middles School. She was in seventh grade, born in the United States, and identified as a Mexican American.

Susana was an eighth grader from Surfside Middle School. Susana was born in Mexico, but has lived in Coastal Plains since she was a small child. She identified herself as Mexican. She was involved in the EC for social reasons and did not particularly care for science at the beginning of the study. *Luis* was an eighth grader from Surfside Middle School. He was born in Mexico, but had lived in Coastal Plains for a while. He identified himself as Mexican. He was very interested in science but was involved in the club mostly to be with friends. *Monica* was a seventh grader from Tidal Wave Middle School. Monica grew up in the town surrounding Tidal Wave and identified herself as Mexican-American. She was very interested in the environment as a result of fishing and being outdoors with her dad.

Monica was the only student chosen from Tidal Wave because she was the only regular attendee at the EC who was also a student in the EC faculty's science class. Due to the limited time at White Sands, I was unable to gather sufficient data from an individual in that club.

Methodology and data collection

The purpose of this study was to critically examine an after-school environmental education program to determine if Wenger's (1998) dimensions were manifested, appropriate for defining a community of practice, and useful for describing learning as participation, membership and identity formation. Due to the questions being asked about student participation in science-focused contexts and the lack of control over the settings, I employed case study methodology (Yin, 2003). I was especially interested in understanding a phenomenon, learning as participation, through various perspectives using multiple methods. During the 2006-2007 school year, I developed case studies of the after-school environmental education program through qualitative methods.

I studied the ECs as a participant-observer. My role as a participant was typically to work as an aide to the program director and co-sponsors during meetings. I attended club meetings at all three schools almost every week during the 2006-2007 school year. Over the course of the year, I led club meetings approximately four times.

Data collection

The data collected involved formal and informal club observations, student focus group interviews, individual student interviews and autobiographies, and secondary data, including demographic and socio-economic data of the schools and their surrounding city. I also asked students to depict club members' locations within the EC practice through drawings. I thought this method would give students another form through which they could articulate a difficult concept (i.e., community of practice) and provide further insight into the location of members (i.e., core, peripheral or marginal) in the club. In addition, I gathered field notes and reflections during and after each visit to an EC meeting.

I recorded informal observations of the EC during most weekly meetings. After each club meeting, I recorded my personal reflections and noted important actions or discussions that might not have been captured in the informal observation notes. I audio-recorded one formal observation of each club, in which I did not participate, approximately three times throughout the school year. During these audio-recorded observations, I took notes on non-verbal actions, such as student and teacher movements and interactions. I conducted focus group interviews with the EC participants approximately three times at each club during the 2006-2007 school year, lasting approximately 30-40 minutes each. These interviews consisted of 4-6 students, who were predominately the same focus group participants throughout the study. I conducted individual interviews with the three students three times during the spring

semester, lasting approximately 20-30 minutes each. All interviews were semi-formal and slightly unstructured, but a script was prepared for each interview to ensure I addressed all dimensions and could keep the interview on track.

Observations, drawings, and interviews focused on Wenger's (1998) community of practice dimensions (Table 3.2). In order to understand the joint enterprise, I asked questions concerning the club activities, purpose, and goals. To examine the mutual engagement, I asked questions about membership, participation and roles. Finally, to examine shared repertoire, I asked about tools, symbols and words used in the EC.

Table 3.2
Community of practice dimensions and associated questions

COMMUNITY OF PRACTICE	EC observations and interviews
Joint enterprise -evolution of practice -purpose of practice	What is the purpose/goal/activity and common practice of the community? Who determines this? How is it determined? How is it expressed?
Mutual engagement -membership -engagement -participation -roles	How do people participate in the club activities/discussion? In what types of roles are students engaged? In what types of roles are leaders engaged? What does full membership look like?
Shared Repertoire -tools -language	What artifacts/symbols/words are used to give meaning to this community?

I also asked explicit questions about participants' interpretations of the notion of community, what communities they felt a part of, and what practices they undertook in these communities. Individual interview questions concerned students' participation, membership and identity with both the EC and their science classroom.

As Wenger (1998) noted, participation in these communities manifests a person's understanding of who they are and where they are located in a social world. Thus, questions also focused on individuals' identities as students and their feelings towards the EC and their science classroom. These questions were meant to further expose both the complexities of participation in these science-focused contexts and identity formation that might be occurring in these contexts. I felt the students' perspective of their membership and participation in a community of practice could further help an outsider to understand the community of practice dimensions. This examination and comparison of both emic and etic perspectives (Pike, 1967) could help to make a stronger claim about the relationship between the dimensions.

Analysis

I used multiple steps for analysis during the research process. First, a thorough understanding of theory was used to determine the dimensions to which the data would correspond. I prepared a detailed plan for each stage of data collection to ensure consistency among cases. Throughout this study I employed a variety of methods in an attempt to develop rich, descriptive cases, and to strengthen claims of validity. I employed data triangulation across methods within cases and across cases throughout the study (Patton, 2002). I recorded notes and researcher reflections after every data collection session and reviewed before subsequent data collection visits (Creswell, 2003). I used the notes and reflections to determine questions for the next visit. Adopting the practice of member-checks, I frequently checked my interview findings with respondents, reviewing the previous interview's responses at the beginning of each interview, to ensure an accurate understanding of our discussions (Creswell, 2003).

After interviews were transcribed, I gathered transcripts, observations, reflections and drawings for each of the four cases. I initially reviewed and highlighted interview transcripts, observations and reflection notes for the three main dimensions (joint enterprise, mutual engagement, and shared repertoire) making notes about other themes that might be present and possible questions that might arise in the data. After multiple readings, themes related to identity, trajectory, community, and practice began to appear regularly, and I coded for these as well. I coded for data segments rather than terms or single words (Linehan and McCarthy, 2001), as the intention was not to reduce data to single identifiers but rather to develop a rich understanding of the community of practice dimensions. I also matched drawings with their respective interviews and examined the dimensions students were asked to represent in their drawings. Once all data were coded, I analyzed where the dimensions, found through the multiple methods, converged in each case to determine which dimensions were most strongly supported. I compared findings, first, within each case to look at the strength of dimensions from each method of data collection. I then employed analytic induction to compare findings across cases (Patton, 2002).

Findings

In this section, I examine how Wenger's three dimensions are manifested in three ECs to determine if the community of practice is an applicable framework for the after-school environmental education program. Additionally, I discuss how these three dimensions contribute to an understanding of learning as a social process. In the interest of space, I limit segments to excerpts from interview transcripts, journals, student drawings and observations that best summarized the dimensions in question.

Key:

O: principal investigator

(…) discussion about the same topic

(…) (…) discussion between topics

*inaudible words or phrase

Ss: several voices

F: unidentifiable female voice

M: unidentifiable male voice

Surfside EC

Community

I typically began my interviews with questions regarding "community" in an attempt to understand how students define communities, perceive their own group, and interact with each other.

O: Okay, so then the next question …would you consider the club like a community? Like a small community or not?

Ana: Yeah.

F: Yeah, I would.

O: Yeah, okay. *Porque*?

Ss: *

O: You think everyone in there is trying to find out about that stuff (science and the environment)?

Ana: At least yeah, even if sometimes they don't even pay attention though.

M: Yeah.

F: But still, they wanna go on the field trips.

(…)

O: Okay, what do you think?

F: Well pretty much the same thing.

O: Yeah?

Jose: Same.

O: You think the same thing? What about you Luis?

Luis: Just trying to communicate with each other and trying to find out what each other think about science and all that.

(…)

O: So you think it's a community because everyone is working towards the same goal?

Ana: Yeah, everyone is trying to learn the same thing.

O: What were you going to say?

Sara: I think it's a community because everyone is working together.

Through this and the subsequent discussion, it became apparent that students viewed the EC as a community because people were working together and had similar goals.

Joint Enterprise

The first focus group interview at the Tidal Wave EC occurred in the middle of the year, but provided insight into why students joined and remained in the club throughout the year. The reasons students provided for their joining the club also appeared as themes in the joint enterprise of the club.

O: Why did you guys join the club?

Sara: Because I wanna learn about science.

Luis: Friends.

Ss: (laugh)

Sara: You get to do *especial* thing.

Ana: Yeah you get to go to places and learn about stuff.

Here students mentioned joining for their interest in science, wanting to be with friends or make friends, and going to places to "learn about stuff". While the interest in science was hard to measure, throughout the year it became clear that the club was a sort of social network for students who spoke Spanish fluently. My observations noted when students befriended others, stopped talking to each other, and even began to date others in the club. And, as an interview segment revealed, identity as a Mexican or someone who spoke Spanish, eventually became a defining characteristic of the club. Finally, field trips were a big draw for most of the students in the club. On field trip events almost all students were present regardless of whether the field trip was during the school day or over the weekend.

The following excerpt from Susana's first individual interview also suggested reasons the students joined the club.

O: Why did you join the EC?

Susana: Oh, because everyone was saying it was fun and like they were talking about that. They talk about animals and everything. Like I kinda like, I like puppies and everything, so you know. And like everybody, Laura was telling me that it was fun and like you can do fun stuff and everything. I was like I guess I'll try it you know, since 6th grade they were telling me you know to get in it … 'cause in 6th grade I didn't like science at all…it was my worst (subject), so I was like, no it's science again. I was like I have science once, now you want me to have it again? Like, nooo.

O: Right.

Susana: And then like seventh grade, Laura told me that it was fun. Like they do fun stuff. It's not all science, its science *pero* fun science. You know, so like how could it be "fun" science?

For Susana, the science component of the club was an outcome of "fun" activities. In fact she joined the club because she heard it was fun and knew her friends would be in it. Susana's interview captured the spirit of why many students joined the EC. Even though she was only one student, she mentioned her network of friends who also joined the club.

During this interview, I also asked Susana if she thought the club was focused on science. Her response was that it was not, but then she quickly made the connection that even the activities of the club trips could be considered science.

Susana: …It's like…you know when we went to the field trip over there…and we were looking for birds. That was fun, and like that was science I guess, but like that was fun, you know.

O: Right.

Susana: And stuff. I thought it was gonna be like boring you know. I don't know we're talking about all these numbers or whatever like, you know, science.

…

O: Yeah, that's good. So you didn't necessarily join because your friends were in it or did you also?

Susana: No because of that too! Because like Eva and all them. It was gonna be fun so I was like I guess. And everyone started to get in, Carmen and Ana and all them so…

These excerpts were indicative of what students both perceived to be the practice and experienced as the practice. They understood that there would be

"science" activities in the club, but from their friends they also heard the club would be "fun". For many of the students, it was important to know that their friends were going to be in the club. The club evolved into a large social network for some of the ESL students at this school.

Mutual Engagement

Questions regarding mutual engagement within the club illustrated that students, despite belonging to different peer groups, were able to work together and build camaraderie.

O: Sometimes it seems to me like everybody in there (the club) is friends, and so is that true? Do you all feel like you're friends or is there kinda different groups or how does that work?

Luis: There's kinda different groups.

F: Yeah cause there's different groups

Luis: They might know each other, but they don't…

Ss: yeah, yeah

O: Okay.

Sara: Yeah 'cause we're close to some people than to others but we all know each other.

Ana: Yeah.

…

Sara: Yeah, but like I know them, but I don't really hang out with them.

The mutual engagement at the Surfside EC seemed to be characterized by familiarity with each other and a friendly cohesive unit. While students expressed that there were different groups of friends within the club, they also emphasized that they all knew each other and worked together.

The next excerpt further explained what was required for membership in the EC.

O: …So do you think everybody that comes to club is a member of the community?
Ana: Yes
Jose: Yes
… (clarifying the question)
Sara: We're all members.
Luis: Well kinda, 'cause some people just come and they're like, they come for one day and the next, the next time they have a meeting they don't come at all.
Ss: Yeah
O: Okay so those people …might not be members because they're not really, they don't come all the time?
Sara: Yeah.
Luis: Yeah.
Sara: Yeah and the one's that do come, I think we're members, but in every community there's a head like… (the teacher)…she's the head of the community

This illustrated that membership here, according to the students, required regular attendance to the meetings. This characteristic of membership was reiterated in the last interview. When I began to discuss how students participated differently in the

club, the group discussed that there were some students in the club who talked and did not pay attention to the co-sponsor or director.

O: Okay, so uhm, so not everybody participates the same way…do you still feel like … Even though some people don't participate, they're still part of the community of the club?

Ss: (hesitant) Yeah; yeah

Felix: *Que dijo?*

Ana: Yeah, cause even though there are some people that are like not listening, they still do what we do like with each other.

O: And they're still considered by everybody else as members?

Ana: Yeah, like the majority talks to people that don't listen (inaudible)

…

O: Okay, let me ask, the people that you think are not participating, right, do you think that they're still considered part of the main members of club?

Luis: Sometimes.

O: Sometimes?

Sara: I think that as long as they're here they're members.

The other students agreed with Sarah's comment. This implied that students' behaviors in the club did not dictate their ability to participate as members. Students considered those who were present and consistently attended the club as members. In order to better understand if there were peripheral members, I asked about roles in the club.

O: Okay..my other question was gonna be like uhm, are there different roles that people play in the community?

…

Eva: Well yeah, cause like there's people that explain it

O: Okay, like (the teacher)?

Eva: Yeah, and (the director).

O: Or (the director)? Okay. And then what are some other roles? Do all the students play the same role or do they have different roles?

Luis: they all have different roles

Sara: Some are translators.

O: Some are translators.

Luis: There are a lot of different roles.

After seeing that the students were struggling to come up with roles, I discussed my observations in science classes and how there might have been different roles in their classes.

…

Sara: Okay now I'm changing my mind…well it's just like, some of us might play a little bit of the same role or like maybe we have like more than one role.

Students struggled to define roles in both focus group interviews. My observations also exposed my own struggle in discerning student roles in the club. The students identified a clear leader in the teacher and the club director, a translator, and a class clown. Apart from these roles the rest of the students seemed to play the same role or as the last student said, "maybe we have more than one role".

In the last interview with this group, students offered that there were different roles, but the roles they mentioned were associated with student stereotypes (e.g. teacher's pet, shy, gothic). When we were finally able to discuss roles as a way of contributing, the students offered the roles, "translator" and "artists", as some of the students were in the midst of drawing for an EC t-shirt competition. Finally Ana decided that, "Yeah, cause there's not really a leader in the club. We all do it together." I'm not certain if Ana meant this or if she wanted to move on to a different topic. However, the students may have found this question difficult because there were no clear roles. In fact, my observations indicated that everyone had a chance to lead, translate, play around, and contribute to the activity in their own way.

Shared repertoire

One aspect of shared repertoire in the club was the snack. Observations and personal reflections indicated the club snack was significant for these students. It was sometimes the incentive for students to attend club meetings. The director occasionally described the snack in Spanish or used Mexican cookies and sweets for the snack. If, after dividing the snack among the students, there were leftovers, he often gave the rest of the snack to a student who had "the most siblings" or to a student who answered a question correctly.

The presence of the program director and his instructional approaches also had shared meaning, symbolizing that the club would run differently when he was absent. The director often talked during most of the club meetings, leaving less time for the students to participate in hands-on activities. Also, the director used oral quiz-type activities in the meetings and gave sweets or money as prizes. For instance, he often asked which states bordered the Gulf of Mexico, giving a prize to the first student that answered correctly. This indicated to the students which topics the director deemed

important. However, he would also ask questions that were unrelated to the club, like the names of his dogs or neighboring schools' mascots.

Finally, a clear example of shared repertoire in this club was the use of Spanish. In the beginning of the club, the use of Spanish was a characteristic shared by many of the students. In the last interview with club members, it appeared that the use of Spanish actually served as a type of boundary for club members. Spanish was both a tool used in this club and a symbol of membership.

Joint enterprise, mutual engagement, and shared repertoire

The following interview excerpts were more difficult to tease apart than the previous excerpts. The excerpts below were from the last interview and indicated characteristics of membership, an evolution of the enterprise, and obvious notion of shared repertoire.

There were poignant aspects of this interview that touched on students' Mexican heritage and how some teachers allowed Spanish to be spoken in class while others did not. A couple of the students used the term "racist" when talking about teachers who did not allow Spanish to be spoken. There was also a frank discussion about how somebody who did not identify as Mexican or did not speak Spanish might not be comfortable in the club.

O: Okay so what if somebody came to club, uhm that wasn't Mexican?
Ss: (inaudible talking)
Sara: That would be kind of weird.
Ana: If there was some who?
O: If there was somebody that came to club that wasn't Mexican?
Ana: I'd kick them out like that (snaps).
Ss: (lots of talking over each other and laughing)

Eva: It doesn't matter, it doesn't matter because it's just a person.

O: Right?

Ss: Yeah; Yeah

O: So what I'm saying is do you think they would feel left out?

Ss: Yeah; Yeah

O: Of the community?

Ana: Yeah because like everybody in there talks Spanish and like there's nobody hardly talking English.

…

O: I guess what I'm trying to say is does it matter if they're Mexican or does it matter if they speak Spanish?

Ana: Well it doesn't matter, *pero* it would be odd.

O: So it would be hard for them to feel like they're part of the …

All: Yeah; Yeah; Yeah

O: Club? Okay.

This interview occurred toward the end of the school year. By this time, the students had clearly developed an enterprise that involved the use of Spanish as their main mode of communication. Inherently, this also determined who could participate as a full member in the group. While the students said it did not matter if the person was Mexican or could speak Spanish, they did think "it would be odd".

The mutual engagement of members was closely connected to the enterprise. For instance, the negotiated enterprise of speaking Spanish at Surfside's EC determined membership in that club. While it appeared that all members were equally accepted, none of the predominately English speaking students from the year before

stayed in the club. In fact the focus group members felt that students who spoke predominately English might not fit in. Other than issues of language, students viewed and treated others as equal members of the group.

Participation, membership and identity formation

The emic perspective of participation, membership and identity with the club was further enforced by that of the outside perspective. A brief entry from a student's journal indicated that students outside of the club might have negative perceptions of club members. When asked to respond to the question, *How does belonging to these communities affect your role in other communities*, Luis wrote, "Some will think that EC is gay 'n' probably won't like you." Still, when asked to discuss if he felt he belonged more to one context, the science classroom or the EC, than the other, he wrote, "Yes, the club because I have more friends and I give my opinions."

Here Luis illustrated that he was more comfortable in the club than in his science class. The benefits of participation outweighed the negative consequences of being perceived as "gay" by outsiders. This also illustrated that there was an identity associated with the group from members both inside and outside of the group that was in part shaped by the perception of others.

Still, learning was not viewed as a competence of membership or transformation of participation. Rather, learning in this context could be viewed as the connections students made between the EC and other contexts, as was the case with Susana. Wenger (1998) also discussed how trajectories within and across communities of practice, such as these, were a part of identity formation. For instance, Susana made connections between the EC and science. Many of the members connected their association with the EC with their group of friends, as Luis illustrated.

Table 3.3
Surfside EC community of practice dimensions

COMMUNITY OF PRACTICE	Surfside EC
Joint enterprise -evolution of practice -purpose of practice	Student goals are to learn about science, have fun and make friends. This is negotiated by students, teacher and director. The enterprise evolves over the year to one that presupposes a social network for students on the margins of the school community.
Mutual engagement -membership -engagement -participation -roles	Students engage as peer groups, but are also able to work together. They befriend each other throughout the year, but there are also instances of broken friendships and relationships. Roles include a leader and translator, but students voice that everyone has the same role or there could be multiple roles. Membership evolves to one that corresponds with the shared repertoire of language. Students that can speak Spanish and attend the meetings are considered equal members.
Shared repertoire -tools -language	Spanish language, snack, director's presence
Learning as a social process	Understood as a connection from participation in the EC to other areas of life, "…science is not always boring, it can be fun…"; "…science is part of my life because I like plants and animals."

Tidal Wave EC

To illustrate the community of practice dimensions at this club I included excerpts from focus group interviews, student drawings and excerpts from individual interviews with Monica. For this case, I discussed "community" and "joint enterprise" dimensions simultaneously because of the relationship found between the two.

Community and joint enterprise

When I asked whether the club could be identified as a community in the first interview, one student responded that she did not feel it was a community because she did not "hang out" with members outside of the club and did not know them as friends. We then discussed what a community entailed and found that students

associated communities with groups of friends that helped each other, or groups of people that knew and helped each other. However, when I asked if the club was a community of practice, the students all felt strongly that it was. Even the student who previously disagreed with the notion that the club was a community felt that the club was definitely a community of practice, with the purpose being to clean beaches, clean the community and care for the environment.

During the last interview with this group, the students provided a similar response to the question of community.

O: …What about just the EC at Tidal Wave, would you consider that like a community?
Monica: Eee, yeah (hesitating)
Ss: (others slowly agree) yeah; yeah
O: Okay, so the next question is why?
Monica: Uhm, because we help the environment.

Monica's response indicated that their collective purpose helped to define their collective group. Another explanation could have been that the students, by this interview, were conditioned to understand that my questions were about practices and communities. Monica's response to my question almost seemed to answer the question of why they might consider themselves a community of practice.

Still, in this last interview, the students reiterated that the practice of the EC community was to care for the environment.

O: Okay, so we talked about communities of practice where a community, everybody in the community kind of works toward the same goal or they have the same purpose.

Would you consider the EC that kind of community, where everybody works towards the same goal or has the same purpose?

Christy: Yes.

O: Okay. You guys said yes all pretty quickly. What do you think that goal or purpose is?

Christy: To achieve a better environment and community. Help save

Sarah: …the whales.

Christy: Yes those, and fish and keep our bays clean.

O: Okay. Heather, do you want to add?

Heather: To help the environment.

O: Okay.

Heather: And like basically (inaudible) the water.

…

O: Ok would you change anything about the practice?

All: No; no.

Christy: I would say actually do more clean-ups and we only do like two every year and we could probably have more clean-ups.

F: We could do it during the summer.

Heather: And instead of just doing a beach, like highway clean-ups and like in parks and around the city, just somewhere where a lot of people might go.

The girls were actually eager to participate in club activities, illustrated by their desire for more "clean-ups". They even wanted to continue the activities through the summer. This exemplified the reach the practice had outside the EC context. Students were eager to continue these practices beyond the school year and the club meetings.

The discussion then turned to various spaces, including a pond, in the community where the girls believed people threw trash instead of using the trash can next to the pond. Here, Monica made the connection between their actions and the life in the pond.

Monica: They don't actually see that there is life there. There's turtles, we've seen turtles, birds, alligators. There is an alligator that actually got loose at Wal-Mart.

The enterprise for this EC appeared to focus on issues concerning the environment. Students were not necessarily joining the club to make friends. However, as seen in the next section, there were students who attended the club to see their friends or take field trips. Instead, the enterprise was negotiated to fulfill a sense of stewardship for the girls. The activities they participated in served as a means of engagement with the local community. They also served as a link to connect science to their life outside of school, as Monica indicated by her concern with the "life" in their local pond.

Mutual engagement

To examine mutual engagement I asked students about different roles they had and how participation varied for each student. In the first interview, this led to discussions about attendance and the difference it might make for membership in the club. I then asked Julie about her feelings of membership because she did not attend meetings regularly.

O: Do you still feel like a part of the community even though you are not at every meeting?

Julie: (nods yes)

O: Okay.

Julie: Because we're all there for the same thing.

Interestingly, Julie identified with the community despite her irregular attendance. Her membership in the community was based primarily on her reasons for attending the club, interest in science and concern for the environment. Still, some members might not have considered Julie a core member of this community, simply because of her attendance.

Student drawings helped to clarify the relationship between attendance and classroom membership. When I asked students to draw a circle representing the EC, with a person in the middle representing someone that wanted to help the environment and help at community activities, Monica and Julie positioned most members in the center of the community. However, Lauren and Heather had a few students in the area between the center and outside, describing these students as "participating but not as much as the others" or as being in the club for reasons other than those they defined as the purpose. Heather labeled these students as "people there just to get out of school/for field trips". Core membership for these students was defined by reasons for attending and regular attendance to meetings and field trips.

Finally, the last interview illustrated a difference in opinion about participation between a student who attended regularly (Monica) and one who attended occasionally (Christy).

O: Okay. So, you feel like some people in the club don't necessarily, aren't necessarily there to help the environment?

Monica: Well maybe not in this club.

Christy: Well I mean yeah like in some other clubs people are just like to be there because their friends are in it or something.
O: Well what about the EC at Tidal Wave? Do you just think that everybody is there for the environment?
Christy: Yep.

Here, Monica, a regular club attendee and passionate environmentalist, was more compelled to believe that not everyone was in EC for the same reasons. On the other hand Christy, who did not attend the EC regularly and tended to associate with a small group of friends in the club, expressed that all of the members cared about the environment. Not surprisingly students' perspectives on engagement, participation and membership varied according to their own attendance to meetings and club field trips. Also, students again discussed requirements for membership in terms of environmental stewardship.

Engagement here was inconsistent due to student involvement in other activities. My observations indicated that students were engaged with each other when they worked on activities, but this work was only a small part of the club practice. Thus, it seemed the engagement factor for students in this club was not in the relationships they built with each other, as there was very little relationship building beyond the groups of friends that already existed, but rather in the common concern they had for the environment. It was clearly the enterprise that united these students as a community.

Shared repertoire

Shared repertoire at the Tidal Wave EC included impending field trips, t-shirts from the field trips, snack, and the term "tree-hugger". While field trips were part of the club's practice, their imminent arrival signaled that more students would be

attending club in the weeks prior. This also signified that students needed to maintain a certain grade point average to attend trips, as school districts mandated this for participation in extracurricular activities.

Also, the program director often tried to provide free t-shirts, through community sponsors, for each club event that contributed to the broader community. The t-shirts were used as a marketing tool for both the club and community businesses. But for the students, this represented the work they did and their involvement in the club. Snack was another form of shared repertoire. Occasionally, the director described the snack in Spanish, which was often the only bilingual activity in this group. Students expected to receive a snack at the EC, and were disappointed when they were told snacks would no longer be provided. Finally, use of the term "tree-hugger" seemed to resonate with the girls in this club and served as a type of identification for the participants, illustrated in a later excerpt.

Participation, membership, and identity formation

In order to discern how participation and membership in the EC were affecting the students' identities, I examined two excerpts, one from an individual interview with Monica and one from the last focus group interview. In Monica's last individual interview, I asked her questions about her participation in both the science classroom and the EC.

O: … Do you feel like you are friends with more people in one community than the other?

Monica: Um, yeah.

O: Which one?

Monica: I think in science I have more friends because I know more people there. Yeah I don't know a lot of the…

O: Okay. Um which one do you feel like you're more of a member of or that you belong to more? If, either one.

Monica: Um, the EC.

O: Really?

Monica: Yeah. I think I am more involved in that than I am in science class. Yeah.

My observations indicated Monica's behavior was quite similar in both contexts, but she was much more talkative in science class. Therefore, this last response took me by surprise, mostly because my experience with other groups led to some understanding that having friends in a group helped one to feel like they were a member of that community. Here Monica described that while she had more friends in her science class, she identified more as a member of the EC. The EC gave Monica more opportunities to get involved in ways she found satisfying.

The focus group interview segment also demonstrated how Monica and others identified with the EC community.

O: Ok so let's say, if you're in band, because most of you are in band right?

Sarah: Uh-hum, they call us band geeks.

Christy: All of us are. They call us band geeks.

O: Okay. And so that kind of has a little bit to do with your identity right?

Monica: Yeah.

O: Does the same thing happen in the EC? Is there some part of it that goes with your identity or does it not?

All: Yeah.

Sarah: They call us tree-huggers.

Christy: Animal lovers

Monica: Yeah like there's a few people that I know that will be like "well guess what, I'm a tree-hugger too, hug the tree", and…

At this point the girls continued with a long conversation about being called "tree-huggers" in different instances at school. For them, it was a form of solidarity and they seemed to take pride in the term. Like the EC at Surfside, we saw how others influenced the identity associated with membership in the club. Students in the club were willing if not eager to take on this identity. The enterprise, means for engagement, and shared repertoire were all closely connected to the practice of environmental stewardship in this club (Table 3.4).

Table 3.4
Tidal Wave EC community of practice dimensions

COMMUNITY OF PRACTICE	Tidal Wave EC
Joint enterprise -evolution of practice -purpose of practice	Students agree that enterprise involves helping the environment and the community through specific activities like beach clean-ups.
Mutual engagement -membership -engagement -participation -roles	Membership is determined by a commitment to the EC's enterprise of stewardship, and to those that attend regularly it is also determined by consistent attendance to meetings. There are no clearly distinct roles in the club. Participation involves attending meetings and events.
Shared Repertoire -tools -language	Impending field trips, t-shirts, snack, "tree-hugger"

White Sands EC, Coastal View, TX

Despite a late start in working with this club, I was still able to capture the essence of joint enterprise, mutual engagement and shared repertoire through interviews with the students. To illustrate the community of practice dimensions at this club, I included excerpts from focus group interviews, and discussions of student drawings.

Community

When I asked what students thought of when they heard the term "community", the students responded with "people", "service (service hours working for community)", "working together", "town", "problems", "people", "society", and "schools". They also provided examples of their own school, town and county, and school sports teams.

The following section illustrated why they believed these examples were communities and provided insight into what they considered necessary components for communities. Later segments illustrated how these were also important characteristics for engagement and membership in their EC.

O: In these examples do you necessarily have to know everybody in the community?

All: No

Rita: Not necessarily…as long as you're friendly and talkative and help people out.

Lisa: I think in Coastal View everybody knows each other.

…

O: Why would a team be a community?

Ss: You have to work together, you have to get along most of the time

Jamie: There's no I in team.

After we discussed "communities", I asked the students if their EC could be a community focused on a particular practice. As I tried to describe the concept of a community of practice, Theresa helped to clarify.

Theresa: So it's like a group of people that are all working, reaching for the same thing?
O: Yeah, exactly. There's a common practice, you know?
…
Lisa: Like working, like a business place?
O: That's a great example.
Lisa: 'Cause like if there's one promotion and they're all going for it.
Jamie: So we're the perfect, so our group here would be that type of community?

The students here seemed to quickly grasp the concept of a community of practice and immediately identified their club as an example of one, where people were "all working, reaching for the same thing".

Joint enterprise

To ascertain the joint enterprise of the EC, I asked about the club's purpose and goals.

O:…Okay, so we talked about maybe yes this could be a community of practice or maybe not. If it is, what's the practice, what's the goal of the EC?
Lisa: Trying to keep earth clean.
Rita: Learning how to keep our environment…
Jamie: Not only the environment, we you know, down here we've also got a lot of Mexicans and Whites, no offense.

All: (laughing)

Jamie: But we get used to our community, the EC. We're also getting use to the other people around here.

Interestingly, the town in which the school is located is ethnically diverse including predominately Hispanic and White, non-Hispanic populations. This statement was very telling of not only the context of White Sands, but also about the deeper effect that this EC might have on the community, in terms of cultural and ethnic understanding. After this statement there was a brief discussion about how students identified themselves. We discussed how not everybody in the club was Mexican and Lisa identified herself as "Spanican". I also noticed here that practice as both "learning how to keep our environment" and "getting used to the other people around here" involved a deeper connection to community and life outside of school. Other answers about the practice included: "try and get other people aware of what's going on", "global warming" and "doing good deeds for the community."

Another aspect of the enterprise was revealed when I ask students why they joined the club. Answers included a concern for the environment, preparedness for future careers in science, and a way to get involved in school activities so that they might have an advantage when applying to college. One answer summed up these issues:

Amy: 'Cause like I feel awful for the community and everything, and the jobs I wanna do work a lot with science. And also it looks really, really good on your record if you like participate in things like this.

This illustrated how the students negotiated the ideal practice of the club (i.e., to help the environment) into one that also helped them prepare for their future. They were willing to include giving to the community as part of the enterprise and were aware that they would be awarded and recognized for this service. The enterprise suited the students in this club well for these reasons, as most of the students seemed to be concerned about their future schooling and careers.

Mutual engagement

To understand mutual engagement, I asked students if everybody in the club participated in the same way. All of the students quickly answered no, and Rita interpreted the question as one of working hard in the club versus "slacking off". There seemed to be tension around this question as a couple of interviewees named specific students who had stopped attending the EC or were perceived as not working hard at most of the club's events.

Jamie: Well but I would say the people who come right now, like this group of people are the ones who showed up since the beginning.

Ss: yeah; yeah

J: And I think all of us in here (inaudible) hard work.

Lisa: We're like devoted to it.

…

O: So there's, okay how about, what if I said there's a core group of people that would participate almost equally?

Rita: Yes.

Melissa: That are determined to work on the goal.

O: And then there might be a few people that don't necessarily participate in the same amount?

Lisa: They're just in it to be in it and like don't really (inaudible).
Rita: They are in it to go to the trips or just to get credit.

This tension around some club members' involvement was reiterated in the last interview as well. Students felt the number of members had dwindled at the end of the year due to fewer field trips. Also, when students were asked in the last interview to identify characteristics of an EC member, they described being a "team player" and going "to every field trip" as important.

O: So that being said, is it fair to say that you guys think there's a core group of people that participate equally or do you still think…here's another question this might help you. Are there different roles that people play?
All: yes
O: Okay.
Lisa: Yeah.
O: So that is kind of a little bit different (…) because people can participate equally…but maybe have different roles. Does that make sense?
Scott: We're like (inaudible)
Melissa: 'Cause like certain people can do certain stuff but they're all determined.
Jamie: Like when we go outside to pick up trash and sometimes some people will rake leaves and some people will pick up trash.
Melissa: Well, 'cause basically we have different roles but it works all together
Lisa: And some just sit there and do nothing.
Jamie: Yeah it all comes together to do one goal.
Scott: But if one slacks off then it just ruins it all for all of us.

Membership in this club seemed to be determined by attendance at club meetings and a work ethic deemed appropriate by the club members. It was clear that some students did not feel that all members contributed to the work load of activities equally. Those that did not meet regularly were noted, and while the club members did not seem to be comfortable discussing these students in front of each other, there was some sense that these students were not in the club for the "right" reasons. However, there did seem to be a core group of "determined" students who had different roles but worked together. Those who attended the club regularly were seen as equal members who were invested and committed to the "cause".

Melissa discussed another dimension of membership when she expressed her ambivalence about whether the club should be considered a community. Her initial argument was that the community was too small to be considered an actual community. As the discussion continued, though, evidence suggested that Melissa's view of the community might have been indicative of how she viewed her membership in the community.

O:…do you kind of feel like this is a group that you just come to, but you don't really feel like it's a community?
Ss: no; uh-uh
O: No? Alright.
Scott: Melissa
Melissa: (laughs)
O: And that's okay, that's fine.
Melissa: That's 'cause I…
Jamie: What do you think?

Melissa: I don't really know anyone 'cause I really, as soon as I get home, I'm at home…I don't go anywhere else so… I just feel this is a place you go to and you just go back

…

Jamie: 'Cause you aren't close friends with anyone in it?

Melissa: I guess so…it depends who you are, like if you're … I think it just depends on what type of personality you have, makes the community a community.

Theresa: I think it also depends on who all you are working with and how well you can get along.

Melissa believed that the personalities of members and the friendships developed contributed to whether a group could be a community or whether one might belong to a community. However, the rest of the interviewees believed that getting along with others was an important requirement for membership. This was reflective of what they said about the nature of communities at the beginning of the interview. Notably, there was no mention of Melissa not getting along with others. Interviewees clearly felt that the students who were dedicated to the purpose of the club were core members of the club. In fact, Melissa was the only one who seemed to consider her position as peripheral if not marginal. This was an issue Melissa struggled with throughout the year, even in the last interview when she questioned whether she had made friends.

Student attendance at club meetings and events was evidence of their commitment to the "cause", as was the amount of work they contributed at events. If students were perceived as committed to the cause and were regular attendants, they seemed to hold equal footing in the club. Most importantly, students were able to identify their own position within the clubs as well as that of other members.

Shared repertoire

The tools and symbols that signified meaning in this club were more difficult to identify. This was probably a result of my short time with the club and its status as a new club. Still, like the other clubs, snack was a significant symbol of the club, as one member noted jokingly that one of the reasons people joined the club was to get a snack. The t-shirts also served as repertoire in this club as a sign of involvement with events and dedication to the club's enterprise.

Participation, membership and identity formation

Because part of the focus of the EC involved science, we also talked about the effect participation in the EC had on students' feelings toward science. During this discussion, issues of identity surfaced and we saw how participation in the EC evolved to affect a student outside of the EC.

O: Do you think so do you think being in the EC then, it doesn't affect your feelings towards science class?

…

Melissa: Yeah when we are talking about like wildlife and we start talking about chromosomes and the exosphere and the stratosphere.

Lisa: And sometimes we feel like a little bit smarter than the people that are in our class because we know about it more.

Melissa: And then we feel weird sometimes when she talks when she asks us a question because we know about it. Like in class when she asks us like a question…

Lisa: …and she has this period when she brings it up about EC and they are all looking at us and they are like…

Theresa: One day in science she asked a question, well she asked the class a question, and it got quiet and I answered it, and out of nowhere you hear like people who are saying Theresa answered that? But she's an idiot. No, she's extremely intelligent.

This short segment demonstrated how students were able to transfer lessons from the EC to the science class. While the knowledge transfer was exciting, the opportunity for these young women to express competence in a subject like science seemed even more fulfilling. The last comment Theresa made demonstrated the empowerment she felt as a result of her participation in the EC. Theresa was able to recognize her own intelligence despite others being unaware of her abilities, and she was able to do so through her participation in the EC. Thus, membership in the EC and the competence she gained there had presumably followed her to other communities of practice, affecting her competence in these areas.

Also, in the last interview students were asked to illustrate the EC and describe the characteristics of a club member. The students were then asked to depict themselves in the club at the beginning of the year and the end of the year, with the center of the club representing a student with all the characteristics of a club member.

O:…If you guys changed position in your drawing, why do you think you changed positions?

Scott: Because I…

Melissa: We learn more. We like it.

Lisa: I feel more important now.

Scott: So do I.

O: Does it have to do with like making friends or just learning more?

Ss: Learning more; learning more

Melissa: Learning more and making friends even though we pretty much knew everybody.

Lisa: But we weren't all friends.

…

Melissa: I don't know. I don't really know if I've made any friends or not.

…

Lisa: Because talking about it. It just made it feel like I'm part of the full community of the EC

O: Yeah?

Scott: Like a full part of it.

At the end of the study most of the students identified as full members of the club. They felt "important now". However this trajectory did not follow a competence in helping the environment. Rather, students' trajectories followed a recognized commitment to the EC and an ability to connect their experiences in the club to other areas of their life. Through their ability to connect these experiences as an EC member, they developed a sense of competence and thus importance. As the students discussed how they had both made friends and learned, they recognized their own growth in the club. For Lisa this was experienced through both reification and participation.

Despite the short time I spent with this club, I was able to see how the joint enterprise and mutual engagement were manifested with the particular students involved (Table 3.5). I also began to see some signs of shared repertoire. Finally, learning could be viewed as the ability for students to make connections from one community of practice to others in which they belonged, forming trajectories and thus identities (Wenger, 1998).

Table 3.5
White Sands EC community of practice dimensions

COMMUNITY OF PRACTICE	White Sands EC
Joint enterprise -evolution of practice -purpose of practice	Enterprise includes both environmental stewardship and learning how to get along as a group and with others in the community. It is also negotiated to address students' needs of future preparation for college and careers.
Mutual engagement -membership -engagement -participation -roles	Students are engaged with each other during interviews and events. Student roles are based on different tasks but are equal. Engagement is dependent on students' ability to work with each other and "get along". Membership is determined by students' abilities to work together and their attendance at club meetings and field trips.
Shared Repertoire -tools -language	t-shirts, snacks

Summary of findings

The findings suggested that the community of practice was an appropriate framework with which to examine the three ECs in this study as a place of social learning. According to Lave and Wenger (1991), the term "community" implied, "…participation in an activity system about which participants share understandings concerning what they are doing and what that means in their lives and for their communities" (p.98). Students were able to discern the enterprise in each club, which enabled them to see its connection to other aspects of their lives, whether it was building a network of students who share similar backgrounds, contributing to their local and global communities, preparing them for their futures, or helping them make connections to science.

All of the ECs studied showed evidence of a joint enterprise, mutual engagement, and shared repertoire. Despite being part of the same EC network, each club's enterprise was unique. This illustrated the importance of student agency in

determining and negotiating the enterprise. The mutual engagement of members was also found to be closely connected to the enterprise. Membership was often characterized by commitment and dedication to the enterprise. Whereas the enterprise resulted in a supportive and social network at Surfside, students at Tidal Wave and White Sands were focused on helping the environment and community. Although shared repertoire wasn't discussed much in interviews, I was able to ascertain, through various methods, the objects, symbols and issues that held particular significance for each club.

Further, an examination of the EC helped my understanding of the phenomenon of learning as participation, membership and identity formation. Both participation and membership around a practice in the EC played a significant role in shaping students' identity in all three cases. For instance at Surfside, where membership involved participation around a practice of social networking, Luis had to reconcile his identity as a participant with his identity as a member of his school. In the EC at Tidal Wave, where the enterprise was focused on environmental stewardship, Monica strongly identified as a member of the club and as a "tree-hugger", which the other members eagerly accepted as a label. Finally, at High Tide, participation deeply affected students' own perceptions of their abilities as students and competent members of the club. By the end of the year, the students claimed to feel "important".

Discussion

Because the community of practice appeared to serve as an appropriate framework for all three ECs, discerning similarities and differences among the EC was an important step for understanding what made the community of practice framework applicable. First, all ECs were extra-curricular opportunities, in which students were

able to join of their own "free-choice". Falk and Dierking (2000) have made the case that learning outside of formal classrooms through "free-choice" arenas often occurs as a result of personal need or curiosity. Students that were able to choose to participate in the EC clearly did so for reasons they found valuable in their lives and critical to their identity. For instance, at Surfside, the club provided a social network and sense of support that students seemed to lack in other areas at school. Research on Mexican-American student achievement has found that extracurricular programs provide a source of social capital for students often marginalized in schools (Gibson, Bejínez, Hidalgo, & Rolón, 2004). Further, extracurricular programs have provided students with a sense of membership and belonging (Gibson, Bejínez, Hidalgo, & Rolón, 2004). These "free-choice" programs have offered students and teachers a space freed from institutional constraints that dictate both what is important to know and the social structures that affect access to social capital (Gibson, Gándara, & Koyoma, 2004).

Thus, while each club was meant to pursue the same interests and activities, the enterprise differed among ECs, according to the needs and curiosities of the student members. The ecological psychology perspective was useful here, mostly because of students' intentional participation in the club, and thus, their understanding of effectivity sets needed to participate in this affordance network. An ecological theory of knowing would presume that EC participants' affordance networks converged on similar paths, allowing for a better understanding of the purpose or practice and enabling students to better negotiate the enterprise to pursue their own goals (Barab & Roth, 2006). The enterprise of each club was negotiated to suit the needs of its members. In essence, the decision of each member to participate in this "free-choice" learning environment developed into a collective purpose that suited the needs of all members.

Like Roth and Lee (2004), I found that participation in community science activities led to learning that crossed "community" boundaries, so that students took lessons from participation in the club to other areas of their lives. In other words, involvement in the EC opened new vistas for students to view science. Examples from interviews showed that students reformed their ideas regarding science and thus were able to take science to different aspects of their lives. The ecological psychology theory might also provide a useful perspective for how students were able to follow trajectories of identity from the EC to contexts outside of the EC via effectivity sets and affordance networks. Despite the fact that the EC did not provide much material on significant science concepts, the students made connections between their involvement in the EC and science. Chawla's (2008) discussion on ecological psychology addresses this finding,

> "According to both ecological psychology and this view of participation, people flourish more fully when they have a rich range of opportunities to realize their capabilities, and their capabilities include seeing the environment accurately and knowing how to take effective action in response" (Chawla, 2008, p.102).

Similar to other environmental education settings, the EC provided multiple opportunities for participation and engagement (Boyer & Roth, 2006; Roth & Lee, 2004). For instance, Boyer and Roth (2006) found volunteers in an environmental program who appeared to be "off-task" were actually contributing to the learning goals of the program, suggesting that modes of participation do not need to be singular. Roth and Lee (2004) found that student involvement in community activities with adults provided opportunities for learning beyond the classroom and into students' adult lives. Beyond the multiple roles the EC provided for participation, a significant finding was the equality of membership students held in the clubs. Most students were considered equal participants if they were perceived to be engaged with

the enterprise. Even when students were not considered core members, either due to their attendance or work at club events, they were still considered members of the EC community. This is further emphasized by the trouble students had determining roles in focus group interviews. Most of the roles mentioned only dealt with various tasks. There was never any indication of a hierarchy of labor or a hierarchy of membership, beyond the leader in the clubs. This was likely a result of the multiple opportunities the EC provided for participation (Roth & Lee, 2004).

Implications

In response to Rickinson's call for theory (2006), I adopt a sociocultural view of learning through a community of practice framework, maintaining that learning is both process and product of participation, membership and identity formation within communities engaged in a particular practice. This study illustrates one way in which the community of practice framework could be adopted to examine environmental education programs as sites of learning. While this paper contributes to the knowledge base of communities of practice in environmental education research, it also begins to distill how "free-choice" learning and ecological psychology might further contribute to our understanding of communities of practice.

Meyers (2006) argues that research and theory should be useful for practitioners. Thus, I would caution practitioners about the need for careful examination of contexts before applying the community of practice framework in efforts to understand a social process of learning. Future research examining environmental education sites as communities of practice could provide a better understanding of learning in these contexts. Because all three ECs in the study could be identified as communities of practice, future research could also examine whether a

variety of environmental programs appear to be suitable for an application of the framework.

On the other hand, I would caution against assuming or intentionally developing environmental programs as communities of practice with predictable learning outcomes. Agency appears to play a significant role in the negotiation of an enterprise, and consequently the community of practice. Despite the club's existence in a number of schools serving similar populations, I was able to recognize how each club's enterprise was negotiated to meet the needs of its particular members. For instance, at Surfside, where the students desperately needed a club that allowed them a place of safety and support, they developed a club that met their bilingual, social and academic needs (Gibson et al., 2003). For Tidal Wave, the club was a means to get involved, give back to the community and protect the environment. Finally, for White Sands the club provided opportunities for community service, which contributed to their membership in other clubs and improved their chances for college. They also felt that belonging to this club might help them prepare for future careers.

Through even our best intentions as environmental educators to develop activities and programs focused on environmental and science concepts, we still might not meet the needs of students, leading to possible changes in the purpose of our programming. These findings illustrate the importance of understanding reasons for participation in environmental education programs. This is especially important for environmental educators who work with marginalized or under-represented student populations. As practitioners and researchers, we should ask why students are joining environmental education programs and what they expect to gain from these programs. Using these questions may help to prepare us for the unique shape each program takes on, due to individual agency and goals, and may help us to ensure the practice is able to attend to both individual and collective goals.

CHAPTER 4

Examining the applicability and usefulness of the community of practice framework in two science-focused contexts

Abstract: This paper provides a critical examination of the applicability of the community of practice framework to various science-learning contexts and the usefulness of the framework in explaining the learning of students in these contexts. Using Wenger's community of practice dimensions, I compare the applicability and usefulness of the framework in examining learning as a social process in two science classrooms and three after-school environmental education programs. Findings suggest Wenger's dimensions were helpful in describing the development of all contexts as possible communities of practice. When Wenger's dimensions were identified both by participants and the researcher, learning could be examined as a social process around a communal enterprise. However, where the dimensions were not fully developed or identified, learning as a social process was more difficult to discern. This paper identifies how and where the framework was useful for examining contexts and learning in various contexts and begins to discuss other factors that contribute to the development of community of practice dimensions.

Science and environmental education researchers, concerned with the complex issues that everyday life brings to the learning process, are turning to sociocultural theories of learning (Lattuca, 2005), such as situated learning (Dillon, 2003; Hogan, 2002), situated cognition (Brickhouse, 2001; Reveles et al., 2004), activity theory and cultural-historical theory (Boyer & Roth, 2006). Unlike traditional cognitive theories concerned with individual gains of knowledge and concepts, these theories are concerned with the person in context as an entire system of learning (Kirshner &

Whitson, 1997; Lemke, 2001). Additionally, particular sociocultural theories of learning contend that learning is a social process that occurs as individuals participate in communities of practice with a specific physical, historical and cultural context (Lave & Wenger, 1991; Wenger, 1998).

In an attempt to further understand how students, often marginalized in the sciences, were participating and learning in various science-focused contexts, I turned to sociocultural theories and the community of practice framework. Like others, I embraced this framework because of the contemporary perspective it provides on learning, its focus on identity and participation, and the space it provides for examining central, peripheral and marginal positions within and between social units.

When I originally applied the community of practice framework, in a preliminary study, I encountered difficulties with the metaphor and its usefulness in explaining learning as a social process. Returning to literature using the community of practice framework, I found few empirical studies that examined the appropriateness of the framework in classroom contexts. Instead, researchers generally assumed the appropriateness of the framework and adopted it to explain particular aspects of learning. I also found a limited use of learning theories in environmental education research to help explain the type of learning taking place in environmental programs. Rather than discard the theory as inappropriate, I wanted to address reasons why the framework was inapplicable and reconsider the value of the framework for various learning contexts. Consequently, this study evolved from examining questions about participation and learning *through* the community of practice framework into a critical examination of the *usefulness* of the framework to compare the learning of students in science classrooms and in an after-school environmental education program.

Wenger's Community of Practice

Wenger's "Communities of Practice" (1998) provides both an organized and accessible framework to study learning as participation. In light of the breadth of theories that have recently brought attention to the socio-cultural dimension of learning in environmental education, I believe using a framework currently applied in a variety of contexts, from the workplace to science classrooms, could aid our understanding of the theory as well as the learning that takes place across multiple disciplines and contexts. In Aguilar (in progress), I present a thorough explanation of Wenger's three main dimensions, joint enterprise, mutual engagement and shared repertoire as well as a discussion on identity in communities of practice. In the interest of space, I will summarize briefly the dimensions and function of identity formation in communities of practice.

According to Wenger (1998), a community of practice is a place of learning where practice is developed and pursued, meaning and enterprise are negotiated among members, and membership roles are developed through various forms of engagement and participation. Each community of practice involves a unique system of 1) *mutual engagement*, 2) *joint enterprise* through negotiated meaning and 3) *shared repertoire* (Wenger, 1998). The *joint enterprise* refers to how members negotiate their response to the conditions and goals of the community of practice. *Mutual engagement* involves the sustained interaction of people within a community of practice and the roles and relationships that arise from this interaction. Finally, *shared repertoire* consists of signs, symbols, tools words that are used as resources and have meaning specific to the community (Wenger, 1998). All of the components work together to determine the practice, and the practice, in turn, works to refine the components.

These three dimensions help to identify a process of learning that involves participation, membership and identity formation. As Wenger notes, "…practice entails the negotiation of ways of being a person in that context (Wenger, 1998, p.149)." According to Wenger (1998), learning is largely associated with identity formation that can be seen through a number of processes: 1) defining who we are through negotiated experience in practices, 2) defining who we are based on what we know and do not know, 3) defining who we are through our experienced trajectories, 4) defining who we are by our reconciliation of belonging to various communities, and 5) defining who are by negotiating local membership to global, broader communities. Therefore, understanding the evolution of the three dimensions and the practice they refine helps us understand how an individual might form identities within a context. Identity then becomes a product of participation in a community of practice and simultaneously influences the practice.

Because this notion of identity is dependent on engagement with others, it allows for various levels of participation, including non-participation and multiple levels of membership including, core, peripheral and marginal. Membership is often determined by a competence of practice. Thus, we can examine social learning of a member by following their trajectory of membership based on competence in the practice. The practice is, therefore, a central component around which the rest of the dimensions evolve. Wenger emphasizes that the examination of practice through the lens of a community is fundamental to our understanding of meaning making, learning and connections to other contexts.

Objectives

In previous papers (Aguilar in progress), I examined Wenger's dimensions (joint enterprise, mutual engagement, shared repertoire) in science classrooms and an

after-school environmental education program to determine if they could be identified as communities of practice. These papers also looked at how useful the framework was for examining learning as a social process in each context. The purpose of this paper is to compare: 1) the applicability of Wenger's dimensions across the science classroom and after-school environmental education program contexts, and 2) how Wenger's framework was used to understand learning as participation, membership and identity formation across the science classroom and after-school environmental education program contexts. I further explore the framework's strengths and limitations by examining where and why the community of practice framework can be appropriately applied for an examination of learning as a social process.

Using a community of practice approach

Many researchers have reviewed the community of practice metaphor or have adopted it for their studies on learning and identity in the classroom (Barab & Duffy, 2000; Brickhouse, 2001; Enyedy & Goldberg, 2004; Hogan, 2002; Linehan & McCarthy, 2001; Roth & Bowen, 1995; Roth, McGinn, Woszczyna, & Boutonne, 1999). Some feel because of its popularity and broad application in a number of disciplines, practitioners have adopted the community of practice concept far too quickly and uncritically (Bradley, 2004; Lea, 2005). Others argue that the term "community" has been problematic for researchers studying sociocultural learning because the term has often been used interchangeably throughout studies (i.e., community of learners, community-based learning, and community of knowers), despite the various meanings associated with it (Riel & Polin, 2004).

For instance, Rogoff wrote extensively on "communities of learners" (Rogoff, 1994; Rogoff, Turkanis, & Bartlett, 2001) to prescribe a type of learning. In her model, she maintained that one learns through participation in a collaborative setting

that involves both adults and students. Students were taught to take responsibility for their own learning and lessons were shaped around student interest and decisions. Rogoff's model focused on a particular school structure that went beyond simple collaboration and group work. It was also meant to inform the design of learning spaces so that a particular type of learning could be achieved. Others have since adopted this theoretical framework into a model for classroom learning (Ash, 2008).

Brickhouse and Potter (2001) used the community of practice framework in their examination of young African-American women's identity formation with science in urban and suburban school contexts. The authors define identity as, "ways in which one participates in the world and the ways in which others interpret that participation" (p. 966). They found that personal identities of the young women affected how they were able to develop identities acceptable in the classroom. The authors suggested that educators look for ways that enable students to retain their home and personal identities while building identities acceptable in the classrooms. Still, some have argued that Wenger's framework provides little guidance to understand identity formation and the complexities involved in this process (Barton & Tusting, 2005; Bradley, 2004).

Some researchers have also suggested that adopting community of practice frameworks would equate to students learning the practices of the larger community associated with the domain of the learning content (i.e., science students will learn the practices of scientists). Hogan (2002), for instance, attempted to use the framework to discern how students involved in localized environmental practices were using this knowledge to gain entrance into the larger community of environmental practitioners. Her findings illustrated that an in-school environmental science course and an out of school independent study course at a community-based environmental organization provided different perspectives on environmental practitioners. Students' exposure to

the resources and practices of the community of environmental practitioners was constrained in both contexts and thus their development as members of this larger community was limited. Others have voiced similar concerns that the community practices in youth educational settings are not indicative of the practices into which practitioners aspire to bring students (Duffy & Barab, 2001; Roth et al., 1999).

Roth, McGinn, Woszczyna, and Boutonné (1999) examined classrooms as communities of practice to understand how artifacts, social configurations and physical arrangements mediated discourse practices around science. The authors found that not all implemented structures within the classroom led to equitable participation in discourse and learning outcomes. In fact, they contended that students engaged in practices "when they wanted to" (p.340), which left unanswered why and when students would want to engage in practices. Ultimately Roth et al. (1999) found that science classrooms could be understood as communities of practice, within which discourse related to science practices could be developed, given the right conditions and configurations.

Enyedy and Goldberg (2004) deemed the community of practice framework appropriate for their study of how the discourse and organization of two classrooms led to paths of inquiry for the students, despite their recognition of the framework's flaws. They also recognized the multiple positions of engagement students could take and how the appearance of a calm, functioning classroom still involved a negotiation of practice and membership between students and teacher. They argued that whether the core characteristics of a community of practice, "sustained participation around a shared object and negotiated rules, roles and positions that structure joint activity", led to the learning researchers consider appropriate was irrelevant to whether or not these characteristics were present and consequential. The authors contended that these characteristics were present in the classroom they observed and used the framework to

examine how these characteristics impacted student learning. They found that the classroom's normative purpose affected how students interpreted and worked with the classroom's domain.

A different approach was taken by Linehan and McCarthy (2001) who carefully used communities of practice as a metaphor to describe learning and not as a pedagogical approach, because of their initial awareness that the classroom in their study was not a "communitarian pedagogical environment" (p.136). Instead of using the framework first to account for classroom practice, they examined classroom practices in an attempt to contribute to the metaphor. The authors examined "responsibility and control relations", and forms of "knowledge evaluation and legitimation", to determine the value of the community of practice framework for understanding classroom interactions. They noted that the tension between "normative practice" and "lived participation" suggested that the participant's perspective was crucial to understanding participation. Further, they found that the community of practice metaphor was most useful when understood in terms of local practices, cautioning against the use of a general and normative "community" model.

All of these studies have provided useful insight regarding multiple uses of the community of practice framework in educational research. However, it is clear the value of the framework is still contested. Additionally, problems with inconsistencies in language used to describe essential components of the community framework continue to arise. Thus, I contend there is more to be learned about the value of the community of practice framework, especially through the emic perspective of participants and the etic perspective of the researcher (Pike, 1967). Using Wenger's defined parameters to examine both science and environmental learning contexts will provide a basis for other studies to compare with their own findings and contribute to what we know about this framework.

Programmatic Context

For the purpose of this study I examined students in science classrooms and an after-school environmental education program, the Environmental Club (EC), run at multiple schools along the coast of Texas. I examined the EC for this study because of the student population of the clubs, the involvement of science teachers from the school, the program's educational goals and my familiarity with the geographical location of the clubs along the south Texas coast. Specifically, I was interested in the club's affiliation with predominately Hispanic[1] schools and communities.

The main objective of the EC is to build environmental stewards along the Gulf of Mexico. One of the program's goals is to bridge coastal communities from the United States with coastal communities from Latin America around a common concern for the Gulf of Mexico through both English and Spanish. According to the director of the program, the EC meets its educational goals through community involvement and various field trips. Students are exposed to environmental concerns and problems of the Gulf of Mexico and their own community through "hands-on" activities, like beach clean-ups, visits to watershed sources and analysis of water from local watersheds. The program also engages students in civic activities like community festivals and parades. Each club's field trips and activities vary depending on scheduling, proximity to sites, and community support.

[1] While use of the term Hispanic is often problematic, because it characterizes ethnicity in oversimplified terms and does not account for race, it becomes even more complex in this south Texas region, where many students are multi-ethnic and multi-racial. Therefore, we use the Texas Education Agency (TEA) statistics and identity categories to describe the larger context of each school. I use surname to generally describe the makeup of each club, recognizing this might not accurately reflect how these students might identify themselves. The exception is our description of one club's ethnic makeup as entirely Hispanic, which results from an interview in which students discuss ethnicity.

The EC meets as an informal, after-school club in ten schools/locations, all of which are under the guidance of the program director. Additionally, each club site requires a faculty sponsor who facilitates science understanding (often the science teacher for many of the club participants) and a faculty sponsor who facilitates the use of Spanish. The EC meets, generally, once a week during the school year at each participating school, depending on the availability of the club's sponsors and the program director. Participation in the program takes place after school, usually in a classroom at the school's campus unless the students are on a field trip. Club sizes range from 10-35 students, with attendance more sporadic at some sites.

Research Design

In order to evaluate how the context was affecting students' participation, membership and identity with science, I looked both at science classrooms and the EC at the same school as well as individuals within these contexts as units of analysis. Therefore, purposive sampling methods were used throughout the data collection to provide information rich cases at multiple levels: school, class, and individual (Patton, 2002).

Participants

School sites

I chose to study sites in south Texas, based on the demographics and my familiarity with the region. A preliminary year-long study (August, 2005-May, 2006) helped to determine which schools, associated with the Environmental Club, should be used as case studies for this objective. Using homogenous sampling (Patton, 2002), I selected schools based on their characteristics relating to a) their involvement with the environmental club, b) stability of environmental club, c) science teacher presence in

environmental club, c) similarities on the states' school report card, d) presence of Hispanic population, and e) proximity to each other (Table 4.1). Thus schools that had been involved with the environmental club for 3 years or more and whose clubs were under the co-direction of a science teacher were examined. These schools also had the same academic ratings on their states' school report card, were similar in demographics and were within 60 miles from each other. Finally, as one school showed signs of organizational and attendance problems, I used opportunistic sampling to recruit another school, White Sands Middle School, into the study. While the homogenous sampling process might have limited the type of results found, I believe it allowed for a greater focus on students and contexts with similar demographics and backgrounds.

Due to changes in the site during the middle of the study, only two of the final schools chosen had ECs that had been established for at least three years. Still, I was able to select schools located in the central area of the club's reach along the Texas coast, located within close proximity to each other. While school and club characteristics are summarized below, it is important to note that the demographics of the students in the ECs differ from club to club and do not necessarily represent the demographics of their school at large (Table 4.1).

Class and Clubs

Stratified purposeful sampling allowed me to first choose classes from the three schools using homogenous sampling based on the teachers' participation in the EC and the overlap of students in the science classrooms and the EC (Patton, 2002). Following preliminary work, I also used confirming/disconfirming case sampling (Patton, 2002) to focus on particular science classrooms. The weakness in this approach was that it allowed for the possibility of potential bias in findings, as the sites were already preconceived to show differences.

I studied two eighth grade science classrooms at Surfside and two science classrooms at Tidal Wave. At White Sands, I began to study one science classroom in the middle of the school year. Considering issues of space limitations, for this paper I chose to discuss two of the five classes studied, based on intensity sampling. The sites described, therefore, depict rich examples of findings on the existence of communities of practice. The EC clubs at each of the three schools are also described below.

Table 4.1
School and EC Characteristics

School/ Environmental Club	*Surfside Middle School*	*Tidal Wave Middle School*	*White Sands Middle School*
School location	Coastal Plains, TX	Coastal Bluff, TX	Coastal View, TX
District category	Non-Metro Stable community	Non-Metro Stable community	Non-Metro Stable community
School size	>800 students	275 students	325
School academic performance	Academically acceptable	Academically acceptable	Academically acceptable
School demographics	56.5% Hispanic 36.7% Caucasian 2.6% African-American	47.1% Hispanic 44.9% Caucasian 5.8% African-American	39% Hispanic 54.5% Caucasian 3.4% African-American
Club size	15 regular attendees 25 general attendees	5 regular attendees 15 general attendees	6 regular attendees 10 general attendees
Club demographics	100% Hispanic	40% Hispanic	50% Hispanic
Club existence	3 years	4 years	First year
Club language (predominately)	Spanish	English	English

Data collection

As the principal investigator, I was both a non-participant observer during the study of science classrooms and a participant-observer in the study of the ECs; however, my role as a participant in the ECs was limited to work as an aide to the program director and faculty co-sponsors during meetings. I had little control or direction over club meetings, but attended club meetings at all three schools almost every week during the 2006-2007 school year, which allowed for continuous engagement and observation (Guba & Lincoln, 1989).

Due to the questions being asked about student participation in science contexts and the lack of control over school settings, I employed case study methodology for this study (Yin, 2003). The case study was also appropriate, as I was interested in understanding a phenomenon, learning as participation, over time and through various perspectives using multiple methods (Stake, 1995). During the 2006-2007 school year, case studies of the science classrooms and EC's were developed through qualitative methods.

Over the course of the school year, I visited students, teachers, principals and club participants in their everyday school and club settings. The data collected included: student focus group interviews; individual interviews with students, teachers and principals; both non-participant and participant observations; student drawings and autobiographies, and secondary data, including demographic and socio-economic data of the schools and their surrounding city, to provide descriptions of the difference in contexts (Table 4.2). Field notes were recorded after each site visit.

I audio-recorded non-participant observations in each science classroom for a full class period (approximately 50 minutes) five times at Surfside Middle School, and six times at Tidal Wave Middle School (Table 4.2). During these recorded observations, I also noted non-verbal actions, such as student and teacher movements

and interactions. Informal observations of the EC occurred almost weekly, in which I recorded topics of discussion, activities, and non-verbal actions. After each club meeting, I recorded my personal reflections and noted important actions or discussions that might not have been captured in the informal observation notes. I conducted approximately two formal observations of each club, in which I audio-recorded the club, and did not participate, each semester (Table 4.2). During these audio-recorded observations, I took notes on non-verbal actions, such as student and teacher movements and interactions.

I conducted focus group interviews to explore community characteristics and student perspectives on joint enterprise, mutual engagement, and share repertoire. As Madriz (2003) notes, "The singularity of focus groups is that they allow social scientists to observe the most important sociological process--collective human interaction (p.365)." Moreover, the use of focus group interviews allows the researcher to have access to more information in a limited amount of time and can sometimes take the attention off of the researcher, allowing for greater interaction between members of the group (Madriz, 2003). I conducted student focus group interviews in two science classes five times throughout the school year at Surfside Middle School, six times throughout the year at Tidal Wave, and three times in one science class at White Sands, for a total of 23 classroom focus group interviews (Table 4.2). I conducted focus group interviews with the after school club approximately three times at each club during the 2006-2007 school year. Interviews lasted approximately 35 minutes (Table 4.2). Between 4 and 6 students took part in each of the focus group interviews, with the majority of students participating consistently in each interview within each club.

Table 4.2
Data collection timeline

	Methods collected in minutes																	
Date collected	Classroom Non-participant observations			EC non-participant observations			Classroom focus group interviews			EC focus group interviews			Individual student interviews			Individual teacher/ principal interviews		
	S	TW	WS	S	TW	WS	S	TW	WS	S	TW	WS	S	TW	WS	S	TW	WS
October 2006	50	50																
November 2006	50	50					50	45										
December 2006	50	50				40	50	45										
January 2007					25	40												
February 2007	50	50		40	25		50	40	30	30	30		30 25	30		60	75	
March 2007	50	50						40				40						
April 2007		50		30		30	50	45	30	35	30	30	30 30	30		60	50	40
May 2007				30			50	40	30		30	30	30 20	30				40
Total hours of data collected	9.2 hrs			4.3 hrs			9.9 hrs			4.25 hrs			4.25 hrs			5.4 hrs		

(S= Surfside Middle School, TW= Tidal Wave, WS=White Sands)

I conducted and audio-taped individual interviews with the science teacher and the principal at each school once during the school year. I used individual student interviews and autobiographies to further explore identity and the trajectories of these individuals in the various communities to which they belong (Brickhouse and Potter, 2001). Three times during the spring semester, I conducted individual interviews with three students. All interviews were semi-formal and slightly unstructured, but a script was prepared for each interview to ensure that I addressed all dimensions and could keep the interview on track. Each individual interview with teachers and principals lasted approximately one hour, and each individual interview with students lasted approximately 30 minutes (Table 4.2).

Pilot study focus group interviews in the spring of 2006 involved impromptu use of classroom drawings to explain and depict roles and membership in the science classroom community of practice. Janesick (2000) emphasizes the value of improvisation in qualitative research:

> "…within the parameters of the interviews, information is disclosed that allows the researcher to improvise, to find out more about some critical event or moment in the lives of the participants. So the researcher begins to use the techniques of the improvisational choreographer/dancer" (p.382).

Thus, I used drawings in focus group interviews as a means to allow students multiple ways to articulate a difficult concept and to gain further insight into the perceived location of members (i.e., core, peripheral or marginal).

Observations, drawings, and interviews focused on Wenger's (1998) dimensions of communities of practice and associated questions (Table 4.3). I repeated similar interview questions throughout the school year. Because I felt it was important to understand the emic perspective (Pike, 1967) of participation in communities of practice, I asked explicit questions about participants' interpretations on the concept of

community, what communities they felt a part of, and what practices they undertook in these communities. As Wenger (1998) noted, participation in these communities gives rise to a person's understanding of whom they are and where they are located in a social world. On the other hand, he also argued that the notion of community does not need to be confirmed to exist, nor do members have to agree on their membership in the community. Still, convinced that the emic perspective of students would further help an outsider to understand the community of practice dimensions and help make a strong claim about the relationship between dimensions, I asked about students' interpretations of the notion of community, what communities they felt a part of, and what practices they undertook in these communities. These questions were intended to understand both the complexities of participation in the science-focused contexts and identity formation that might be occurring in these contexts. In addition, individual interview questions and autobiographies addressed students' participation, membership and identity with the EC and their science classroom. Questions also concerned their identities as students in general and their feelings towards the EC and their science classroom.

Analysis

I used multiple steps for analysis during the research process. First, I applied a thorough understanding of theory to determine the concepts to which the data would correspond. I prepared a detailed plan for each stage of data collection to ensure consistency among cases. Throughout this study I employed a variety of methods in an attempt to develop rich, descriptive cases, and to strengthen claims of validity. I employed data triangulation across methods within cases and across cases throughout the study (Patton, 2002). I recorded notes and researcher reflections after every data collection session and reviewed before subsequent data collection visits (Creswell,

2003). I used the notes and reflections to determine questions for the next visit. Adopting the practice of member-checks, I frequently checked my interview findings with respondents, reviewing the previous interview's responses at the beginning of each new interview, to ensure an accurate understanding of our discussions (Creswell, 2003).

Table 4.3
Community of practice dimensions and associated questions

COMMUNITY OF PRACTICE	Science Classroom	Environmental Club
Joint enterprise -evolution of practice -purpose of practice	What is the purpose/goal/activity and common practice of the community? Who determines this? How is it expressed?	What is the purpose/goal/activity and common practice of the community? Who determines this? How is it determined? How is it expressed?
Mutual engagement -membership -engagement -participation -roles	How do people participate in the classroom activities/discussion? In what types of roles are students engaged? In what types of roles are teachers engaged? What does full membership look like?	How do people participate in the club activities/discussion? In what types of roles are students engaged? In what types of roles are leaders engaged? What does full membership look like?
Shared Repertoire -tools -language	What artifacts/symbols/words are used to give meaning to this community?	What artifacts/symbols/words are used to give meaning to this community?

After interviews were transcribed, I collected transcripts, observations, reflections and drawings that corresponded with each other and developed cases for each context. I initially reviewed and highlighted interview transcripts, observations and reflection notes for the three main dimensions (joint enterprise, mutual engagement, and shared repertoire) making notes about other themes that might be present, along with possible questions that might arise in the data. After multiple readings, themes related to identity, community, and practice began to appear

regularly and I coded for these as well. I coded for data segments rather than terms or single words (Linehan and McCarthy, 2001), as the intention was not to reduce data to single identifiers, but rather to develop a rich understanding of the community of practice concepts. I also matched drawings with their respective interviews and examined what concepts students were asked to represent in their drawings. Once all data were coded, I analyzed where the dimensions, found through the multiple methods, converged in each case to determine which dimensions were most strongly supported throughout each case. I compared findings, first, within each case to look at the strength of dimensions from each method of data collection. I then employed analytic induction to compare findings across cases (Patton, 2002). The use of analytic induction allowed me to look further at the distinctions between cases already framed separately (i.e. science classrooms vs. ECs) while also allowing for a further examination of cases that did not fit the framework.

Findings

In order to address the applicability and usefulness of Wenger's community of practice framework, I focused first on how Wenger's dimensions were manifested in two science classrooms (Table 4.4) (Aguilar in progress) and all three EC's (Table 4.6) (Aguilar, in progress). I then examined whether the existence of these dimensions led to the applicability of the community of practice framework in the learning contexts (Table 4.5), and I looked at how learning, as a social process, was manifested in both science learning contexts (Table 4.5). Here, I will briefly discuss findings from the aforementioned objectives, first from the science classrooms and then from the EC's.

Science classroom findings

Community of practice dimensions

Although Wenger's dimensions were manifested in both science classrooms (Table 4.4), at Surfside the dimensions were in contention and not fully developed or understood by either the students or myself. For instance, students often discussed joint enterprise in terms of what it should be (i.e., "learning science", "doing homework") and what it was (i.e., "talking", "playing with friends", "making the teacher mad"). Mutual engagement occurred among various groups within the classroom, but not often as a whole class. Thus, membership in this class was related more to peer group belonging within the class than whole classroom engagement with a common practice. Shared repertoire, like daily writing activities and the class notebook, appeared to have separate meanings for the teacher and students in the Surfside classroom.

Students at Tidal Wave, in contrast, agreed that the classroom's joint enterprise involved "passing" and "learning about science" a well as "helping each other" and "getting along". Mutual engagement often involved the whole class or working groups of 2-4 students. Membership was based on students' familiarity with each other and the perception of a student's willingness to work as a team member and their ability to "get along". Shared repertoire involved daily reminders, classroom activities, and a classroom motto. Much of the shared repertoire involved group work or depicted a community ethos.

Applicability of framework

I found Wenger's dimensions useful for critically examining the organic structures of existing learning contexts to determine if they might be appropriately considered communities of practice. The ability to identify the dimensions in the Surfside classroom, however, did not ensure the development of each dimension. This

led to difficulties in applying the community of practice framework. For instance, at Surfside the joint enterprise was continually renegotiated, not fully understood, and often a source of conflict for the student interviewees. Also, when asked about the existence of a community of practice in their classroom, students' answers varied and were inconsistent throughout the school year.

Table 4.4
Science classroom community of practice dimensions

COMMUNITY OF PRACTICE	Surfside Classroom	Tidal Wave Classroom
Joint enterprise -evolution of practice -purpose of practice	Students disagree over class goals/activities/purpose. There is a dichotomy between what should be practiced and what is practiced. Non-participation appears to be the normative practice, as negotiated by the students.	Students agree on both normative activities, like passing and learning science, and a practice of "helping each other" and "getting along". This is negotiated by students and teacher through classroom structure and activities. This is reified by shared repertoire representing collaboration.
Mutual engagement -membership -engagement -participation -roles	Non-participation in classroom activities is more prevalent than participation. Student roles are indicative of student stereotypes. Engagement is dependent on peer group belonging. Membership is difficult to discern.	Students are often engaged in group work. Student roles based on who is able to help others in the class. Engagement is dependent on students' ability to work with each other and "get along". Membership is determined by students' abilities to get along and work together.
Shared repertoire -tools -language	Items include: "Big Idea", TAKS (standardized test) warm-up, and notebook. Meaning of artifacts for teacher differed from that for students.	Items include: "One for all, all for one"; "Ask 3 before me"; review game; lab roles; "cybg" raffle; daily agenda; TAKS warm-up
Learning as a social process	Difficult to discern due to the difficulty in defining a classroom enterprise with which students were engaged.	Learning is understood as a developed competence of the negotiated enterprise, "getting along" and "working together".

In contrast, an examination of the dimensions at Tidal Wave led to an understanding of the classroom as a community of practice. Students at Tidal Wave consistently agreed about the joint enterprise. In their classroom, students were engaged on a consistent basis and understood means for participation and membership. Shared repertoire of the classroom was used in ways the teacher intended it to be used. Students also were more consistent and in general agreement about the existence of a community of practice in their classroom than were the students at Surfside.

Learning as a social process

At Surfside, where whole classroom engagement was rare and reasons for membership were more abstruse, students also disagreed about the existence of a community of practice. My observations did not help to define either the dimensions or the classroom as a community of practice. Thus, I found it difficult to apply the framework in a way that would help to explain learning as participation, membership and identity formation (Table 4.5). While student trajectories were apparent, they did not seem to evolve around a competence or understanding of the classroom practice. Instead, I briefly saw the trajectories of student engagement and membership follow students' association with peer groups in the class.

On the other hand, students in the Tidal Wave classroom were in general agreement about the notion of their classroom as a "community of practice" and about the enterprise, which was to "work together" and "get along". This allowed for an examination of learning as a development of competence in the classroom enterprise. I was able to see the trajectory of this competence with one student, Danny[2], in particular.

[2] Pseudonyms have been used to protect the identity of student participants.

Danny found it difficult to label the classroom as a community at the beginning of the year because he felt that not everybody in the class was able to get along and everyone did not always agree with each other. However, during the school year, he began to agree with his peers about the classroom being a community with a collaborative purpose. Danny identified his personal changes in the classroom, or trajectory, as one of not knowing anyone at the beginning of the year to getting in trouble for talking to his peers at the end of the year. According to Danny and his peers this was evidence of his ability to "get along" and "work together" with other members of the class. He also saw an improvement in his science grades and developed a greater interest in science. Whether Danny's trajectory in science interest and achievement was due to his trajectory of membership and identity with the community is not within the scope of this paper to address. However, an understanding of competence in terms of the classroom practice helped to further understand learning as participation, membership and identity formation in this context (Table 4.5).

EC findings

Community of practice dimensions

While development and recognition of Wenger's dimensions differed between science classrooms, the dimensions were consistently developed and recognized at all three EC's (Table 4.6). At the Surfside EC both students and I were able to identify a joint enterprise based on social and academic needs. Here the students felt the purpose of their club was to "learn about science", "have fun" and "make friends". Mutual engagement involved peer group and whole club interactions. Roles included a translator and leader, but students felt that most roles were shared equally among

Table 4.5
Context characteristics and outcomes

Contexts	Characteristics	Community of Practice dimensions	Learning as a social process
Surfside classroom	-mandated participation -large class size -irregular interaction -collaboration during labs -no apparent community involvement	JE: not developed; disagreed upon by participants ME: not as a whole class, rather within peer groups SR: varied use and interpretation of tools between producer (teacher) and User (students)	Difficult to discern
Tidal Wave classroom	-mandated participation -medium class size -regular interaction -collaboration during typical class activities -no apparent community involvement	JE: developed and agreed upon by participants ME: whole class SR: shared understanding of tools between producer (teacher) and user (students)	Understood as competence with classroom enterprise of "working together" and "getting along"
Surfside EC	-free-choice participation -medium group size -regular interaction -collaboration in most activities -little to no community involvement	JE: developed and negotiated ME: whole group and peer groups SR: shared understanding of tools, produced by both the director and students	Understood as ability to connect the enterprise to other areas of life
Tidal Wave EC	-free-choice participation -small group size -opportunities for interaction -collaboration in most activities -regular community involvement	JE: developed and agreed upon ME: whole group and peer groups SR:	Understood as identity with the EC enterprise and ability to connect the enterprise to other areas of life
White Sands EC	-free-choice participation -small group size -regular interaction -collaboration in most activities -regular community involvement	JE: developed and agreed upon ME: whole group and peer groups SR:	Understood as identity with the EC enterprise and ability to connect the enterprise to other areas of life

members. Membership eventually evolved into one that was based on an ability to speak Spanish, as this was the dominant language used in club meetings. Shared repertoire consisted of the Spanish language spoken, impeding field trips, a snack during meetings, and the director's presence, as this indicated a different type of club meeting (Table 4.6).

At the Tidal Wave EC, both students and I were able to identify a joint enterprise based on the club's overarching goals of helping the environment and the community through hands-on activities (e.g., beach clean-ups). Mutual engagement involved peer group and whole club interactions. Membership appeared to be based on a commitment to the club goals and attendance to club meetings and activities. There did not appear to be any clear roles in the EC. Shared repertoire included impending field trips, t-shirts, end of club snack, and the term "tree-hugger", which students eventually used as a form of identity with the club (Table 4.6).

Finally, at the White Sands EC both students and I were able to identify a joint enterprise that involved environmental stewardship and future preparation. Students also felt that part of the enterprise was learning how to deal with diversity and to get along with others. Mutual engagement involved peer group and whole club interactions. Roles were based on different skills students could bring to the club (e.g., creativity) but were given equal status. Membership was determined by students' abilities to work together and their commitment to the club in terms of attendance to club meetings and activities (Table 4.6).

Applicability of framework

An examination of the dimensions in all three EC's led to an understanding of each club as a community of practice. Students in all three clubs consistently agreed about the joint enterprise, even as it was negotiated throughout the semester. For example, students at the Surfside EC did not discuss the importance of Spanish in their

club until the end of the semester, at which point all of the students agreed it was a significant aspect of club membership. Students in the three EC's were also engaged with each other on a consistent basis during club and understood means for participation and membership. While shared repertoire in the EC's was scarce, the few objects/symbols/signs that were used were understood by all participants. Finally, the students were fairly consistent and in general agreement about the existence of communities of practice in their EC's. At the Surfside and White Sands EC's, students felt strongly that they belonged to a community of practice. At the Tidal Wave EC, students were hesitant to identify as a community but felt that their club definitely functioned as a community of practice.

Learning as a social process

The applicability of the community of practice framework to all three EC's helped with an understanding of learning as a social process within the EC's. However, instead of viewing learning as a competence of practice, as was the case in the Tidal Wave classroom, learning was more apparent in trajectories and connections students made between the multiple contexts in which they participated. Susana, for instance, a student in the Surfside EC, found that science was part of her life beyond the classroom through participation in the EC. When prompted to write about her feelings concerning the EC in her journal, she wrote: "I think the club is fun to go. I have learned from the (EC) that science is not always boring. It can be fun too. We just have to be smart and make science fun." When prompted to describe her feelings about science in her journal, she wrote: "Well, I don't really like science, but I think science is gitting (sic) more fun to read and to study too. In a way science is part of my life because I like plants and animals." For Susana to indicate that science is part of her life she must understand a connection between her involvement in the EC and the science class and that belonging to both affects who she is outside of school.

Table 4.6
EC community of practice dimensions

COMMUNITY OF PRACTICE	Surfside EC	Tidal Wave EC	White Sands EC
Joint enterprise -evolution of practice -purpose of practice	Student goals are to learn about science, have fun and make friends. This is negotiated by students and teacher. The enterprise evolves over the year to one that presupposes a social network for students on the margins of the school community.	Students agree that enterprise involves helping the environment and the community through specific activities like beach clean-ups.	Enterprise includes both environmental stewardship and learning how to get along as a group and with others in the community. It is also negotiated to address students' needs of future preparation for college and careers.
Mutual engagement -membership -engagement -participation -roles	Students engage as peer groups, but are also able to work together. They befriend each other throughout the year, but there are also instances of broken friendships and relationships. Roles include a leader and translator, but students voice that everyone has the same role or there could be multiple roles. Membership evolves to one that corresponds with the shared repertoire of language. Students that can speak Spanish and attend the meetings are considered equal members.	Membership is determined by a commitment to the EC's enterprise of stewardship, and to those that attend regularly it is also determined by consistent attendance to meetings. There are no clear roles in the club. Participation involves attending meetings and events.	Students are engaged with each other during interviews and events. Student roles are based on different tasks but are equal. Engagement is dependent on student's ability to work with each other and "get along". Membership is determined by students' abilities to work together and their attendance to club meetings and field trips.
Shared repertoire -tools -language	Spanish language, snack, director's presence	Impending field trips, t-shirts, snack, "tree-hugger"	T-shirts, snacks
Learning as a social process	Understood as a connection from participation in the EC to other areas of life, "…science is not always boring, it can be fun…"; "…science is part of my life because I like plants and animals."	Understood as identity and involvement with environmental stewardship enterprise; including identification as a "tree-hugger"	Understood as identity and involvement with environmental stewardship enterprise and connections made from participation in the EC to abilities to "write articles" and be "extremely intelligent"

The ability to make connections from participation in multiple contexts was also apparent in Theresa's experience with the White Sands EC. In one interview Theresa discussed how EC field trips affected her: "My favorite was the nuclear power plant. Well, because I write like a whole lot of like articles and stuff about how we can change the world and I send them to like magazines and stuff." In another interview, Theresa also described how she was able to answer questions in science class, to the surprise of her classmates, because of her involvement in the EC: "One day in science [the teacher] asked a question, well she asked the class a question, and it got quiet and I answered it, and out of nowhere you hear like people who are saying, 'Theresa answered that? But she's an idiot.' No, she's extremely intelligent."

For both Susana and Theresa, participation in the EC created opportunities for them to transfer their identities with one community to that of another. In essence, they were able to feel more competent in science as they found ways that science contributed to their lives. This is especially poignant for Theresa who was able to dispute others' perceptions of her as an "idiot". Instead, she created her own identity as one that was "extremely intelligent".

In summary, Wenger's dimensions were useful for identifying whether the community of practice framework was applicable to various science learning contexts. The framework appeared to be applicable when the dimensions evolved and were largely agreed upon by both participants and the researcher, and the majority of participants felt they belonged to a community of practice. When the framework was applicable, it was also useful for examining learning as a social process. However, factors influencing the framework's applicability and an understanding of learning as a social process appeared to differ between science classrooms and ECs.

Discussion

The purpose of this study was to examine how Wenger's dimensions, joint enterprise, mutual engagement and shared repertoire, could lead to an understanding of a community of practice and learning as a social process in two science classrooms and three after-school environmental education programs. To do this, I first examined how the dimensions were manifested in each context and whether the manifestations led to an understanding of the context as a community of practice. I then examined how learning could be viewed as participation, membership and identity formation in each context. Through the analysis, I recognized that a variety of factors appeared to influence the development of dimensions and existence of communities of practice in the various sites. Influential factors did, however, differ between the science classroom and EC contexts. A closer look at these factors aids in understanding the strengths and limitations for using the community of practice framework in science-focused contexts for educational research. Below, I discuss the factors that appeared influential in science classrooms first and then those that appeared influential in the ECs.

Science classroom factors

In science classrooms, the development of dimensions and thus, the applicability of the framework, appeared to be associated with a number of factors: physical structure of the classroom, classroom and school culture, and access to peer groups.

Physical structures

School and classroom size differed at the two science class sites. The Surfside classroom consisted of 22 students who sat at long tables of 5 stretching to the back of the classroom, and the Tidal Wave classroom consisted of 14 students who sat in

groups of 2-4 at each cluster of tables. The Tidal Wave classroom was also much smaller, allowing for closer and sometimes inevitable interactions. The physical structure of the science classrooms might have affected the building of community by either limiting the opportunities for interaction without it becoming disrupting, or by allowing for easier whole class engagement.

Roth (1995) studied the organic development of a community of practice in a science classroom to understand the transformation of both practice and shared resources. He suggested that conditions for the transformation of practice and resources could be met when students were able to interact with others by moving around and gathering in areas of high student density, as well as when they were able to build on knowledge that that they felt was important and was made very visible. The structure of the Tidal Wave classroom allowed for multiple opportunities to work in groups or pairs and the practice of the classroom was one which called for this type of collaborative work. Thus, in order to meet the demands of the classroom, students negotiated a joint enterprise that required support for each other and an ability to work together. On the other hand, the classroom structure at Surfside did not allow for much high density or interaction. Talking and moving around in the Surfside classroom were often reasons for reprimand unless students were participating in labs. Olitsky (2007) argued that large classrooms might impede a teacher's ability to develop a "mutual focus" and therefore, solidarity in the classroom.

Classroom and school culture

Both classroom and school culture also seemed to play a role in the development of dimensions, which influenced the applicability of the framework. The culture in the Surfside classroom was largely individualistic, whereas the culture in the Tidal Wave classroom was fairly cooperative. At Surfside, a lack of consistent engagement may have impeded the students' ability to develop a joint

enterprise. On the other hand, consistent, cooperative group work at Tidal Wave may have led to a negotiation a joint enterprise that met their needs for success in the classroom. For instance, the students at Tidal Wave negotiated an enterprise that involved "helping each other" and "getting along", which allowed for multiple students to participate and contributed to each other's academic success.

While teacher practices and their influence on classroom organization inevitably influenced the findings (Enyedy & Goldberg, 2004), the larger school culture also appeared to influence classroom organization and practices. For instance the school culture at Surfside was one that focused on TAKS (Texas Assessment of Knowledge and Skills) as a means to get students to graduate. In both principal and teacher interviews at this school, the issue of state testing arose, emphasizing not only the tests' influence in the classroom, but in the entire school. While the testing issue was also recognized by the teacher and principle at Tidal Wave, the way in which this school approached it was completely different. Students at Tidal Wave were involved in school-wide contests focused on TAKS preparation. This whole-school involvement on issues critical to student success might have helped to create a better understanding of the enterprise among students as well as build solidarity among them (Olitsky, 2007).

Additionally, both administration and staff at Surfside discussed their belief that many of their students were not going to go to college and that the school's goals for these students needed to be realistic. They stated their purpose was to help these students pass high school. While this approach has often been viewed as realistic and necessary, it could serve as a hindrance to achievement for some Mexican-descent youth (Gibson et al., 2004; Hurd, 2003).

The focus on state testing and passing at Surfside could explain why students had difficulty identifying and engaging in a classroom practice. Because a large part of the school's purpose was to have students pass state tests and courses so that they would eventually have the means to pass high school, students might have perceived this practice as irrelevant or not worth the work. Or students might have perceived testing to be the focus of their education, and therefore, decided not participate in the enterprise (Lemke, 2001). Instead students might have negotiated a practice that they perceived as worthwhile and that met their immediate needs more effectively, such as building peer groups.

Access to peer groups

A sense of belonging played a role in whether the students considered their classroom a community of practice. As Gibson, Gandára and Koyama (2004) note, when students feel accepted by their peers and as though they belong to the school, they are more engaged with academics and school activities and are therefore more apt to enjoy school. This is especially important for the formation of a community of practice. In order for students to engage and participate, there must be a basis for a sense of belonging (Olitsky, 2007).

At Surfside, students appeared to be working more in peer groups than as an entire classroom community. One student, Stephen, tended to recognize the classroom as a community when he could associate with a group of friends in the classroom. In my interview with the teacher at Surfside, it became clear that she wanted to protect the students by allowing them to work within their own peer groups rather than forcing them to work with others who might not accept them. This could serve to isolate Mexican-descent students, as research has indicated that this ethnic group is more likely than other groups to choose their closest friends from their own ethnic

background (Gibson, Gándara, & Koyoma, 2004). Additionally, Lewis-Charp, Yu and Friedlaender (2004) found in their study of students' multiple worlds, that,

> "...a school climate that facilitates peer relations within and across groups, addressing both structural borders and peer-enforced differences, can enhance students' social-capital network and, ultimately, their engagement in school" (p.110).

Therefore a structure that does not foster students' sense of belonging to their school, or that impedes students' abilities to cross between different peer groups, might help explain the weakness of the community of practice framework in the Surfside classroom.

On the other hand, the class at Tidal Wave, with similar demographics but fewer students, displayed less of a propensity to break off into peer groups. Gibson et al. (2004) argue that the key to creating communities where students feel they belong is to focus on building relationships, including relationships between students and teachers and students and students, and to create practices to which students can contribute. These relationships offer forms of caring and resource sharing. By the end of the school year, these types of relationships became the classroom norm at Tidal Wave. While these relationships did not appear to be a goal for the teacher, her small group practices, the structure of the classroom, and the culture of the school seemed to contribute to their development and to the space for student contributions.

Summary of science classroom factors

The physical structure of classrooms, the classroom and school culture, and access to peer groups within a classroom all seemed to affect how community of practice dimensions developed; yet, the same cannot be said of dimensions in the EC contexts. Instead, the structure of the classrooms in which the EC met was irrelevant, as the informal atmosphere of the club allowed for students to sit wherever and by whomever they wanted. Consequently, students tended to sit close together and often

walked around each other during club meetings. The larger school culture was also less influential in the development of EC dimensions. Engagement was common during EC meetings and events, and state testing was not an issue we had to contend with in the EC. Finally peer groups were present in the EC, but due to the inherent need for engagement in club activities, students had to work across peer groups.

EC factors

An analysis of the ECs illustrated that factors other than those found in classrooms, such as reasons and opportunities for participation, were more influential in the development of community of practice dimensions in each club.

Joint motivation and free choice

Like Kolikant, McKenna, and Yalvac (2006), I found that a significant factor in the ability of EC's to develop as communities of practice, was the "joint motivation" for students to be involved in and contribute to the club. Students were motivated enough to attend club meetings once a week after school, generally because the club attended to the students' needs and interests. For example, students at Surfside attended club to meet their social needs and engage with groups of friends that had similar backgrounds (i.e., Spanish speaking). Students at White Sands attended club because of their desire to enhance their academic portfolio and because of their interests in the environment.

The ability of students to meet their needs and interests in these contexts could be attributable to the free-choice of students to engage in this type of after-school program (Falk & Dierking, 2000). While students did not necessarily choose the topics discussed, they did know the types of issues that would be discussed. At the outset, students had a general understanding, by the title of the club, about the enterprise in which they would be engaged. Using free-choice, they choose to be a part of the EC.

This also enabled students to engage with each other under assumptions about each member's purpose for being in the club. It appears the joint motivation behind student participation allowed for a more solid understanding and an easier negotiation of the enterprise than if students were mandated to participate in a community with a purpose they did not fully understand or appreciate.

Multiple and equitable opportunities for participation

A number of studies have shown that science learning programs outside of the science classroom can provide multiple opportunities for student participation (Boyer & Roth, 2006; Fusco, 2001; Roth & Lee, 2003). The opportunities for participation in the EC allowed for a more equitable structure of membership relative to the school classroom. There did not appear to be a hierarchy of membership among students in any of the EC's. Rather roles were based on students' strengths, such as the creative students, the students who clean, and the students who can translate. This allowed for a participation that was welcoming and inviting of all student members. Therefore, students were less likely to be marginalized according to their performance or abilities, as they would be in a classroom, giving more students opportunities to engage.

As a consequence, learning in the EC's was not viewed as a trajectory of competence with the enterprise but rather as recognition of individual possibilities provided by participation in the enterprise (Barab & Roth, 2006; Roth & Lee, 2002). Learning in the EC's went beyond the typical associations of competence in knowledge or skill sets. Instead, students' learning appeared to be recognition of their own abilities and how these abilities translate between multiple contexts (Barab & Roth, 2006).

In classrooms, joint motivation, free-choice and equitable opportunities for participation are rarely present. Classroom participation is mandated, rendering free-choice an unlikely motivating factor in the learning that takes place there. The

opportunities for classroom participation are often limited to those that evolve around competencies in skills and knowledge and are hierarchically organized (Rogoff et al., 2003). However, when the classroom practice offers multiple opportunities for equitable participation, as the Tidal Wave classroom did, membership is inclusive of a majority of the students, leaving little room for marginalization.

Through the analysis of this study, I found differences in science-focused contexts that could account for the difference in findings. While the factors discussed did not cover every difference among the science-focused contexts, the factors I presented were supported by literature on learning. Thus, understanding the intricacies of learning contexts could lead to a better understanding of when and where the community of practice is applicable and how it might be used to examine learning as a social process.

Implications and Future Research

This study answers questions about the applicability of a community of practice framework and how it might be used to understand a social process of learning in science-focused contexts, but it does not answer questions concerning how communities of practice can be built. Rather, I offer caution in attempting to use the framework prescriptively, as a truly negotiated enterprise will be largely dependent on the individuals within the context. However, there do appear to be some obvious factors (e.g., physical classroom structure, classroom and school culture, peer group belonging, joint motivation/free choice, multiple participation opportunities) that either encourage or impede the development of Wenger's dimensions and thus the community of practice. Future research would contribute to our understanding of the

community of practice framework, by examining these factors as well as others that might contribute to a more stable and successful community of practice, regardless of its participants.

There also appears to be a relationship between the emic understanding and the strength of Wenger's dimensions. For instance, when there was consistent engagement in the contexts, the students had a better understanding of the enterprise. Similarly, when the enterprise was clear to participants, it was easier for participants to identify requirements for membership. When participants understood reasons for membership, reasons for marginalization were more apparent. While Wenger depicts these relationships and their interdependence on each other, it would be helpful to tease out the strength of the relationships among the various factors.

The methodological implications from this study suggest the importance of the emic perspective when analyzing the applicability of the community of practice concept. Because identity is a crucial agent in a social process of learning, identification as a member of a community of practice appears to be a significant component as well. Applying the community of practice framework to a learning context without understanding participants' views on their participation, might prove less fruitful for determining if the enterprise is joint, if engagement is mutual and how repertoire is shared.

Finally, I recognize that our current education system is interested in learning outcomes that can be assessed on exams and tests. This paper does not address those types of outcomes. Instead it addresses how we might be able to view learning differently. Understandably, this may not be helpful for many practitioners who are asked to provide certain types of results. However, research can continue to address how functioning communities of practice might develop enterprises associated with the types of learning outcomes some find useful. This again leads to a prescriptive use

of the theory, which I have already cautioned about. Yet, if we, as researchers and practitioners, are aware of what students bring to these contexts and the needs they are trying to meet, we might be able to better predict how communities of practice could develop and contribute to a broader understanding of science learning.

CHAPTER 5

CONCLUSIONS

In a study originally concerned with the marginalization of Hispanic students in science classrooms, I engaged with theories of learning and their applicability in various science contexts. The use of a community of practice framework for this study proved problematic but also extremely interesting. Over two years, I was able to examine students in their science classrooms and in an after-school environmental education program. It was my original intention to study how these students were learning and why they might be marginalized as learners. Shortly after I embarked on this study, however, I realized I would have to scrutinize whether the community of practice framework was applicable in each context before I could understand learning from a sociocultural perspective.

Findings from my study in two science classrooms indicated that Wenger's community of practice dimensions were helpful for understanding whether the framework was applicable in each context. However, the recognition of dimensions did not lead to an appropriate application of the framework in both science classrooms. Instead, participants in the Surfside science classroom disagreed about the joint enterprise, showed little mutual engagement, and the shared repertoire was not necessarily shared between the teacher and the students. The conflicts and inconsistencies in the Surfside classroom prevented me from being able to apply the community of practice framework for an understanding of learning as a social process. Also, in the Surfside classroom, the students differed in their opinion of whether the classroom could be considered a community of practice. The other classroom studied, Tidal Wave, proved to be an entirely different case. At Tidal Wave, students illustrated a continual negotiation of an enterprise that most classroom members agreed upon. The Tidal Wave students were also engaged on a consistent basis, which

led to an understanding of participation and membership. Due to my ability to discern modes of participation and requirements for membership in the Tidal Wave classroom, I was also able to discern learning as a social process that involved participation, membership and identity formation. Students at Tidal Wave also agreed, by the middle of the year, that they belonged to community of practice.

Findings from the three after-school environmental education programs (ECs) studied, indicated that Wenger's community of practice dimensions were also helpful for determining the applicability of the framework in these science-focused contexts. The framework appeared to be appropriate for each environmental education program in the study, meaning each EC could be called a community of practice in which learning could be understood as a social process. The enterprise was understood and agreed upon by participants in all ECs. However, despite the EC's intended purpose, students negotiated the enterprise differently from club to club to fit a purpose conducive to meeting their needs for participation. Engagement in all three clubs largely involved whole group engagement, and shared repertoire, while scarce, held similar meanings for all participants. Student participants were able to define membership and there appeared to be multiple opportunities for participation that allowed for students to be involved in multiple ways. This provided for an understanding of learning as a process of participation, membership and identity formation as students made connections from their involvement in the EC to their involvement in other contexts. Students in all three ECs also believed that their ECs were examples of communities of practice, especially by the end of the year.

In summary, this study contributed to our understanding of a sociocultural theory of learning in science-focused contexts, by illustrating both limitations as well as strengths of the framework. Wenger's community of practice dimensions were useful for examining whether each context could be studied appropriately as a

community of practice. However, this strength of the framework did not always lead to a successful understanding of learning as a social process. Where the findings first pointed to a community of practice, learning could be understood as a competence with that practice or an ability to connect that practice to other areas of one's life. On the other hand, where the findings did not point to a community of practice, learning as a social process was difficult to discern. The important lesson learned was to carefully consider the joint enterprise, mutual engagement and shared repertoire of each learning context before declaring the context a community of practice.

Implications

Research

The methodological implications from this study suggest the importance of the emic perspective in studies using the community of practice framework. This study illustrates how a closer examination of the emic perspective of members can help to determine if the community of practice framework can be appropriately applied to multiple contexts. Because identity is a crucial agent in a social process of learning, identification as a member of a community of practice appears to be a significant component as well. Applying the community of practice framework to a learning context without examining the participants' views on their own participation, might prove less meaningful when determining if the enterprise is joint, if engagement is mutual and how repertoire is shared.

Because sociocultural theories of learning are still relatively young, it is important to carefully consider the intricacies and implications behind the multiple theories, frameworks, and models associated with learning. While some researchers use the term "community" to depict a model of learning, it is important to consider

that not all "community" frameworks can be used in this manner. Similar to Schwen & Hara (2002), I caution others about a prescriptive use of the community of practice framework, specifically about the possibility that the community of practice framework might not be applicable to all contexts. When using the community of practice framework, I would carefully consider the context in terms of Wenger's dimensions before assuming the existence of a community of practice for study. This also has implications for practitioners interested in developing communities around a particular practice.

Due to the applicability of the community of practice framework to all after-school environmental education programs in my study, future research in this area could provide further insight into whether the framework might also be appropriate for other types of environmental education programs. If, as researchers, we continue to find that the framework could be appropriately applied to multiple environmental education programs, we might also consider what it is about these programs that lead to the favorable application of the framework. As evidence continues to show that environmental programs offer multiple opportunities for participation of traditionally marginalized students (Barab & Duffy, 2002; Boyer & Roth, 2006; Fusco, 2001; Bouillion & Gomez, 2001; Roth & Lee, 2003), further research with environmental programs and sociocultural theories might benefit those interested in students often marginalized in the sciences.

Theory

This study also contributes to our understanding of a sociocultural theory of learning in two science-focused contexts. In regards to science education research, a number of factors within schools and classrooms appear to contribute to the way in which Wenger's dimensions, and thus, communities of practice, develop in each

context. I touch on some of these factors such as physical classroom structures, classroom and school cultures, and peer groups and belonging in chapter four. However further research in this area might provide insight into the reasons certain classrooms and contexts might be more conducive to the development of community of practice dimensions. For example, Olitsky (2007) has begun to depict how "interaction rituals" help build communities in classrooms, despite the content matter.

Findings from the study of the community of practice framework in ECs also show that there are ways for environmental education research to both contribute and benefit from further use of the framework. Because all three EC contexts in this study could be described as communities of practice in which learning could be understood as the development of connections between membership in communities, future research could examine whether this might hold true of multiple environmental education settings. For instance, an examination of how certain characteristics of environmental education programs might contribute to the ways in which joint enterprise, mutual engagement and shared repertoire develop could further our understanding of both the community of practice framework and our understanding of learning in environmental education.

A new understanding of learning, apart from the traditional notion of learning as an accumulation of knowledge, has implications for those interested in the connections between environmental programs and science learning. This sociocultural view of learning allows us to look at student success and student participation in ways beyond evaluation of knowledge or skills, leading to new considerations for learning assessment and more possibilities in terms of the value of environmental education programs. Also, existing research on both free-choice infrastructures (Falk, 2002) and ecological psychology perspectives (Barab & Roth, 2006; Chawla, 2008) could

provide greater insight into the type of social learning that is facilitated in environmental education programs.

Finally, this study illustrates that a possible relationship between the strengths of dimensions exists. For instance, the study shows when there is consistent engagement in the contexts, there is a better understanding of the enterprise by participants. Also, when the enterprise is clear to participants, it is easier for participants to identify requirements for membership. When membership is understood, reasons for marginalization are also more apparent. While Wenger depicts these relationships and their interdependence on each other, it would be helpful to tease out the direction of these relationships. A further examination of the relationship of these dimensions in empirical studies could also help those interested in the framework to determine which dimensions to focus on for a better understanding of how communities of practice develop.

Practice

The implications for practitioners concern an understanding of how practice and individual agency affect both the process and outcomes of EE programs. This study shows how an understanding of dimensions is necessary to understand learning as a social process via a unique enterprise. A significant aspect of how a context develops as a community of practice is in the negotiation of its enterprise by its members. The enterprise is often dependent on both individual and collective agency in the learning contexts. Students appear to negotiate the enterprise so that it meets both their individual and the group's needs, whether the need is for social interaction or academic enhancement. Thus, a preconceived notion of how a community of practice could function around a predetermined enterprise might prove inaccurate, or worse, it might force students to respond adversely to the educator's intentions.

Still, understanding the importance of agency could point to possibilities for environmental educators, especially as they often have more flexibility with program objectives and goals than do science teachers. The issue of agency should serve as a reminder to take care in examining the needs of the populations we serve. Careful planning and focus should go into the practice, at both a macro and micro level. Practitioners and researchers should ask why students are participating in particular science-learning contexts, whether mandated or not. We should also examine how participation in these contexts could meet students' individual and collective needs. Finally, as program developers, we should consider what students expect to gain from these programs. Using these questions could help to prepare us for the unique shape each program takes on, due to individual agency and collective goals, and could help us to ensure the practice is able to attend to both.

To address issues of participation brought forth by Reid and Nikel (2008), a continued examination of sociocultural theories in environmental education research is needed. In this study it was the practice and enterprise that gave form to both the community and participation within the community. Thus, environmental education researchers and practitioners should be as concerned with the unique practice that evolves from each program as much as we are concerned with the modes of participation in these programs.

Finally, I recognize that our current education system is interested in learning outcomes that can be assessed on exams and tests. This paper does not address those types of outcomes. Instead, this paper examines how learning might be viewed differently than a solely cognitive process. While, this may not be helpful for many practitioners that are asked to provide results, research can continue to address how functioning communities of practice might develop enterprises associated with the types of learning outcomes some find useful. This again leads to a prescriptive use of

the theory, which I have already cautioned about. Yet, if we, as researchers and practitioners, are aware of what students bring to these contexts and the needs they are trying to meet, we might be able to better predict how communities of practice could develop.

APPENDIX A

CLASSROOM OBSERVATION SAMPLE

Tidal Wave Observation
2-21-07
no warm up on board
chart in middle of board
Agenda to right side of board and day and date
Agenda:

1. SC Test #3, Ind. Raffle
2. T.O.C.
3. "Ask 3b4 me", correct Tests and Quizzes

circled *6 wks Test Thur*, ch. 6, 7, 8, & 15

env: foggy! And warm…in 70s' but very cloudy

-starts similarly, tells students to stay with her and cooperate even though there is no warm-up.
-she is going to take attendance.
-11 students in class and Monica is gone…no she just came in late…and had a pass from the nurse
-T is talking about science challenge and if student shave 7 or better then they can get ticket for raffle…this is why some students didn't get tickets in last class
-t reviews what ask3b4 me is and they seem to know…Kevin is in front still Monica is in front with Danny…the 2 boys that talked a lot before are now in front table. Sarah is in back with other blonde boy.
-they review toc and she said they should be on 23 which is the ch. 15 test…then 24 is on board, ws: eco-anagrams…it was a homework assignment which some did and some did not…if you haven't' turned it in late work deadline is Friday….
-t tells them she has graded everything she has…she is passing things out.
-she is going to do science challenge first b/c one she passes out papers it will be too confusing to have papers on the table…
-Laura talks about how she feels smart b/c she can said deoxyribonucleic acid…Monica tells her she is smart and they strt talking about something.
-there is another Danny in class now and he is sitting in 2nd table on right.
-the boy next to Laura got an 8 and somebody mad e comment that he copied.
-Kevin is sitting by himself and there is a girl that is sitting by herself behind him
-t talks to boys in front about making fun of Kevin and not giving him hard time.
-there is some talking going on that I can't hear b/c Monica is talking to me about not having her spiral and when we are going to do the interview
-we might have to reschedule the interview
-I think there are 2 new kids in this class…
-students immediately start looking at their grades and each others'

-t tells them they should have gotten 2 papers back otherwise they have a zero…and tells them to get their grades listed and to put them in the folder except for the test…asks for attention so she can explain.
-t gives instructions…telling them they are going to correct tests and quizzes…one boy "the new Danny keeps talking" and I think t is getting annoyed. So students are going to have things all together and t is going to go around and make sure they all have them…again she tells them to help their neighbor…
-Jaime doesn't have his binder and she said see how this is a big disadvantage…she asks him if he would take this seriously…if he wants to study with blank tests and worksheets…and he says yes. Not sure what would have happened if he said now.
-most students seem to have all of their papers…Monica and Danny help the new Danny and the other boy behind them.
-t helps Matthew get his stuff, Matthew sits next to Laura in 2nd row middle column.
-most students seem to have all 6, t just goes around and asks students if they have all 6.
-Monica started getting up and t says not yet b/c she wants to give info. out.
-Patrick is the new student and he has to get blank papers too b/c he is new?
-Jaime gives students purple pens
-t is telling Patrick how to do this, just go around and ask students what answers are.
-the new Danny is still talking.
-t wants to give the students some info., telling them a lot of questions come from 6 items…not just memorize the question but to study content of question…ask someone why did you chose that one, I don't understand that…telling them she might change wording or order. What would answer be if there was a different word put in there. Which is an example of abiotic…which is an example of biotic…think it through.
-the other thing is the concept map…you need to study that right now.
-students are quiet and possibly paying attention or zoning out…some of them are looking at T and some of them are doodling or looking into space.
-t says finally the short answer ?? would you like to know which ones you will have to answer.
-t tells them to find the short answer page on the ch.6 test and they need to focus on the first one
-t says on ch.7 and 8 test they need to know the first short answer ?? about bacteria growing on a dead mouse…they might want to check out the answer on somebody's when they are looking at answers.
-then most of them did good on the 2nd question so which one do you think you will be asked and blond in back row next to Sarah says first one and T laughs and says yes
-now students are told they can go and circulate and immediately Monica goes to Laura…Matthew stays where he is, Sarah stays at the back table with boy and the rest of students go to Kevin…they know he has the answers. The 2 new boys stay where they are. Interesting that Monica goes to Laura. Now Matthew has gone over to Kevin's desk so Matthew, Jaime, Mary, Sammy and Kelly are surrounding Kevin trying to get answers from him.
-Monica now goes back to Sarah and boy next to her.
-they ask T about a question from one of 6 weeks test

-new Danny tells T about his lunch. He is not really working on correcting his work and t tells him to make sure he also corrects his paper and doesn't just help the new boy.
-so there seem to be 3 groups right now…those around Kevin, Monica/Sarah in back and the 2 new boys.
-Monica now goes to front group to ask them about a question
-T has been working in front while students are working…I think she is grading??
-Danny left front group and is working with Monica now at the table next to Kevin's…this is interesting b/c they are also desk partners. Danny went back to front group. Monica is going back to her group after borrowing paper from Kevin's group.
-Laura is using deductive reasoning to figure out answer…we know its not b or c so it must be…
-maybe the students are having trouble with a question and so
-finally students goes up to t and asks and when he comes back Laura says what is it and blonde boy says okay and reads question and reasons through it. Kevin has to come to back table to ask about a question and Sammy also goes to back table. Monica goes to front table.
-Kevin is sitting to side and tells them he needs his paper. He looks a little frustrated. T has to tell class that Kevin is not the only person with the right answers. Monica goes to new boys group and asks them about a couple of answers. She mingles with all groups.
-its interesting to hear Laura's group try to figure out answers.
- Danny goes to new boys table and is helping them get answers.
-Sarah is having a question about if Monica marked on her wolf and the boy in the back can't find his 15 test…she is going through her tests…and finds Jonathon's .
-Sarah is upset about who marked on her test.
-students are talking at a fairly low level and sometimes talking across classroom to ask about answers for instance, Monica calls out to Kevin and ask him a question.
-an aide comes in at 11:03
-students in back are still working on answers …Matthew has come back to his seat. Danny and Jaime and Mary are at Kevin's desk. Kevin is next to Sammy…not sure if he is helping Sammy b/c Sammy is looking through his binder. And Kevin is sitting next to him looking through things with him. I think students are finishing up.
-t tells them they can start quizzing each other. She goes to back table and tells them in her opinion Jonathon should face them and quiz the girls.
-new Danny has been sitting at his table the whole time…t asks if he got his answers corrected and he says yes, but she is basically telling him he needs to do something.
-Kevin is quizzing Sammy. Laura and Matthew are just talking.
-t now tells Danny to quiz Mary and Jaime. I'm wondering how t decides who to quiz…are these the students don't need as much review or is it b/c they are boys.
-the new students are just sitting there and talking.
-all students are kind of talking quietly in small groups.
-now Sammy is asking Kevin questions…I wonder how these 2 students got together..also Kevin just got a question wrong and I'm wondering if he is doing this on purpose.

-kids are kind of acting up a little while doing quiz but at leas they are still doing quiz…maybe this makes it more exciting for them.
t-tells them they need to start getting ready b/c she doesn't want them to be late for lunch…they get their things together and start lining up by door.

reflection
-dynamics in this class are interesting…Kevin sits by himself and it seem he is a little like an outsider but also plays a major role in the class. Students surround him when doing the ask3b4me.
-some students are just concerned with getting answers but others are interested in understanding…it seems like Laura's table is concerned with learning about answers.
-the new boys now seem to be peripheral or marginal members of class.
-t also made a comment about how the students didn't turn in homework…maybe ask about this??
-T tells me she got this game idea from robin…I think the original point is to get them to not bother the teacher a hundred times…but it definitely promotes working together…not as sure if it promotes community b/c students seemed to gather into 2 different groups…no 3 different groups…one being the new boys that were by themselves most of the time except when Monica asked them a couple of questions; then there was Monica, Laura, Jonathon, and Candice's group and then the rest of the students surrounding Kevin.
-Kevin finally got out of the middle and I think he was a little relieved…I wonder how he feels about his position in this community.
-Monica seems to move around a lot and that seems good.
-really the notion of community here is a little mystifying, it seems the students know each other well but congregate into different groups for different reasons
-Kevin's group was definitely male dominated with the exception of Mary while Monica's group was female dominated with the exception of Jonathon…however these exceptions could have been there due to the location of their assigned seat.
??-so the question is why did Danny, Jaime, Matthew and Sammy go over to Kevin while Monica went to the back tables
??-do they go were there friends are or where they think they will get the best answers or where they think they will learn the most…do they go were there are people with similar learning styles/learning goals…similar interests?
-what is the practice??? This is also really difficult b/c to me it really has a lot to do with working together , "helping your neighbor" and yet T doesn't really feel that her class is a community of learners…I don't think they've established this community on their own…lets revisit whether they are a community or not and what the goal or purpose is…who participates in this goal purpose…everybody? Does everybody participate in the same way….what are some different roles in the classroom? Where do people belong and why?

*t or T= teacher

APPENDIX B

CLASSROOM FOCUS GROUP INTERVIEW TRANSCRIPT SAMPLE

Tidal Wave classroom FG (1)

O: Here we are ok so real quick the thing I want to do first is just introduce myself and then remind you guys again what this is about. And then you guys can go around and tell me, I have your names because obviously I wrote them down, but that way I can have your name with your face and know who you are and if you want to tell me a little bit about you that's fine too. And then we will talk about Communities, because that's what my study is about. And then also, what I might do is give you guys some papers and this is why I told you to bring something to write with. And we can sometimes draw, because for me it's sometimes easier to explain what I'm talking about with a drawing and I know that's not for everybody, so if you want to draw, great if you don't want to it's not a big deal. We'll just still talk about things, but so first of all my name is "Olivia Aguilar" and you guys can call me Ms. Olivia, because you're in school and you call people Miss or Mr. That's fine. And then my study, if you guys remember, well this is like my big thing what I'm doing to get my degree and I've spent a long time working on it. And so, what I'm interested in is learning how students learn in their classrooms and specifically how students learn science. And so, what I'm trying to do is figure out how you guys kind of work together in your science classroom or not work together to try to help each other learn science or not help each other learn science basically. So that's just what I'll be asking you a little bit about and a lot of what I learn about to is called Communities of practice and so that's something else that I study is try to figure out is if students build Communities in their classrooms and how these might help them. But I think in some cases people do build Communities and I think in other cases they don't so I'm just trying to figure how your classroom works. That's basically it. Okay? So again my name Ms. Olivia and then hold on let me get something to write with so I record and I write down things because I've tried to just record before and not write down things and then I have like to go back and listen a thousand times because I didn't write things down and sometimes I can't understand what you all are saying or even what I'm saying. Because I talk really fast I realize that I need to slow down. The first time I heard myself on this I was like oh my God I've no idea what I just said. And so I had to go back and slow it down and listen a lot of times. So I'm going to write and I'm going to record and so if I'm writing and I'm not looking at you that doesn't mean that I'm not paying attention to you, that I'm not listening to you. It just means I really want to write it down so keep talking okay? So anyway why don't we go around and introduce ourselves? Okay? Can we start with you? What is your name?

L: Liz

O: Ok, Liz tell me something about you that I can remember you by?

L: I wear glasses

O: Yes, actually my glasses are almost just like that, how long have you worn glasses?

L: About 3 or 4 years

O: Oh, really? I had to wear them when I was little. When I was like in 3rd grade. Okay. * (3:03)

SARAH: Sarah

O: Tell me something about you. Other than you wear glasses.

SARAH: I like animals.

O: You like animals, okay. Do you have pets?

SARAH: Yes.

O: How many? Oh, a lot? (laughter)

SARAH: I've got six.

O: Oh, my gosh. You do. Okay, that is a lot. All right, if you're trying to Count you've got a lot. Okay.

Monica I'm Monica and I have no idea what you can remember me by.

O: I'm sure you can think of something, Monica. Do you like fishing?

Monica Yes,

O: Yes, I know that about you all right. Okay

AUSTIN: My name is Austin.

F: …you like horses, Cows. Yes she loves horses.

O: You like horses, all right. Obviously that's something a lot of people know about you?

AUSTIN: Yes

O: All right that's a good one then.

LL: My name is Laura

O: Laura okay, Laura do you go by just Laura or Laura Lee?

LL: Laura Lee

O: You go by Laura Lee, Okay

LL: I'm always wearing my rings

O: Okay, I like that ring. That's pretty. All right.

Kevin: Kevin, I like sports.

O: What kind of sports? Like do you like to play or do you like to watch?

Kevin: Play

O: Yes, you play all sports? What is your favorite?

Kevin: Football.

O: Is it? Okay. All right

Danny: My name is Danny, I'm tall and I have blonde hair and blue eyes.

O: Okay, so you describe what you look like so I can remember you. So I can write that down. All right that's good. That helps me.

F: * (5:04)

O: Yeah actually I can go on to…So let's talk about. Let's get into what we were talking about and I'm going to give you guys some paper and you can like I said you can draw or write or do whatever I just know having paper helps me talk about things so I assume it does for other people, but it might not necessarily be true. Okay, I'm running out of paper already. So something I want to talk about is Community, like I mentioned before. And the first thing I want to talk about is when I say the word Community. Can you pass those around? Actually you can give me some and I'll pass these around the other way too. Thanks. When I say the word Community what are some things that Come to mind? And you don't have to raise your hand on anything you can just talk. What's that Kevin?

Kevin: Houses

(Several) Families, Parks, Coastal Bluff

Monica: What?

O: When I say the word community what are some things that come to mind?

F: I don't know

M: A lot of people.

O: A lot of people, okay. Okay, I've got parks.

F: Schools, doors, couches (laughter)

O: Did you say couches? That's good, that's fine, couches, actually that's funny because that was brought up in the other group too. All right.

M: cars

O: So when you guys are saying these things, these are, cars, couches, these are parks these are things that you see in a community right? Okay. Pets? Okay.

(Several) Plants, kids, lots of kids

O: Okay. That's what they said last time too. Lot's of kids. Okay. All right

F: Birds

O: Birds. Liz what about you?

L: Houses.

O: Houses. Okay I've got houses.

L: Um I don't know.

F: Apartments.

L: Same thing.

O: Apartments, Okay. So it kind of sounds like you guys are describing an actual community? Yes or just what you're thinking about? It's what you see, and hear? Is that your kind of describing Coastal Bluff when you're thinking about community?

M: There is lots of water around.

F: And the mall.

(several) Yeah there's lots of water.

O: Small. Okay so let me then ask you what are some communities you belong to?

M: Basketball

O: Basketball, okay.

M: School (laughter).

O: School, that's a good one. So you were saying basketball team. Like your basketball team? Okay. All right what are some other ones? Those are good.

M: Yeah

M: Volleyball.

O: Yes. Are you going to go through every sport and be like every sport team?

F: Family

O: Your own family, all right.

Kevin: * (8:22).

O: Those are good Kevin.

M: The street you live on?

O: Like your neighborhood? Yes.

F: "Stop hitting me"

O: Okay, so far I have Basketball, Volleyball teams, School, Family, like Neighborhood and Street. Those are good. Those are all great examples.

F: City

O: Your city. Oh that's right I did have Coastal Bluff. I had Coastal Bluff. Anything else you guys can think of that you might belong to? Other Communities that you might belong to?

F: The classroom

O: All right. The hard part now is going to be after you gave me these examples. Now, I want you to tell me why you think that those are Communities.

F: Because you are with people.

O: Because you are with people, okay. Kevin what were you going to say?

Kevin: That.

O: That's it? Okay. All right, because you are with people, so in, so let me go back and repeat them and you guys think about these examples and then tell me why you would consider them Communities. Okay? So we said Coastal Bluff for the City, your Basketball or Volleyball Team, and let's just say Sports Team, okay? Your school, your family, your neighborhood like your immediate neighborhood, the street you live on and your classroom. Okay those are, so how many examples. 1, 2, 3, 4, 5, 6 examples. So what maybe do all of these have in common like what are some things that these have in common that make them Communities?

M: You're involved with, yes.

O: You're involved with them? You're involved with people okay so we said with people, and you're involved with them. And that's kind of different than just there's people. Like your saying there's kind of involvement you have to work with people. Right? Okay. Is that right? Okay. What else?

F: You like doing it.

O: You like being part of it. Okay. That's good. Like I said I'm just writing down so you guys can keep talking

F: Usually they get along

O: Okay.

F: Mostly all the *(10:38) Not the telling part (Several)

F: Usually family.

O: Usually what?

Kevin: Family doesn't get along * (10:45).

O: That's a good point Kevin. There's probably some arguments sometimes huh? And when you argue about things you are probably trying to work something out or get to a certain, like a, what am I trying to say? Trying to like, what's the word, Come to an agreement about something obviously, like if you're arguing about something you probably want somebody to see your point or they want you to see their point and you're trying to get to an agreement on something. So that kind of probably similar stuff happens in other Communities you probably just don't argue out loud like you would with your family and somehow you are trying to negotiate what you want then different ways.

M: * (11:34)

O: No? Do you argue in other Communities too? In volleyball?

F: In volleyball not so much.

O: In basketball?

F: * (11:52).

O: Well you look like you have something a Community in mind. And I'm like, I don't know what …

F: Cheerleading

O: Oh, in cheerleading. Okay. Yeah. I'm sure that can happen. Yeah.

F: Always arguments in that part.

O: So if I were then to talk about. I think you guys brought up some good points. Let me repeat these. So you were saying some of these things that all these Communities have in Common are that you work with people and that you're involved with people. So maybe something that well we will get more into that later on. And that you usually enjoy being part of it and you usually get along with people. Anything else?

Kevin: Nope

O: Nope. I think I have something * (12:35) Okay. So that's we are kind of talking about Community. So one thing I want to go back to then is what's, okay Could we Consider your science classroom a Community? And you don't have to say – you don't have to agree on that.

(several) Yeah.

O: Did you say kind of?

Danny: Mainly

O: Mainly. So let's talk about that, okay. So some of you guys say "yes" right off the bat and some of you are like "I don't know". So if you think yes why do you think yes? And then this won't be a debate but we'll just discuss it. Hey it's Election Day we can have a little debate that way. If you think your science classroom is like a Community why would you say it is?

Sarah: Because you are part of it. (Several in agreement)

F: We work together

F: We do stuff

O: What do you do?

(Several) Experiments, work together to do experiments.

Danny: We watch movies.

M: We just work together. We have to read the book, we're going to have to work together.

O: So you do a lot of things together? That's what you guys are just saying?

F: Yes

O: Okay; watch movies together, help each other. Do you guys watch movies often?

(Several) No. This is like our first time.

O: This is your first time.

M: We watched the * (14:09) but they're not very interesting.

Kevin: And we watched * (14:10)

O: Bill Nye * (14:14) I think he's called, he went to the school that I go to. Yes, I know I think that's why I like him. Bill Nye (laughing)

F: He repeat everything, he Continuously repeats it so you never get the answer.

O: Well that's it, I think that's why teachers repeat things to you.

M: We watch Bill Nye on videos.

O: Ok so you guys are saying and tell me if there's more things that I'm missing. The science classroom is kind of like a Community because you are all part of it, you work together, you do stuff together especially experiments which I've also seen you guys do together. Anything else?

Danny: We are expected to do it.

F: You have to do it.

Danny: You are not in a position where you can choose * (15:04). (several talking)

O: Ok so if you don't. So let's think about maybe if your classroom's not a Community why would it not be a Community?

Danny: You don't get along with everybody in the classroom like Charles. We don't always agree with what you have to do.

O: Okay and I think those are good points. Okay so Danny is saying like the classroom might not be like a Community because you don't always get along with everybody and you don't always agree about what you want to doing. Is that right? The second part? Okay.

Danny: Yes

F: We say somebody in the classroom, does she hear it, do the teachers hear * (16:01). Well then the teacher, the teacher.

O: Yeah I should have said that in the very beginning I didn't tell other classes, I don't mean to but I'm the only one that listens to this and I'm the only that knows what you guys say in here so. As long as we make sure that we kind of protect each other in this environment then we can feel more open to say what it is we want to say. Okay so we don't always agree with everything that's done in a classroom. Okay. And you're saying the teacher?

M: We have our, we don't like all of the decisions

O: You don't like all of the decisions? Well that probably happens when you're a student in a classroom. Right? You don't like all the decisions your teacher makes

I imagine. So if we were to say that – there's probably then different kinds of roles that people have. I'm kind of jumping ahead of myself because this usually stuff I ask in the next second interview but I think this is a good time to talk about maybe different types of roles that people have in the classroom. So it sounds like your teacher has one role and you guys might have another role and you have to kind of decide how to work together?

Kevin: Yeah.

O: Yeah, would that be fair to say? So do we want to talk about that or do we want to save that for another interview?

F: Talk about it. (several in agreement)

O: Okay, so what kind of role do you think you play in the classroom?

F: Student

O: Student role.

M: The person who does the work. Yeah that's us, the workers.

O: Okay the workers.

F: And she's our boss. She plans it, we do it.

O: Okay. Teacher plans it, you do it. Is that how it is in other classes too? Or just this one?

(All) Other classes. Just in this one most likely.

O: Really?

M: Not in my class, Mr. R is always trying to do stuff * (18:10).

F: Oh Mr. R is really Cool. (several talking).

O: We're not talking about that.

F: All of that because we were laughing in history so laughing really, really loud.

F: Right we're being quiet and (laughter).

F: How can you be quiet when you are laugh so loud?

F: I laugh quietly.

F: You are loud when you laugh.

F: I know I am. Like last year (several talking).

O: Okay so let me, so you are saying, Kevin you were saying something it's more loose? Science class or other classes?

Kevin: Yeah. My other classes my schedule doesn't always stay.

O: Oh, okay. So there's more structure in your science class. Okay.

F: She just don't like me.

O: All right.

F: (Several) Yeah, like when she tells us what to do.

O: That's what you guys stick to?

F: Like she tells us to do our work and we're trying to do it and she's over here, you all hurry up and we can't Concentrate by doing it and she's over there talking and we hurry up. And we shut it right down, if you don't be quiet (several)

F: One day me and Liz are going to end up writing down what she's saying because we hear it.

Danny: I did that once * (19:24) like because Kevin's license plate the other day.

F: No that one was…(several) are you serious?

M: Because she didn't think he was…

F: Tough guy.

M: Yeah, she didn't think it was, like thank you for the rough kid, like this maybe friends or something she's put, I didn't know you were a rough kid and so and so and * (19:49).

F: Surprise, right, like…

O: She thought that you were saying that's what you were? Why did you guys make license plates?

(several) Because I put a thing on there that said qu and she tried to make me put 5.

O: You only wanted to 5 (chuckle). Okay, so okay so you guys give me almost. What well we didn't go back to that but. We will take a pause real quick and go back to you. So it's kind of like a Community in that oh man I lost my place, you science classroom is kind of like a Community in that you are all part of it you all work together you do stuff together and you do experiments. But then it's kind of – but then Danny is really the only one that said that he didn't really know if it's exactly like a Community because you don't always get along with everybody and you don't always agree with everything that's done in the classroom. But one thing I want to ask you is in all the Communities you guys mentioned so let's say let's go back let's talk about family and school. All right? Those are two Communities in your neighborhood. Does everybody always get along?

(all) No

O: Okay does everybody always agree on doing the same thing?

(all) No.

O: No. And I'm not trying to say to you. I'm just saying like if we are going to talk about different Communities let's talk about what they all have in Common and what they don't. Oh gosh, this isn't very smart of me to do. Okay so yeah. Then also in those other Communities in your like family, school, and your neighborhood and even maybe let's say on your basketball team. Does everybody play the same role?

(all) No. Besides the player.

O: Besides the player. Okay, so let's go back to some of these Communities and talk about some roles that might be there and then let's go back to our classroom and see if there are different roles in the classroom too. Which we started talking about but all of you guys gave me where there is student/worker and then there's the teacher who is the boss. Right? So I want to kind of explore more of that but I want to see if we can Come up with different types of roles. We've got about 10 minutes, okay. So in these other Communities I've got I'm just going to rewrite them because I'm tired of going back and forth. I've got, let's go to basketball team, the school and then the family. Okay what are some different roles here? What are some different roles that maybe people play on the basketball team?

Danny: Different positions? Guards.

O: Different positions, okay. What about like and I'm going to give my example of the Community that it feel like I belong to and I'm going to get to what

Community of purpose is too, so that's what I really want to get to. But a Community I belong to I'm part of a group of graduate students we are all working on higher degrees other than – we are either working on our Masters degree or Ph.D. And we have an office together we all share an office space. So when I go to my office every day I know that there is always going to be someone who gets there way before me – there's always somebody who is there at 6 o'clock in the morning or something crazy. I know but they have families too. I know that's there's always going to be somebody who if I need help I can yell over the doorway that I need help or something. I know there's always somebody who brings like a snack for us. And I am always the person who talks a lot in the office and so anytime somebody wants a break they will come talk to me because I sit there and talk all day. So there are different roles that we play but we are all working together somehow because we are all working towards the same goal, we're all trying to get our degrees. And we know that we kind of have to help each other sometimes. And sometimes people are helpful and sometimes people aren't but that's kind of a Community that I belong to. I know what everybody is doing and I know what we are all working towards. Okay. And so I just mentioned some different roles that we have and mine is the talker and I guess that sometimes I might be funny and maybe provide Comic relief. But then there is other people that are way more responsible and then I know I can rely on for help. Okay. So those are different roles. So in your, let's say the family. I think family is an easy one to talk about. Oh, let's go back to basketball teams. So there's different positions and then like what are some different roles? Like maybe there's somebody whose always like the …

M: The Coach's favorite, you can do it.

O: The Coach's favorite, okay.

(Several) Oh, yeah. Yeah, we had one of those. Every one has one of those. Liz knows what it's like.

A: Sunshine. (several talking)

O: All right, all right. We'll try not to get to names or who specific people are, but ok there's the Coach's favorite, there's probably I imagine somebody who's like. On the team or in class.

F: A kiss up

O: In class or on the team, yeah. Okay let's go to because we are going to personal issues I think. Let's go to family. What are different roles people play in the family?

F: Siblings

O: Siblings. What are some roles they play?

Kevin: Evil.

O: Evil.

F: They mess up the house, the Cooking, the cleaning, the dishwashing.

Danny: …the one that never gets in trouble.

Kevin: Laundry, Laundry.

Danny: Must be the exact opposite of me.

O: (chuckle) So one that never gets in trouble and one that always gets in trouble? (several talking) Oh man. Okay. And then the one that always gets in trouble and then what are the, and then what are the, if I were to now talk about, I want to talk about a Community of practice or purpose. And so I was telling you that the Community I belong to our purpose is to all like get we're all trying towards a degree. Right. We're all trying to like I guess it would be similar like if you were all trying to pass or something. That we're all trying to like get our degrees and get our research done and that sort of thing. So if in your family there is a purpose. What would the purpose be?

F: To stay together

O: To stay together, that's a good, yeah that's a really good I'll bet that's a big purpose for most families, to try to stay together. And what did you say Kevin?

Kevin: I forgot.

F: I said living.

O: Okay, You said living and …

F: And * (26:13).

F: He's clueless right now.

O: Okay, stay together is something that. I am going to help you out. Something that the other group mentioned was that like basically to keep a roof over your head so for like everybody to provide for each other is kind of what we talked about. Maybe this is a hard one. Should I think of, what, what would be the pur…Okay let's go to, this would be a more clear example with the purpose of your basketball team is to what?

(Several) To win, get the ball away from the other team.

O: All right, to win.

F: … to make a basket.

O: Make a basket. Okay those are good purposes. Okay so you guys kind of get what I'm talking about when I am saying there Could be Communities of purpose or practice. Because you Could probably belong to a Community that doesn't really have a clear purpose or practice. You know like let's say, let's say your city Coastal Bluff. Do we really know what the purpose that everybody here has?

Danny: No.

O: Because you probably don't know everybody very well. Necessarily.

(Several) Yes, we do.

O: Oh do you. Because it is a small community?

(Several) Yes every like oh my God.

O: Well if you guys had a purpose for Coastal Bluff what do you think that that would be?

Kevin: The smart people of the future. (laughter)

O: To educate the people for the future generations? Yeah? You know it does seem like your Community really works toward education because I go to a lot of schools and you guys are a good school.

F: Our school? Our Community fights.

O: Yes, your – but that means that shows that. Yes that's exactly right. You have to show, obviously if you fight it shows that you're Concerned right? Because there are other communities where they don't fight because they don't care. You know they could be just like whatever. I don't care what happens and so. But it seems to me like a lot of people are very involved in like civics in your community like getting involved and arguing and making a point.

F: Have you read the newspaper lately?

O: No I don't read your newspaper. Is it bad?

F: Not that bad.

Kevin: Oh it's not Cool. (several talking).

O: Uh oh really? I am trying to think did I drive through town Saturday?

F: It goes around through town pretty fast. (several agreeing and laughing)

O: What?

F: Everything you find out one thing and your parents will know when you get home.

O: Oh my goodness. So it is a pretty small.

F: Oh, that's old news, we knew that already.

O: But see it's interesting to me that you guys would all know this because in other Communities I go to that are similar size. They are smaller Communities you know people don't know anything. Because they don't care as much, is what I trying to get to you.

F: They don't Communicate with each other.

O: Right, and they don't really care about their progress of their teacher and of their cities. You guys at like you have something to say.

F: No.

O: Are you sure?

F: Yes. Sarah?

O: Okay, you can say something if you want. Okay so let's go back to a Community of purpose and I want to ask you then, we talked about how your science classroom Could or Could not be a Community. Do you think we Could call it a Community of purpose?

(Several) Undecided.

O: Well let's go around and see what you guys say. Like do you, are you first of all do you guys understand what I mean by Community of purpose?

(Several) No

O: No. So that's probably why you're like 'I have no idea'. So what and I'm going back to a real good example would be basketball and their purpose there is everybody's trying to work to win the basketball games. Right?

Monica: Oh I get what you're saying.

O: And when I was talking about me being a student in grad school we all had a similar purpose. All of our purpose was to graduate and to get our research done. Okay. So we had a purpose, but remember I said there was different roles? Like I was the one who talked a lot? And then somebody else was the one who always brought a snack, and somebody is always the one who I Could rely on to like help me find a book and then somebody else was always to help me write you know or they would edit my papers. So we all play different roles but we were working towards the same goal. And kind of like a basketball team that you were saying you're all trying to win games right? Maybe try to get State or whatever I don't know and you all have different roles. Which would be different positions.

F: I wonder if we Could * (30:31).

F: You can get state.

F: I don't think so

O: Oh you don't in middle school?

(several) I have no idea, I don't know.

O: I don't think middle school, I don't think middle school does that but you can still have district yeah district championships. Yes. Okay, so that's kind of what I mean by Community of purpose. Is that more clear now?

F: Yes.

O: Okay, so what do you think about your science classroom being a Community of purpose? And if you think, and if you think it's a Community of purpose what would the purpose be?

Danny: To learn.

O: To learn.

M: To pass.

F: to work together and get along. Communicate more. To learn about science.

O: So to Communicate more?

F: Yes it seems like is it wasn't for school you wouldn't have any friends. It's like you meet them here and like the very next day – hey they live next door.

(Laughter) F: They live down the street. You can see people, like I see people (several) live right by me, like I would see Kevin and say I didn't know he lived there. Like you go around the house, like drive around and you see somebody …

O: You see somebody you know. That's funny.

F: Yeah they Could be pink or purple and you never knew they lived there.

Kevin: If you Could do that before you Come to school, but you're just saying that's another person.

F: On my street there's this big pink peach house.

O: We've got to go in a few minutes and I'm going, I'm going to rush this along. So some of the purposes you guys are saying would be to learn to pass, to work together, to get along, to communicate more. To make friends. Does that sound right?

F: Yes

O: Yeah, okay. I'll leave that there. So one thing I want to get to then before we go is and I'm sorry I'm rushing this but I want to – we are only going to have one more interview in December and then our next interview won't be until after Christmas so that will be in January sometime yeah. I know can you believe Christmas is Coming up really soon. Yeah, then I don't have so much work to do. And I'm like I still have two more months, but okay so one thing I want to talk about is do you think everybody in your science class participates in the same way. Or do you participate in other.

(several) No.

O: Well that was quick all right. Why not?

F: Because some people try harder than others. (several)

O: Okay. You don't have to name anybody. Okay, some people try harder than others. Danny do you have anything to say?

Danny: Some people like work together more than other tables would, let's put it that way.

O: All right. Anybody else?

F: Some people get along a lot easier and they can Cooperate easier. Like the * (33:32).

O: Okay, Cooperate with each other or Cooperate with the teacher?

(several) each other * (33:39)

O: You think both? Okay. You guys can keep talking if you have something

Danny: Like some people will work together and they get a better grade. And other people don't do much work at all they just talk and they don't get good grades and Complain. Like somebody I know.

O: Hey, let's not, let's not him but. So you guys do you have to it kind of sounds like you have to almost rely on working together to get a decent grade?

(Several) No. It's just easier because we can do a lot of work in like. If I bring a paper in and don't like 5 problems * (34:26), I'll get someone to help me.

F: You Could be looking for one problem and can't find it but then someone else Could help you.

F: Like we just turn around and * (34:34) (several)

O: But it seems to me and I don't know if this is how you feel. It seems to me like that's kind of encouraged in your class to help each other. Yeah? So going back to what one of the purposes might be you guys said it, to work together and to get along? So maybe that's something that's really emphasized in your classroom in your science classroom. Is to working together to kind of help each other. And then let's go back real quick before we leave to we started talking about the different roles and you guys were saying like the student's role was to do the work and the teacher's role was to be the boss? Do you want to elaborate? Is that all you guys think the students are there to do?

(Several) is to learn, keep learning.

O: Do you guys all have the same role?

(Several) No.

O: You don't all have the same role. What are some different roles that there might be?

(several) We have this thing dumb, smart, well when you do experiments you have different jobs. Materials, coordinator, manager, materials manager.

O: I think there are four is that right?

F: I can't remember

Danny: Investigator, Coordinator,

Sarah: Oh, yes. Investigator, remember Liz?

Monica: That's easiest one. Oh my God.

F: There's more than 4 isn't there? Usually somehow our table ends up with another one.

O: So I've got materials manager, recorder, investigator, and…

Kevin: coordinator.

O: coordinator and…

F: Like the boss or something.

O: And then that's it? Yeah I think that sometimes you guys have more than one materials manager. That is how it works.

A: Yeah I think that's how it is, I don't know.

M: When we have bigger than * (36:21).

O: When you have bigger, when you have more that 4 people. Right. Okay so when you have experiments you have different jobs. What are some other roles that there might be? And there might not be you guys might all play the same role do you think you all play the same role in class?

M. No. When it's the regular day, we all do the same thing.

O: When you're all doing the same thing, do you think you have all the same role? But Laura you look like you were going to say 'no'. It's fine, I'm just figuring out why.

LL: No because some of us have different purposes for trying to learn in the classroom and then others might not want to learn in there.

O: Okay, I think that's a really good point. So you are saying that some people they really are trying to do their work and learn in classrooms and some don't necessarily try as hard.

Danny: Other people just want to pass they don't really care. (several talking) Or remembering it.

O: Yes, I think that usually happens in a lot of classes. Yes so that is probably very accurate. Really, you just want to pass?

Danny: I get good grades. I usually don't remember anything. I don't, I'll try to work on it but after the project or whatever is done it's gone.

O: So you forget about it. Yes, well there can definitely be – so those kind of interesting roles that I haven't heard before. That some work hard to learn and some kind of work to pass and we will get, maybe we will get into more roles at our next, at our next interview because I should probably get you guys going. Alright. Anything else you guys want to…I was going to have you draw your Community. I forgot to have you do that. (laughter and talking) Okay that's fine. Why don't we make sure we do that next time, Why don't we make sure we do that next time because I really want to see you guys draw your Communities. I am going to write that as a note to myself. Next time draw Community.

F: * (38:24).

F: Made a cake.

O: So in the meantime you can keep the paper for yourself and I guess that's – any other Comments before you go?

F: Nope

O: And like I said let's make sure what is discussed here stays here.

END OF INTERVIEW
* = indistinguishable word/phrase
F= indistinguishable female

APPENDIX C

EC FOCUS GROUP INTERVIEW TRANSCRIPT SAMPLE

Tidal Wave EC Focus Group (2)
Heather, Monica, Julie, Lauren

O: Ok. So we have not done one of these in a long time. Let's see, who didn't, I think all of you all did the last one that we had right?

I did.

I think.

O: You did?

Yeah. It was about, it was last year?

O: Yeah. Yeah it was a long time ago. We haven't done one in a long time because it's been um lots of people in and our in club for different events I guess. So um it's been taken me awhile to get all of you guys back together again and here you are. Um ok so we're just going to kind of start off where we did you know where we were last time and I'll probably ask you a little bit of the same questions just to see how you might have changed your mind. Um Monica did this in class the other day so um I'm just going to explain it again real quick but. I was thinking, I was looking over um some of the other classes that I do these interviews with and I was looking over their answers to my questions before and then their more recent answers and saw that some of them had changed their mind about some of the questions I asked so I thought it might be um important to go back and kind of ask, just review some of the same questions just to see if you had changed your mind at all or thought um about something differently. Um and the other thing I wanted us to be aware of was that um it almost seems like because I'm asking you these questions while your in Club that um there seems to be a tendency to um, how am I trying to say this, to (pause) well I don't even know what I'm trying to say. But anyway, we will go over the answers, we'll go over the questions and then if I have some questions about them I'll ask you guys. So um do you guys want to say your names so I can have it on the recorder?

L: Lauren

O: OK.

H: Heather

M: Monica (?)

O: Alright. And then you guys know I'm Ms. Olivia. So first of all who all was at the um Earth Day/Bay Day? You two. Ok yeah that's right. I saw you there. No um did you all have fun?

Yes.

O: Yeah? You all got to walk around a lot huh?

All: Yeah.

O: (laughs) Did very many people come to the game?

All: No.

O: No? Yeah I saw that there wasn't a whole lot of people there so I didn't know um but at least you guys got to walk around and have some fun so that was good.

M: The best part I think was the rock climbing wall.

O: Did you get to do it?

M: Yes.

O: Yeah? Did you make it to the top?

M: Yes.

O: Well that's cool. I didn't get to do it.

M: No not really because I'm not scared of heights.

O: You're not?

J: I am.

O: Yeah I am too.

J: That's why when I was in Washington, D.C. and we found out that the Washington Memorial has no metal beams.

O: Oh really?

J: It's just the gravity of it holding itself down.

O: I did not know that.

J: Holding itself up actually. Yeah we're going in the elevator (laughs) and he was telling us this as he was slowing us down.

O: Oh no. (laughs) Um ok so this where we started last time (ok pass those two) um what we talked about last time was does anybody remember? Don't answer. (laughs) Does anybody remember what we talked about last time?

No.

O: No? Ok. Then that's ok then that's good then we'll just do kind of similar questions.

L: Something about like groups and like school groups.

O: Right. You're right, you're, that is what we talked about. Well ok so the first thing that I'll ask you guys and once I ask you this you'll be like "oh I remember", but um what are some things you think of or what are some words you think of when I say the word community?

M: Um class.

O: Alright well you, ok. Ok. That's a good one. Alright. Heather anything else? Ok. Those are all exactly what I would expect people that work together. Ok and so do you guys remember now a little bit about what we talked about, communities, a little bit? Ok. So basically the questions have to do with communities and then also specific types of communities. Um so I I didn't exactly look over everybody's from this group…

Is somebody going to come in? (?)

Oh no that's just a student (?)

O: Ok. (laughs) Um so I wanted to ask a little bit about uh different communities you might be involved in. So can you think of any that you would consider yourself a member of?

J: This.

O: This group right here?

J: Yes.

O: Ok. Good.

J: I don't know. I've seen them before.

O: (laughs)

I think…

H:…They're going to cheerleading or something.
O: Oh it's the people going to cheerleading? Probably?

H: No because the guys only three guys are going to the cheerleading.

O: Alright so Julie says this group would be a community. What do what are other communities you are involved in?

J: EC

O: Ok. What about you? Alright. (laughs) Monica do you want to say anything?

M: Um athletics.

O: Ok. Heather?

H: Band.

O: I think band is a good one. I think are you guys all in band?

All: Yes.

O: Ok. So you all know each other in band. Ok and so let's talk about band then since you are all in it. How is band like a community?

J: Well our teacher Mr. (?), well my teacher Mr. (?), I don't know what you all are in, but Mr. (?) always tells us if we mess up then it makes the whole band look bad because the band is just one sound, or something like that.

O: (laughs). OK .

J: I don't really know. It's on the wall.

O: Uh-huh. So he's got a saying that makes it basically a saying like…

It's like one band, one sound right?

It's on the wall?

Yeah it's on the wall.

J: Yeah one band, one sound. So like if somebody messes up the whole band messes up.

O: Ok so you guys all have to work together to be one sound?

All: Yeah.

J: That's why we kind of got in trouble on the way back from San Diego. "Remember our score, straight 3."

M: Yes. Staright 3's which means we weren't the best but we were good. So she got mad about that.

J: We were average and she doesn't want us to be average. She wants us to play ones even though…

O: Ok.

J: Cause if her high schoolers can do it she expects us to.

O: Ok. Interesting. So ok so you are kind of a community because you have to work together and you have to you are working towards the same thing. Um that's a good example. So I'm going to so what I do then is I go to different classes and different clubs and ask if they feel like they are part of a community in these classes or clubs. So um and it changes from class to class and from school to school and um and things like that so. If we were to talk about EC would you feel like that was a community?

H: I'd say yes.

L: And another community would probably be colorguard.

O: Colorguard yeah. That would be a good one too. Um ok well let's talk about, well here is another type of community for us to think about and band might fall in this category. But um we belong to different communities and let's say like the neighborhood, your neighborhood or your city your brought up city might be a community you belong to and then let's talk about band and that's another community you might belong to. So another type of community I look at is a community of practice. I don't know if you guys remember me saying that term but that would be where everybody in the community kind of works on the same thing or they work towards the same kind of they work on the same things, they work towards the same kind of goal. So a good example of that usually is like a sports team. Right? Or like a work. You know a place of work where you all are kind of working on the same things and you have the same goal.

J: Work yeah you are working on the same things especially if you are working fast track then you're definitely the only one person that works there.

O: (laughs). Ok but then all of the people at fast track that have to work there, maybe not at one time, but all of the people they are all they do the same thing.

J: Fast track basically have a stomach ache. Have you eaten anything? No. Go eat something.

O: Huh. Ok.

J: That's what Fast Track is and the ER has major problems like a guy cut off his finger.

O: Oh ok I gotcha. Yeah I gotcha. Ok. Um ok so but you guys get what I'm talking about as far as a community of practice? Does that explain it a little bit better? Maybe everybody working on the same kind of thing? So um so I want you to think about the communities that you belong to and if you guys want to write these things instead of saying them out loud you can too. I have some more writing utensils. Um but then I also want you to think about community as a practice and so what are some communities of practice that you might belong to? (pause) Don't everybody speak at once.

J: I wasn't paying attention sorry.

O: That's ok.

My dad says that.

O: (laughs) Don't everybody speak at once? Um I was saying what are some communities of practice you might belong to?

J: Well we already mentioned one.

O: Which was?

C: Band.

O: Very good. Alright that's a good one I think. That would be a community of practice. So what would the practice be?

J: Band or music.

O: Uh the practice would be playing your music right. I guess, even though everybody has a different instrument they are all doing the same thing. Right, ok.

J: ?

O: Right exactly. That's a great one. Uh anybody else? No? That's ok.

H: Athletics.

(Announcement)

O: You know I just realized I don't have a watch. I don't even I didn't bring my wrist watch…Ok well just keep track. Ok good. Um so you can keep me on track. Ok so Julie mentioned band, Heather said athletics, so it would be different sports events right? Um anything else? Would your Colorguard be considered a community of practice?

L: We all twirl, we all twirl flags.

We all try to work together to get…

O: Right. So that seems like that would be one.

Home Ec.

O: Home Ec.? Ok what's the practice there?

J: Shop.

O: Shop?

J: Yeah because if you don't let people help you get to what you need if you can't find it, or if they need it too so they'll help you find it and they'll, you both…

O: Ok. Great. These are good examples. Ok so let's then, ok so these are, so we've talked about some different examples of communities, and then most of the communities we've talked about were we decided communities of practice where there was a common practice. So um I'm going to go back to the EC and um think about if it's a community why and could it be a community of practice?

J: Yeah because EC I do believe so.

O: Ok. (laughs). Does anybody else think anything? Or anything different? Does anybody here not think it would be a community because that's ok too if you don't feel like it's a community. Sometimes we'll have you know in classes some people think they are communities and some people don't.

H: BCIS is a community of practice.

O: I don't know what BCIS is.

H: It's a class. But we're all learning about computers.

O: Ok. So that would be the practice. Do you feel like it's a community? I'm not in it so I don't know.

H: Well I don't really I don't really think about is as a community.

O: Ok. And that's fair. Probably a lot of these things I'm mentioning you might not think about as a community. Like you might not think of Colorguard as a community. Do you?

L: Not really.

O: Ok.

L: More like just a group.

O: Just a group. Ok. So that's kind of she brings up a very very that's a very important thing because I'm trying to figure out are these just groups or are they communities? So that's what we are trying to figure out. What would be, what would make something, what would make a group a community?

M: They help each other.

O: Ok. Helping each other.

Or trying to.

O: Ok. So that would be the difference than say because somebody mentioned a mall the other day and I was like well that's a group of people ok but I don't really know if they would be people at a mall would be a community.

J: Well maybe because they're all shopping around and being people.

O: Right. So that's kind of the difficulty. Are we just looking at a group of people walking around and doing their thing or somehow are they some kind of community.

J: Just hanging around.

O: That's what I'm trying to figure out about the EC. Are we just a group of people or are we a community?

M: Well I think we are all trying to head for the same thing like trying to help…

(Announcement)

M: Ok and like um people, I forgot what I was saying.

O: You were saying um ok Monica was saying that she thinks that the EC is a community because everybody is kind of working towards the same thing.

M: Um ok and um they are trying to save the environment and stop littering.

O: Ok would you guys agree or does anybody think anything differently? Yeah she said to get people that people all have the same goal and that was to kind of save the environment and to get people to stop littering. Yeah you would agree with that?

J: Half of the time I still agree with that. Actually 75% of the time but…

O: And that's a good point too since you are here maybe not 100% of the time. Let me see, Heather and Monica are pretty much at every meeting. So would you do you think it matters and so Julie do you think it matters if you are there at every meeting whether or not you feel like you belong to the community?

J: Huh?

O: Do you still feel like a part of the community even though you are not at every meeting? Ok.

J: Because we're all there for the same thing.

O: For the same thing. Right. So it has more to do it sounds like it has more to do with the practice then right? That you know what the practice is so that's why you feel like part of the community. Um what about Monica and Heather, what do you guys think about as far as people being there do you think it makes a difference?

M: Um kind of and kind of not. Because like it might be something really really important and then they are like asking them about it and they are like uh. It kind of matters and it kind of doesn't. Like if (?) or talking then I guess it doesn't really matter all that much, but when they are talking about important things yeah that's probably when they should be.

O: Ok. What do you think Heather?

H: I think in some meetings and not in others.

O: Ok. That's good. What about you? You want me to skip the question?

Yes.

O: Ok I'll skip it. So um ok the other thing I want to ask about is roles. Do you think there are different roles in the EC? Do you think people play different roles or does it does everybody have the same role?

Um yes. Some people…

O: Julie what were you going to say? That too?

What Julie said.

O: Ok. Same thing?

Yeah.

.

O: What about you Heather?

H: Down to the scrapbook (?).

O: Ok so you think so people have different jobs then kind of.

J: I have a question. What about **(?) on the computers?

L: He works on the website.

M: He's our website.

J: Ah I did not know that.

H: You go to apusd.com and then you go to…

M: I looked for the website once and I was like I wonder if there's anything and there's a website so…but it hasn't been updated since like last year.

O: Yeah we need to update the pictures on it this year. We need to do that.

M: Yeah we can pizzazz (?) it a little.

O: Yeah you'll want to get your picture on before the end of the year.

H: You mean the main page?

J: Yeah that's where Mr. Craig (?) is supposed to scan the pictures.

O: Oh ok. Do they all talk about that?

H: I'm in that photo because I went to that one Earth Day/Bay Day.

O: Oh good. Well maybe we'll do that before maybe when we work on our power point we can get somebody to take pictures and then put those on there too. Because we've got to work on the power point.

L: In that photo I have shorter hair.

O: (laughs) Oh yeah is that because I remember when you had shorter hair. Um ok so why don't we, the other thing I want to do is lets write um and then we did this before, but what I want us to do is if there was a practice in the EC what would it be? What are some things that we all worked on or we all do in EC? And I'm going to write it down and if you'll write it down too. Put your names on these papers and then underneath it put "practice" and then we'll come up with what a practice of the EC might be.

J: I don't have a pen.

O: Oh here you want…eh I don't know if I have a pen but I have a writing utensil.

J: I don't need the sharpie.

H: You aren't allowed to have a sharpie.

J: And your point…? No one's caught me yet.

O: Let's see. Do you need something? Do you want a little pencil? Oh no you've got one.

J: I knew I had one. I used it last class.

O: Ok so what do we think the practice is? What do we think the practice is? You can give it back to me when we're done and that would be good. Of the EC. Well you guys told me what you think the common goal is which is…?

All: Help the environment.

O: Help the environment? Ok so is that something that you guys think we do in club?

M: Yeah.

J: We talk about how we can help it but we don't actually…

O: Yeah except for on the field trips probably. Ok so we talk about how to help the environment. Ok. What else? I'll let you guys think about it. And then you can tell me something.

M: Ok what was the question?

O: The question was what is the practice of the EC? What are things that we do in the EC?

L: Earth Day/Bay Day and the Shrimporee.

O: And the what? Shrimporee?

L: Help out in the kid's corner.

O: So we kind of we help out um at events. Can I put that? Help out at events.

L: Yeah like Shrimporee and Earth Day/Bay Day.

O: Ok. Help out at events like Shrimporee and Earth Day/Bay Day. That covers it? That covers it too?

L: Yeah.

O: Ok then so what I want us to do is draw um we are going to do a drawing but in a minute, so what I want you to do is draw kind of your idea of of the EC. It can be any shape or take any form but then right in the middle of that in the very center of your EC would be somebody who does all of these practices. So they are there to help the environment, they talk about how to help, they help out at events like Shrimporee and Earth Day/Bay Day. Ok and I realize the club is not very big so that's fine. But um I want you to kind of show me um where people in the club, not specifically like there are eight people and this is where they are, but kind of an idea of where people in the club are around this practice. Does everybody in the club you know um do they do these practices a lot? So would they be towards the center? Are there some people kind of spread out and maybe towards the outside? Does that make sense?

J: It kind of sounds like you're telling us the pyramid of sound. Like the lower you go, the more higher you go is not…

L: The higher you go is the outside of the circle and the lower you go…

J: Like low brass, she's always saying, low brass soften up.

O: Ok I don't know the pyramid of sound but maybe I'm sounding like it.

J: There's low brass and all of the instruments that are in low brass and just keep going an octave up is the flutes and everything.

O: Ok well we'll figure out the tower of sound later but right now let's do this because I've got to let you guys go in a minute. So um in the middle right is somebody I don't know starts with an "x" or whatever, who is doing all of these things you know during club, they help the environment, they talk about how to help, and then they help out at events. And then I want you to kind of show me where the majority of people, or where you know people are at um in the club and kind of…

M: Well I think most field trips…

O: Ok well then why don't you show me where those people are and then maybe put why you think that they are there. So just for field trips or just here for food.

M: Because I think that maybe like the people um outside the circle, that um yeah those are probably the people who don't…

O: Ok. Can you write that on your drawing for me? Ok thanks. So if you have, yeah she makes a good point, if you have people somewhere else and you want to explain why you have them somewhere else or if you you know you can draw people differently, you can make some people squares, some people "x's", some people circles, or kind of label who they are and what they do.

J: Make layers.

O: Yeah you can make layers.

J: Yay.

O: Would that be concentric layers? Concentric circles? (laughs)

J: I do not know what that means.

O: (laughs) Ok.

J: Now I can name you off a couple of medical terms that I have no idea what they mean but…

O: I don't know medical terms. That's for sure.

J: Numbers and random letters. I'm sitting here going English please?

O: (laughs) That's funny.

L: I can actually do that in Spanish class you know. English and Spanish.

J: Well when we did that in that class Mrs. (?) would send you out.

O: Ok and then I just have a couple of more questions before we go so when you are done with your drawing you can um…

M: I'm sorry what is that? It's kind of…

O: It's a little pouch. I've had it since I was a baby. It's a little pouch my parents gave me when I was a little baby. I keep change in it although there is only a penny in it right now.

M: I was going to say is that a (?) or is it a pouch…

O: It's really dirty now but it used to have, I think they got it in Mexico, it used to have a little butterfly, and it used to have another animal up here but I've had it for a really long time.

M: I was going to say what is this?

O: (laughs) You don't have to. No you don't have to put names. So we only have a few more meetings left.

J: I think that t minus twenty one days.

M: Yeah it's twenty one days.

O: Is that right?

M: Yeah we're getting out on the twenty fifth but um last year and a few years before that we usually get out on the (?) so that's why.

O: I know.

L: There's four weeks left so there's four meetings left.

O: Ok. Good to know. We need to have our pizza party, or whatever it, yeah we'll have a pizza party. We still need to do that for everybody that turned in their forms. Um ok who's not done with their drawing? Do you need more time? (laughs)

J: This is a drawing like drawing a person I'd be, I would need more time but since it's this…

O: Yeah I can't draw a person that's why I would never ask you guys to do it. It would take me forever.

J: I can. But it's good.

O: Well that's good.

M: These are the type of people that I draw.

O: Ok. The circle? Stick people. Oh eyes. (laughs) Ok well here's my question I was going to ask you guys and I'll ask while Lauren is still doing this but um how many of you joined club because you like science? Three? You like science Heather?

L: I think I joined it…

O: That's why you joined? Because of your brother? Ok. What about are there other clubs that you could have joined if you like science at this school? No? Ok. So you guys already liked science before you decided to be in the club? Ok. What do you think, does it help you like science more or do you think that there's not really much science in the club?

M: Well I think it's more science than ...

J: Every now and then we'll learn a term but…

O: Right. Yeah. Like la basura?

H: But we never actually remember it.

O: (laughs) You guys don't remember that word?

M: We only did it like uh the first two or three weeks is the only time we did it and then after that we didn't do anymore Spanish.

O: Yeah ok I agree. So you think it is more science than Spanish? Um do you think have you learned anything about the environment or about science?

M: I didn't know there is as much people littering but I didn't know a lot of people were littering. Like, I didn't think that many people were but a lot of people she said. I don't remember how many though.

O: What about ya'll? Do you think that you've learned anything? (laughs) Heather. Are you saying no? It's ok I mean I don't care I'm just wondering.

H: Not really.

O: No? Ok. So all those lessons I gave you…I'm just kidding. (laughs)

CJ: Lessons. What lessons?

O(?): Well I tried to do a water shed game. Didn't I try to do a water shed game?

O: Yeah where I had you guys draw different things along the water shed?

J: Oh yeah.

O: And then I guess that might be my only my last question. Do you guys have any questions for me? Ok um you know what real quick though before we finish this drawing why don't you also um tell me maybe if you can on that sheet different roles that you think there are in the club. So we've talked about it but if you could, you can either show me my drawing different people the people that might have different roles or you can um write down what they might be. Everybody get that?

M: Like we don't have to write who has the role?

O: Um you don't have to write well you can do whatever you want. I'm not going to tell you what you have to do. But…

J: So what am I writing?

O: Different roles. We talked about different people having different roles so maybe what those different, you can just put what the different roles are. And then in the drawing if you want to maybe circle like who has what role and then write the role down. But you don't have to give me names of the people. You are putting a lot of thought into that. I really appreciate it. Did you finish that part?

H: Yes.

O: Ok so now we are doing we talked about different roles so now I want you to show me either in your drawing or you can just write what the different roles might be and like if these two people have a role like you can circle them and say their role is this. Or if these people have a role, like what their role is, but also maybe like tell me what the different roles are. And then when you're done with that, that's probably all I have. I might try to do one more interview before the end of the school year but it might be hard to do.

J: I just can't draw feet or hands to save my life but…

O: Oh. That's ok. Alright. Do you need more time?

M: When you flip it over this way isn't is supposed to be the other way around on the backside? It is.

O: Yeah. It's upside down.

J: I was talking about the drawing but ok.

J: One time I was talking on the phone to my grandma and I wasn't even paying attention and I was sitting there drawing on the calendar we have on the desk. My mom got mad.

O: Uh-oh. I bet. Ok I better let you guys go because it's almost over. So make sure your names on that. Will you put the date on it too just so that I have the date. Did we do a drawing last time do ya'll remember?

All: No.

O: No? Ok. Alright and then you can hand me those and we may or may not have another interview at the end of club I'm not sure yet but we'll figure it out. But we will have…Do you want to read your poem before you go?

M: Homework oh homework I hate you, you stink. I wish I'd washed you away in the sink. If only if only (???), homework oh homework you're giving me fits. I'd rather take baths with man-eating sharks or definitely lie alone in the dark. Eat spinach or liver, pet ten porcupine, then tackle the homework my teacher assigned. Homework is the last thing on my list, I simply can't see why you even exist. If you just disappeared it would tickle me pink, homework oh homework…

O: Yep I know that poem. They actually used to say it when I was young too.

APPENDIX D

INDIVIDUAL STUDENT INTERVIEW TRANSCRIPT SAMPLE

Monica interview (1)

M: I think that club should be a good time.

O: Yeah. No it is a good time it's just that um I wouldn't want to cut into, I wouldn't have had a group meeting before. Ok so the things on your journal, can I see your journal, I asked you about were basically you as a student to describe yourself and you as a student. So we can um go through this, oh good, you put a lot that's great. Ok so what are some main things that if I if I was just a stranger and I said tell me just some really important things about yourself, what would you tell me? That you think I should really know.

M: I'm family.

O: You're family?

M: I have a family. Yes.

O: Ok.

M: I have two sisters, my mom and my dad. Um…I'm active.

O: Ok. In school?

M: Both in school and I guess I could say outside.

O: Ok. What do you do outside of school?

M: I like swimming, bike riding, rollerblading (laughs).

O: Wow. So you like being outdoors?

M: Yeah.

O: Ok. What got you interested in being outdoors? Have you always been that way or did your family, did you do something to where you got interested in outdoors? Is your family that way?

M: Um well some of my family is, not all of it. But I guess because usually when we go on vacations um me like we're outdoors.

O: Oh really?

M: But I've always liked swimming when since I was a little girl.

O: You go swimming out, you can feel free to eat your burger too, but did you go swimming in the beach when you were little?

M: Um no not really.

O: Just pools?

M: Huh?

O: Just pools?

M: Yeah like usually the pool but when I turned about seven or so I started swimming at the beaches.

O: Ok. And so you said when your family goes on vacations you all go outdoors usually?

M: Yeah.

O: Do you all go camping or what?

M: Well a few times we went camping but what really got me into swimming was when we went to Sea World and west Texas and all of those places.

O: Oh alright. So you like the um like nature parts of those things or what?

M: Well yeah I like watching the dolphin shows.

O: Yeah I like the dolphins. Ok so I know that um actually ok so you described yourself so you told me the things that are important to you are your family and that you're active. Um what kind of, if I were to ask you what kind of student you are, overall in general, not just in science class but overall, what kind of student would you consider yourself?

M: Um sometimes well most of the time I'm paying attention but sometimes I kind of get carried off a little bit. But then I get right back on track. Um so I'm not really sure.

O: Ok. Do you do your work?

M: Uh-huh.

M: So you always turn in your homework and stuff?

M: Um yeah and if I have like um a bad grade in science I will go ask my teachers what work I can get a better grade on. Like if I have any missing work.

O: Ok so are your grades important to you?

M: Uh-huh.

O: And why?

M: Well I guess because my career choice and I really want to become this. I've been saying it and thinking about it since I was like three or four. Um but I really wanted to become a scientist, (laughs), a pharmacist.

O: A pharmacist. Ok well either one it's in the science field. A pharmacist huh?

M: Uh-huh. And so that's why most of it, most of it is because…

O: A pharmacist.

M: Yes, a pharmacist, thank you.

O: It's ok. I know what you mean.

M: A pharmacist.

O: And so that kind of is drives you like is your motivation to get good grades and do well in school, the fact that you want to be a pharmacist? Because you know why. You have to have good grades to go on to college or what?

M: Uh yeah.

O: Ok. How did, what made you want to become a pharmacist?

M: Um I don't know, I guess, well my main goal is to help people feel…and achieve the goal so that's, I don't know why, it's just one day my mom took me to the pharmacy to go get something, some medicine, and um I just wanted to be a pharmacist from then, so I don't know what happened.

O: Huh. Did you talk to the pharmacist there and that made you think of it maybe?

M: Well kind of. Not really.

O: Ok. What do your parents do? Do they do anything in the science fields or anything in the medical field?

M: Um no. No not really.

O: So they didn't, nobody in your family really said hey this is what a pharmacist does and tried to encourage you to do that?

M: Well they encouraged me but it's like nobody is in that…

O: Field. Ok. What do they encourage, do they encourage you to pursue that career or do they just encourage you to do well and you know get good grades.

M: Well both. They encourage me with that career and to get good grades. Um but…

O: So do you think naturally you like science or do you think you like it because you know you want to be a pharmacist?

M: Well I naturally like science. I think it's fun. A lot of people think I'm kind of weird for that but…

O: What do you like about it?

M: I like doing the experiments and like there's this egg experiment that we did. I didn't even know that an egg was a real, just like a huge cell. I barely learned that.

O: That's pretty cool. Yeah so you like learning new things?

M: Yeah.

O: And you think you do that more in science than in any other classes?

M: Yeah because in the other classes we don't really do experiments or um anything like that. So science yes is …

O: Where you learn?

M: Yeah.

O: But do you think it's just because of the experiments or do you think it's because of the field?

M: Um.

O: Like if you didn't have experiments regularly would you still feel like you learned a lot?

M: Uh-huh. Because the stuff that we read about it, like I don't know why but last year when I was in science, I got like really into the cell when we got into the cells and all that.

O: Yeah. I like that part too. That's more like the biology part of it right?

M: Yeah.

O: Yeah. That's really interesting. So well what about your other classes? What are some classes that you don't like as much?

M: Um I'd say Texas history because like we don't do much in there we just like we just like do like papers all the time and we don't really get to do anything and um we like hum we just like read and um sometimes we don't even read we just do the work. And it gets kind of hard because if you don't read something before you're doing something that goes along with your reading then you don't really get it all as fast as it would be if you did read.

O: Yep. That makes sense. So part of what you like about, or maybe, I don't know if I'm interpreting this right, but part of what you like about science is the fact that you're actually doing things like…

M: Yeah.

O: With your hands and like getting involved. And you don't get to do that in Texas history as much I guess right? Yeah and there's probably not as much opportunity for that. What about um do teachers make a difference as whether you like a class or not?

M: Um well I (laughs) um I don't know.

O: You can eat with your mouth open right now if you want because I just want to make sure you eat before your bell rings.

M: Oh (laughs). I don't know.

O: Well let's say it this way, if you had a teacher that maybe was a little bit not as nice or that you didn't like as much in your science class would you still like science?

M: Uh-huh.

O: Ok. If you had a teacher that you loved in Texas history would you like Texas history more?

M: Um I don't know.

O: Ok. So it's more to do with the subject than the teacher really?

M: Yeah.

O: Ok. Well what kind of, so you told me what kind of student you are, you do your work and you try hard and you want to get good grades because you want to go be a pharmacist. What kind of student are you in science? Is it the same thing?

M: Um I guess I'm more involved in science because…

O: Ok.

M: So I guess I'm more (laughs)…

O: Involved?

M: Yes. I'm more involved in science.

O: I see that you're involved in science, but of course I don't see you in your other classes so I don't know but you're saying you're not as involved in your other classes?

M: Um (laughs) well there is only two or three other classes that I'm really involved in. Which is band and home ec.

O: Ok so in the other ones are you just quieter or do you, how are you in the other ones? Like your English and math and Texas history.

M: Well English we don't really do experiments but we like, the way that she like teaches us to do it, it's kind of like fun so, because our English teacher is really fun (laughs). And she makes um English more exciting than a different teacher would I guess I could say. So that's probably a reason why…

O: Ok. So it kind of has to do with the teacher there.

M: Yeah.

O: Ok. Let's see what else I want to ask you. What kind of student are you? Find out your feelings about science. You like science a lot. Because you learn things right? What do you like about your science class?

M: I'm thinking.

O: No, that's fine.

M: Well I like a lot. I like the people who are in my science class because I have to like get advice or get well yeah advice from other people who understand more than I do. Some people that if they were in my class I couldn't really get advice from. Um.

O: You mean advice on science things?

M: Yeah.

O: Ok. Well who do you get advice from? Who do you get help from?

M: Well usually from Sarah or Laura, Danny or Patrick or Kevin. And sometimes from the T. Usually from the T.

O: Ok. That's a lot of people that you kind of can turn to huh?

M: Yeah.

O: Ok.

M: I can turn to mostly all of my science…

O: To get help?

M: Yeah.

O: So you like it because of the people and I know you like the experiments right? Anything else? You can wait, you can chew and tell me when you're done. I will take a bite while you are chewing. This is a little bit harder. I haven't had an interview while we eat during it (laughs).

M: There's um the teacher, I really like the T, sometimes she can be a little um I don't know how to explain it but um and sometimes she can just be like nice and explaining. (laughs). And that's like one of the reasons that I really like to be in the class.

O: So sometimes you really like being in the class because of the T and sometimes just ok.

M: Yeah.

O: Ok. If you want to expand on that you can. Just so you know I'm the only person that hears this, it's just between you and me. But um so why did you join the EC?

M: Um.

O: Yeah that's fine.

M: Because I really like how the environment looks and how it looks outside. And um I wanted to help the animals. I love animals. And um just a few weeks ago my dog died because um he was out in the neighbor's yard and they have like trash all over their yard and he was eating some of the trash and he just like died the next day.

O: Oh no.

M: And that's some part of the reason why. But no I really wanted to help the animals and I learned that we were going to go help the Bay and I got really excited then because me and my dad were always, that's like the one place we can connect with each other.

O: Yeah out at the Bay? Because you all go fishing a lot right? Ok. Um when did you when did you start fishing? When you were little?

M: Uh-huh.

O: So you've always been fishing? Well that's fun.

M: I was telling my dad I want a fishing pole, I want my own fishing pole. And he wouldn't.

O: Ok. So you've had one for a few years then?

M: Yeah.

O: Um. Ok so you didn't necessarily join the EC because of friends or...no? What about because you're active? Did you join it because you wanted another club to be in?

M: No.

O: So you just thought well I really want to do this and so I'm going to do it?

M: Yeah. I really wanted to do it because some people that were in the EC, I know they did it for like friends or something because they're like that and I was like well why did you join and they were like well because one of them said because they didn't want to go home and the other um because their friends were there.

O: Ok.

M: And I was like well why are you in it?

O: But you like being in it because of what we do like beach clean-ups and stuff?

M: Uh-huh.

O: What's been your favorite activity that we've done?

M: I like that.

O: Ok. With the pizza party? (15:10)

M: Yeah.

O: That's the one that I didn't go to. What was different about that one than the last one?

M: Um the last one no the last one year…

O: The one we just had a couple of weeks ago.

M: Yeah. We didn't really do the same thing we did. Like we went to other places and this time we only stayed in one place. But um I got to work with different people and we went farther down the trail to look for more stuff.

O: Ok this last time?

M: Yeah.

O: Ok. So which one did you have more fun at?

M: Um

O: Here you can use one of these napkins.

M: I've got a runny nose (laughs). Um but like well the first time we like went to Dolphin Harbor(?)…

O: Oh ok.

M: And um well we didn't really get to do much there because there wasn't like as much trash as there was and after um the EC meeting after that they were like asking us why do we think that why do we think that um Dolphin Harbor(?) was cleaner than Trout Bay.

O: Oh Trout Bay ok.

M: Or yeah, or the Lighthouse (?). Um yeah and well I thought maybe because the people, a lot of people go there and I guess they don't want to have to stop going there

because people are just like throwing trash everywhere not in the trash cans. So I guess that's why maybe they keep it clean.

O: Ok because people really want to go there you think?

M: Yeah.

O: Ok. Um ok and what do you think about what do you how do you think the club is going or how would you change it or what would add? Do you think you learn much science in the club?

M: Well I think most of it is science because the Spanish part we only like learned a few words so I think it has more to do with science than it does…

O: Like what what part of science do you think?

M: Um well since it's dealing with the environment and cleaning I think that has to do with it. And that's like really what I think it has to do with it. Um the Spanish part we don't do as much because like when we are eating a snack or something he'll tell us what the word is in Spanish and um that's only been a few times that he's done that. So we don't really…

O: Do the Spanish part as much?

M: Yeah.

O: Yeah. You're right. Do you speak any Spanish?

M: Um (laughs).

O: A little bit? Can you understand some?

M: Well only if you parts of it. Because my grandpa, he speaks nothing but Spanish.

O: Yeah that's how my grandfathers are.

M: I kind of have to learn how to speak to him. Like some words I can understand because he's tried to learn how to speak in English. Um and sometimes I can't understand what he's saying.

O: Yeah. That's the same thing that happened with me and my grandpa. Yeah he only spoke Spanish so there were only a few words that he could speak in English. So growing up, I mean I still didn't really know Spanish very much, but I kind of knew what he was saying sometimes. Um but yeah it's harder for older people to learn

another language I think. Because he never learned, I mean he lived here all of his life and never learned English.

M: Well the only English my grandpa really speaks because he's real religious with God and um like when we say hi or we go to give him a hug when we first see him he will be like God bless you. And then…

O: That's funny that that's what he learned huh?

M: He goes God bless you mija or mijo or yeah something like that. And um that's like kind of the only Spanish I know kind of (laughs). I know yes and no and um when you're on the phone. But it's kind of weird because he grew up with my grandpa talking like that so my dad like knows how to speak Spanish. And sometimes he'll be like he'll be like talking in Spanish and then he's like Monica and I'm like what and he's like I called you over here and I'm like you did? (laughs).

O: That's funny. So what about your mom? Does she speak…
OH19M58S OH21M31S

Big hash before 20.

M: Well my grandpa, my mom's dad, he died, so she kinda got like a stepdad. but uhm they speak Spanish, but mom doesn't really speak Spanish. She grew up with it but she never really learned it

O: learned it, okay, yeah. That's kind of how I am
M:Yeah
O: although I'm tying to learn more now. After being around my grandparents more I've been able to learn more, but uhm
M: well, I like the way we have like this cycle thing where every Saturday, we'll or Wednesday, we'll go to my grandma's house, my mom's home
O: uh-hum
M: and every Sunday we'll go to my dad's mom's house
O: oh, okay
M: and that's how I keep in touch with them
O: uh-huh
M: and I really like that because I like spending time with my grandparents
O: yeah, I do too. I like spending time with my grandparents a lot too
M: like, except that Sunday morning I always go dressed up because my grandpa, he's always asking me if I would
O: uh-huh
M: so I get dressed up so I can go to church
O: oh, okay that's fun. So you go to church with your grandpa then? Oh, that's neat, uhm, so would you like to do more Spanish in the club or does it matter?
M: yes

O: you would? Okay. Wait where was I , oh
(bell rings). Is that your bell?
M: yea
O: okay, how much further to go?
M: what do you mean?
O: to eat. Are you almost done? Okay. We can probably cut it short there, I don't think there's anything else that I have to talk to you about but I we'll talk about it next time and I'll give you more questions…to answer next time. I should probably talk to you about your participation in the science class so we'll talk about that next time.
M: okay
O: okay?
End
21:31

APPENDIX E

PRINCIPAL INTERVIEW TRANSCRIPT SAMPLE

Tidal Wave Principal (1)

O: I'm going to record this and this is just an um um real informal interview and it usually just ends up being a conversation about things. But um the reason I want to talk to the principals is because I spend so much time with the students trying to understand uh if they've even if they've developed a community in their classroom and then basically I talk to the principals and teachers to kind of get an idea of what the context is of not only the classroom but the school and then oftentimes too the outside community. And how everything kind of affects each other. Um so the main thing that we talked about in interviews is what is a community and if they feel like they belong to a community.

P: The students?

O: Uh-huh.

P: What kind of responses do you generally get?

O: I get mixed and sometimes it varies throughout the year. Um normally at this school they feel like they belong to a community. Um what I've seen though through all the schools is that oftentimes too it depends on if their friends are in their classrooms or how closely they are related to their group of friends. Um so it's been interesting because it's it's uh kind of uh back to peer groups and that sort of idea.

P: And this study is for your dissertation right?

O: Yes. It is. Right. Yeah. Um so the first thing I want to ask you is if you could just describe in general the students at this school how would you describe them?

P: I could describe in general the students at this school?

O: Yeah. Yeah. Is there a type of student or is there…

P: Well there are all types of students. Um I'd say we have a thirteen actually twelve to sixteen year old adolescent trying to get through middle school, pre-adolescent in some case, and um they have to deal with all of the issues that um this age group do. There is a lot of peer pressure. Uh-huh there is. And there's some bullying and there's things like that. But we work to minimize that as much as possible. And we do try and, not try, we work really hard in making this a safe environment for them.

O: Right. Yeah I've noticed that.

P: Describe them over all as good kids though.

O: Yeah. Ok. Um if if I were to ask you to define community how would you define that?

P: I would say it's a um network of people that live in a in an area and work together and attempt to improve their lives through social interaction, and business, and government, and education.

O: Ok. Ok. And so if I um were to ask you if you felt like this school had it's own community…

P: We're a community. We have learners here at this school with the common goal of getting these students where they need to be to get into high school and that includes passing the state assessments. You know we work together as a team and you know we have high pressure areas like English, math, science, and history because they are tested and we also have elective and enrichment courses. And they work toward the same goal. Ideally.

O: OK. Very good. So and um how do you or if I don't know if you think it if it does but do you think that translates to the classroom? Do you think that it's possible for each classroom to have its community or do you think it is more of a school community?

P: Oh yeah. No I know that each classroom has its own dynamics and that's because of the teacher and the group that's there. And they and they interact differently. In a communal sense. A sense of community.

O: Yeah. Ok. Um …

P: That's definitely true.

O: Ok.

P: Student A will act differently in classroom A than they will in classroom B because of the dynamics of it.

O: Right. Right. Yeah absolutely and that's kind of what I look at too when I go from classroom to classroom and try to figure out basically what it is that's making Student A uh you know um maybe act differently with different things. But I think um yes it has to do a lot with the teacher and it might also have to do with the other students possibly.

P: Yeah. Oh definitely. Yeah the students and how what their strengths and needs are and how they um convey those to the group.

O: Uh-huh. So that brings me to a question I don't know what order but um the other thing I look at is specifically not just community but a community of a practice where you kind of actually touch on this already but where everybody you know kind of works on the same goal or they have kind of the same practice. So a lot of the time when I talk to the students I will use like work as an example because they are all kind of working on the same goals. And you know you mentioned when you talked about um the community in the school and the goal is to kind of get through testing and…

P: Achievement. Student achievement. That's our main goal period. I mean it has to be because we want, that's the purpose of the school, we want the students to come in and learn what they need to learn and then be able to apply that in upper grades and eventually in life.

O: Right. Um for each well well I won't I won't ask that yet, maybe I'll maybe I'll get to that later. But ok so that would be the practice of the school.

P: Do you want me to close that door?

O: Um yeah do you mind? Just because it will probably get louder. Thanks. Um how would you describe the community around or I guess Coastal Bluff community around the school?

P: I would describe it into a community that is evolving from a um primarily um fishing and shrimping type industry um with a very strong local, how do I say it, network into a newer um the um industry has changed from that to more information based and also more people working for various plants around here and developing the properties around here which are very very valuable at least at this time. Um uh I would describe it as many of the parents that I deal with have some positive and negative experiences in school. Many of them are very young parents themselves so I have to take that into account when I am interacting with them. I get a lot of um a fairly large group of um students that live with people other than their direct parents, like their grandparents or aunts and uncles or foster, we have quite a few who are in foster environments. Um we have a network of or group of students who are inclined to to um lean toward gang activity out in the community and they find that as a support network for them for lack of I don't know if home environment is bad or they don't care or we have a large number of young people that lean toward that. Um I would describe it as a positive overall community. Generally the people here uh interact very well and I think that the city government um maybe I shouldn't say anything about the city government (laughs). I think that at times they they have the I think they think they have the best interest of the city and their citizens in place but you've got the the issue of being political and this this is what I want. Personal agendas.

O: Sure. Right.

P: Did that answer your question? I kind of went off on a tangent.

O: No yeah it does. No no no it does because it all helps me to understand it a little bit better as far as the parents and things.

P: Of the of the of the set property value, the property is becoming very valuable, particularly down by the water, and uh so you've got a section of town that is really really high dollar, you know in fact I went with my brother-in-law last weekend and he was looking at buying a lot over there down by the water and it was $250,000. Well yeah for just a small lot with nothing on it. And then you have 70% of our kids who are on free or reduced lunch. District wise um my campus may be a little off that but generally 70% of the students in the district are on free of reduced lunch which means they are below poverty level for the number of kids in their household.

O: Right. So and I wouldn't have brought this up expect for you just made me think of it. When I was talking to another principal he was telling me (laughs), I don't know anything about financing and school districts but he was telling me about where the taxes came from and I think in his district it was more from the plants versus the property and you know he said it was from the property that had a lot less money I guess.

P: Right. We are technically chapter 42 district which means we we receive money from the state which means we are a poor district. But ** for example which is about 10 miles down the road is a chapter 41 district because of the property value since 1997 ball park have tripled in this area. They've tripled here too but we're still not at the point. Uh-huh and we don't we don't uh get any of our tax pays from any of the refining companies like Oxycan(?) or any of those or even Demusa(?), the carbon black plant, **, that's under the Coastal Bluff school district. So yeah we we're still poor but the property values are increasing. For example, I think our total taxable value when I started here was around $200 million and now it's closer to $500 million for the district and that's that's where we generate our local tax dollars and school finance we get state money, federal money, and local dollars. If your local dollars are over a certain amount per student, then we end up giving money to the state and we get nothing from the state. If they are below that, which we are, we get money from the state as well.

O: Ok.

P: Federal it doesn't, federal it's blocked grants basically so you're going to get it anyway.

O: Yeah. Ok. Um so…

P: It's a lot more complicated than that…

O: Right. So I just asked you to describe the community but how do you feel like any of those aspects that you described as far as having younger parents, students living with other um with other relatives or foster parents, do you feel like that effects the community of the school or the school at all?

P: Oh yeah. The poverty and the fact that students are not coming to school prepared to learn um definitely effects it. It affects it at this level and it affects it at the elementary level as well significantly. I was an elementary/primary school principal here for five years and you know I saw kids that were, I had the expectation of kids coming to this school ready to learn to read you know in kindergarten or I had kids that could come to school that were four years old that could barely talk. Speak English or Spanish and not go to the bathroom so it affects it. And it's because of the lack of, you're not born with the knowledge or how to be a parent, hopefully you have a role model that you can, you can use and then make your own decision beyond that. And many of people just didn't know. And I don't fault them for that. And they didn't have any money. It affects it though definitely.

O: Right. Well and if you think of anything along those lines too let me know what you think. Um how do you think then that that might effect well I guess that's the same kind of question. Um you've already answered these questions so that's why I'm kind of pausing here. Um let's see. You talked about the practice of the school being um basically achievement and that's what the main goal is. What do you think the students think the practice of the school is?

P: Many of the students come to school to interact with their friends. Excuse me, I have a group, I mean there is a body of students that I mean many of them I don't know well because they are never in the office and I consider them low maintenance. They pass all of their classes they do well in class and they never get in trouble. Yeah and and those generally I believe has decent parental involvement. They have the expectation that you are going to go to school and do what you are supposed to do. And then I have those that are more challenging of course. What was the question?

O: Um just what do you think the students think the practice would be?

P: Well we hammered achievement and they have to pass the TACS. And starting next year the students in eighth grade have to pass the TACS or they can't go on to the next grade level. Um a gateway year. And we have, our scores have steadily improved since I've been here, and I've been here three years and I think we'll continue to see that but you know that's a hard decision when a student whose working as hard as they can but don't pass the TACS the state assessment, don't pass it a second time, don't pass it a third time, and I've got to tell them that you've got to lose a whole year of your life here again. That's not an easy decision or conference. And I don't take it lightly certainly.

O: Yeah. I uh and I'll tell you since I've been here the past couple of years I see how big the TACS is and it's just like it ends up being you know everything in all of my interviews and all of my discussions, TACS comes up. It's pretty amazing what an influence it's had. Um ok and well my other question was who decides what that practice is going to be? Not only in the in the um school but also in the classroom. Do you think um and it's kind of an odd question but I guess what I'm trying to say is do you think that it comes down from you to the teacher or how much role does the student have in developing what that practice is?

P: Um it's mostly between the administrator and teacher but I do consider it a collaborative effort from us. When you say practice do you mean instructional strategies or do you mean the material that is taught?

O: Um I mean what kind of what's the norm? What kind of goes on everyday?

P: Students definitely have an influence on that because they can as a group um force change in a classroom. You know if a teacher comes in and they are having continued problems then there is something that she or he has to make a change. Now if they are doing something and everyone is achieving at the top, well (laughs), that's great and you've also got to look at that and make sure that we are doing stuff that is challenging enough. You know high enough expectations.

O: Right. Right. Ok.

P: Students have some say in it, they don't have much say in what is being taught though because we have to cover it in order to, because we're tested on it.

O: TACS. Right. Absolutely. Um what do you think sets the school apart from other middle schools in the area ?

P: Me of course. (laughs). Sets us apart from other middle schools. I think somewhat the uniqueness of being here in Coastal Bluff, we have a good facility, um and I have a very good um close-knit faculty. In fact when I came here I was appointed principal here and the things I heard from the district was that the people over here are terrible and they were going to stab me in the back and things like that and I have not found that to be true. I found that they work well together. If somebody needs something then they work well to get it and it's not just because of me. And I try to facilitate that. I'm not really a big top-down leader. I'm more of a facilitator. If you need something I will work to get it but in the end you better perform you know what I mean. I will give you the stuff that you need but you give me what I need and I need the students to achieve and pass and you know do what they are supposed to on the state assessments.

O: Right. And that leads me to another question that's not here but I'm going to ask you and that's what do you see as your role as the principal here?

P: As an instructional leader. Definitely. But I also as a facilitator for instruction and to set up the parameters in which people can work and be happy. Job satisfaction. People that are happy are going to work, do a lot, perform a lot better for me than someone I'm forcing you to do it. Now do I have to say that yeah do I make everyone happy all of the time? No. You can't when you are working in an organization this size. Um definitely that of instructional leader.

O: Ok. Something um that I don't ask my other my other schools because they don't have this but I noticed um something that always strikes me always when I'm here is the uniform um and how students really yeah and how students really do um wear their uniform even because I've been to other schools where they try to enforce the uniform and it doesn't really work you know kids are still wearing whatever. So I guess I'm just interested from the outside, how does that work here? How does that influence well does that does is that all of the schools in the district or how does that…?

P: It's…excuse me...it's standard throughout the district yes. Except at the lower level. Elementary kids don't have to wear belts because you know they have accidents. Um and why it works so well here is because I have support from the staff in doing it and we've set it up from the beginning this is what we've got to do, this is how we are going to enforce it and we do it. And we train the students a prompt their first couple of weeks when you know we are constantly reminding them teaching them what is appropriate. You know we've even gone as far as to have a what's it called, you know when you walk out on the runway. A modeling thing where you model the appropriate clothes. And you know show them what they can and what they can't wear and how they can and can't wear it. And if they don't do it we give them consequences.

O: Right. Ok. And then so how long has that been in the district?

P: Four years now? Four or five.

O: Ok alright. So they've had a few years to get used to it.

P: Yeah. The kids that are here have experienced it most of their time in school so they should know what to expect. But, do the other schools enforce it as well as we do? No. But they don't have the faculty I have. They are in a different environment. Elementary is different than secondary because I've worked at both. I started my career working at a high school and a high school environment is different than a middle school environment. Students that are in high school are going to either perform or they they expect more freedoms and they've earned it quite frankly you know. And other districts I've seen even when you have standardized dress K through 8, 9 through 12 they could wear different clothing. And you have to buy in from the faculty and high school teachers are different. When I worked there I would walk by people and they would never speak to me for example. And that's just the way it is and I wasn't offended.

O: Right. And how many students do you have here?

P: I have about 300 or 280 this year maybe.

O: And that's just two grades right?

P: Seventh and eighth grade.

O: Ok. Um.

P: And that's another thing. We used to have sixth grade here.

O: Right I was just going to ask you do you think that makes a difference?

P: I do. I do.

O: In what way?

P: Well I taught sixth grade for a number of years and sixth grade is very different students. You have kids who are this tall and you have kids that are bigger than I am in the same classroom and all kinds of dynamics. And lack of maturity. And also in seventh grade is when you get to implement athletics and extracurricular things that they can participate in. When you have sixth grade here and they can't do it uh I just don't think it works as well. Although you know I went to a school that was sixth, seventh, and eighth. I think it's it's working better here in this district being at the elementary school level.

O: Ok. How did they decide because I went to school too sixth through eighth and I think most of the schools I go to, and there might be a couple that I don't. Um is it is it a district thing that decided to do that or…

P: District thing and they passed a bond issue and built an extra wing on that school and did some extra building projects at the high school. So that was part of the bond issue so that community bought into it through voting.

O: Huh. Interesting. Um what about uh as far as you mentioned a few and this kind of goes back to some of the other questions from before but you mentioned a few of the industries and stuff in town. But what do you think like most of your parents or…

P: Where do they mostly work?

O: Yeah do they mostly…

P: Quite a few of them still work at the plants down over here by Coastal View and um there is a hospital here, some medical complex that I know some parents that work at. Some of them go to **, some of them don't work.

O: Right. I just didn't know if um more last year I ran into students who seemed more transient and I didn't know if their parents were in the military or if that was a big thing.

P: We get some in the military probably about every three to five percent that are in the Navy and uh but our transient mobility rate is about thirty percent overall. The greater number are these kids that are living in the Coastal Bluff ISD and this sounds ugly but they get evicted after ninety days and move to Coastal Bluff ISD then move to ** or they move in with an aunt over here. That's where the most of our move-ins come from mostly. Or moving out of town and coming back because they were from Coastal Bluff or living in poverty. Hotels and things like that. Motels excuse me.

O: Yeah just moving from place to place. Um do you think that affects the feeling of community here?

P: Oh yeah. Oh Yeah. Certainly um if you are only here you know six months then there's not a whole lot of time to buy in or and with parents who've whatever their problems are whether they're not working, maybe they're young, maybe they just there's not a whole lot of chance to become involved. And they may extend all of their energy trying to get a job or whatever. And that affects the kids no matter what. If I'm going home, and I've taken kids home before, to a one room motel room and there are five or six people in there then um school sounds pretty good.

O: Right.

P: Air conditioning and you get to eat here.

O: Yeah. Exactly. Um man you just made me think of a good question but we'll have to come back. Um ok I guess we're probably getting to the end. Um what do you think it is most important for the kids to leave this school with? What lesson?

P: Yeah I'd say that they can be successful and go onto high school and do that. That's academically, socially, you know extracurricular, or not. You know there are programs here that you know it's not just football, band, or cheerleading. There are a lot of other things that kids can do like EC and things like that. Be successful and grow as a person. And hopefully a love for learning. You know because it doesn't stop here or high school no matter whether it's formal training you still learn things everyday.

O: Right. Um that might be similar but what is the what is the most important lesson you feel you can teach them?

P: That's the same thing. Being able to go forth and be successful and know they can achieve.

O: Ok um…

P: And hopefully be a life time honor you know. Seek out things that they like. I don't care if it's carpentry or some kind of trade or just liking to read or whatever just something.

O: Yeah something they can enjoy and find to be part of the school. Um what do you think is a measure of success both in the school and in the classroom?

P: Success in the school, the state and federal government tell me what success is and that's performing well on the TACS and having good attendance rates and lowering my drop-out rate which at this level it should be zero but unfortunately it's not and um and the classroom is getting to the students and knowing and as a teacher which of course before you're a principal you have to be is you know finding what it takes to get to those students to help them achieve and learn. They have fun doing it. Being in the classroom everyday, being a good teacher is not an easy job. Being a teacher can be an easy job.

O: Right. That's a really good point. You're right about that. Um yeah (laughs). I used to teach and I was like this is hard. It's one of the hardest things.

P: Being a good teacher is hard. Yeah I put a lot of hours and time into it when I did it. And not everybody does. But it's my job to kind of move those people on if they don't here. And generally speaking my staff does a good job.

O: That's good. Um what do you think the students believe is a measure of success?

P: Passing I think. And they have a lot of pressure. I've got kids in my office every year crying if they don't pass that TACS test. It's a lot of pressure putting on them, put on them. And they take it seriously whether or not it appears they do when they are doing it. But passing.

O: Right.

P: And we reward them for passing I don't know if you know that.

O: Right what are some of the rewards?

P: For passing your classes?

O: Uh-huh.

P: We've done, took everyone that passed one six weeks, we've done it by marking period, to the movie. We took them to a movie over at the ** and gave them lunch. This week we are doing a hot dog cookout over at the stadium for everyone that passed. And it's kind of like bribery but…

O: Well yeah I understand what you're going to do in the classroom so…

P: We bought them breakfast for all the kids that passed and they got to eat. We had a dance, a (?) and ice cream social during the all this is done during the school day so everyone that's not passing has to still work.

O: So this is for passing the six weeks?

P: Uh-huh.

O: Ok and then um passing TACS?

P: Can't do anything for that. That's illegal.

O: Ok um…

P: I mean I can take everybody a reward for taking TACS but I can't the state tells us that we can't reward students for passing TACS.

O: Ok. Um what uh would you consider a measure of learning? That can just be passing too I guess.

P: Having an understanding of the material that is taught. And being able and the more you advance with school being able to apply it to a certain situation, a practical situation.

O: Ok. Um…

P: Yeah and that could be a test, that could be some kind of skills test, could be a paper you write, or whatever.

O: Right. Yeah anything. Which I did think of the other question I was going to ask you. I also noticed and maybe you can give me a better understanding of other classrooms but the classes that I observe here tend to be smaller classroom sizes. I don't know if that's normal in all of the classrooms here or…

P: Are you talking about science?

O: Right well I've seen the classrooms that I observe are between I think twelve and fourteen students.

P: Yeah that's pretty good. Generally speaking my my seventh grade class this year is a small class. It was a hundred…generally generally my classes that come up are about a hundred and fifty, a hundred and fifty five, this one is about a hundred and thirty. And that's because it was it is the first gateway class. These kids had to pass TACS in third grade, they had to pass TACS in fifth grade. And now they have to pass it next year in eighth grade. And some of them didn't so they held them back.

O: So it's a smaller so the classrooms aren't always that small then?

P: No and we are very fortunate this year.

O: Ok.

P: Last year as a matter of fact my eighth grade class was closer to two hundred. So those classes were more crowded. So you just it increases and decreases, not by a huge amount. Twenty students in a class or less of a class of you know a hundred and fifty can make a significant difference in the class sizes. In fact if they start going too low they will start pulling teachers away from me.

O: Huh. I won't tell anybody then. (laughs). Um ok last two questions, when do you when are you most comfortable as a principal?

P: When am I most comfortable? When I am walking around and interacting with kids and teachers in the classroom. That's my favorite part of doing it.

O: Ok and then when do you feel most accomplished?

P: When do I feel most accomplished?

O: As a principal.

P: When my student's scores come in and they've done a good job. That means and I don't take credit for that I know it's the teaching staff but us working together, all of us, and when I see a student turn around I don't know say for example I have a child who is having a lot of problems in seventh grade and then in eighth grade they mature and move on and start doing better. I like seeing that.

O: I said that was my last question but I also have something else. I'm sorry. I think of things that aren't on my list and then I'm like when should I say this. But um as far as discipline do you feel like you have a major discipline problems here or how do you handle discipline?

P: I have a very strong assistant principal who handles most of the student discipline and I think that we have a very structured discipline plan and we have it under control. And yes we do have some discipline problems. I sent a student to the D.A.P. this

morning for continued infractions. But overall I have to say we have in these two classes a good group of kids and fewer really significant discipline issues like breaking the law and kids you know committing felonies and things like that. Not so much here but outside. And then lower thug(?) factor.

O: Yeah I feel that just being here.

P: I think we have a very safe environment here.

O: You think that's because of the strong…

P: I think it's because the faculty works together. If it were just me and/or him we can't do it. The teachers have to enforce it and they have to buy in to do that and they want it too. You know if they feel like they aren't supported for example they write a student up and I just talk to him and send him back to class, that can happen maybe once or twice after that I'm going to say well I will just take care of that myself.

O: Right. Sure.

P: They have consequences for their actions. For us and the kids. (laughs).

O: Yes well I definitely do um notice a huge difference here. I mean this school is really a great school I feel like compared to the other schools I go to. As far as you know discipline and even in the halls. It's just a it really stands out to me of the schools I go to so…

P: And with the demographic of students we work with I think it is really important to have this kind of structured safe environment because they may not after school.

O: Right. Yeah. Absolutely. But anyway I am very impressed by your school and I love coming here so…

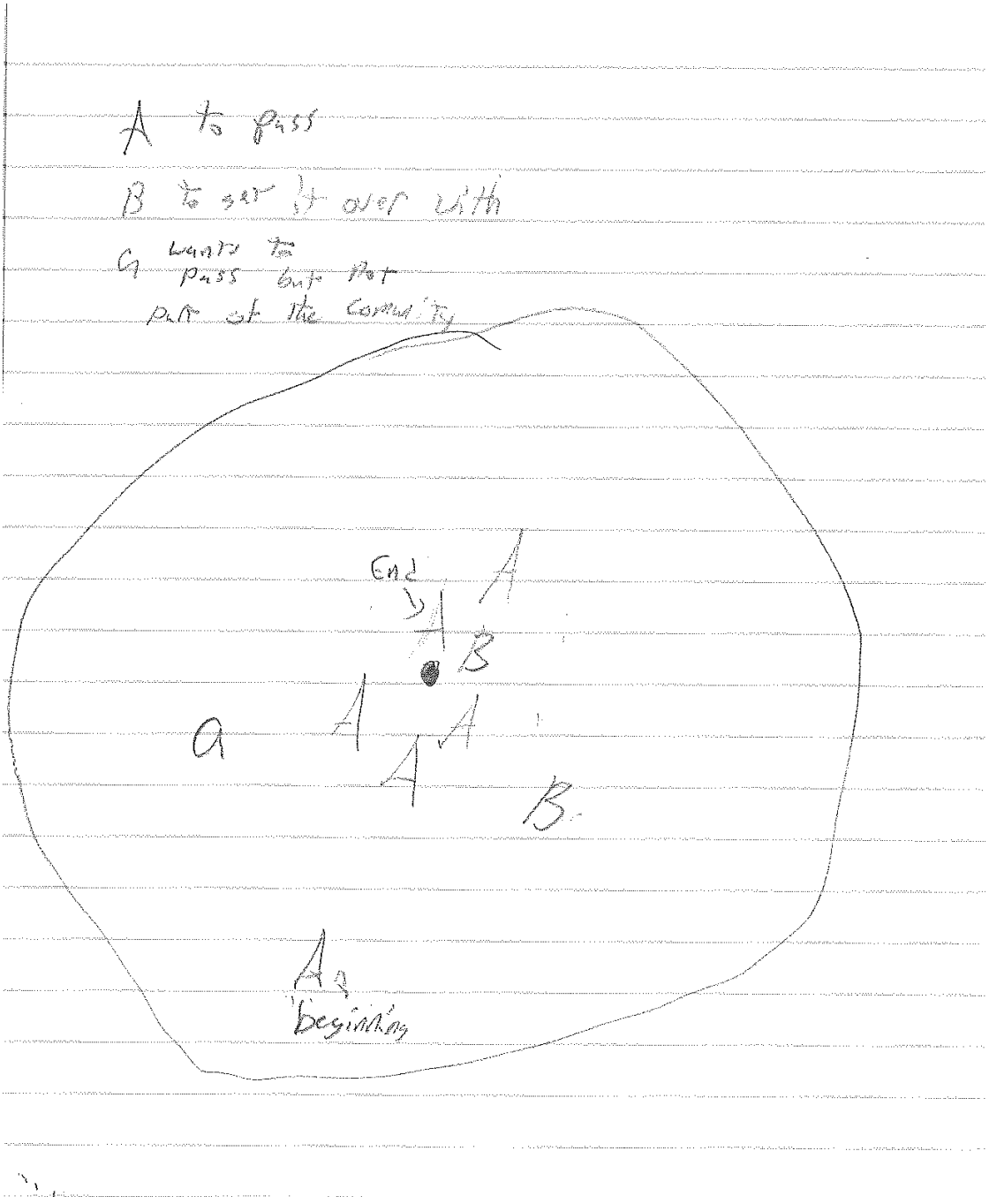
P: Make sure you say that to the mic (laughs)…

O: Thanks for your time I really appreciate it.

P: No thank you.

APPENDIX F

STUDENT DRAWING SAMPLE



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