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**Emotion and Culture in a Collaborative
Learning Environment for Engineers**

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**Emotion and Culture in a Collaborative
Learning Environment for Engineers**

by

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Dedication

To Mom and Dad

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**Emotion and Culture in a Collaborative
Learning Environment for Engineers**

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The extensive body of research on emotion and culture has identified both commonalities and variation in the expression and experience of emotion across cultures. In addition, social constructivist views of emotion suggest that some features of the expression and experience of emotion are defined by culture-specific rules of behavior. This suggests that individuals who interact with members of a culture different from their own may encounter misunderstandings or miscommunications due to differences in culture-specific rules that govern some aspects of emotion messages. A smaller subset of the research on emotion and culture has looked at emotion in the context of real-life interactions between members of different cultural groups. In particular, there is a small body of work that looks at emotion in culturally diverse work groups. The present study adds to this body of research by looking specifically at emotion in the context of a

culturally diverse collaborative learning environment in an undergraduate engineering class.

Collaborative work sessions were videotaped and a stimulated recall and narrative retelling methodology were used to interview student participants about their emotions during the work sessions and their feelings about collaborative learning. An instructor interview was also conducted. A grounded theory approach was used for data analysis. Results indicate that the problem-solving culture of the engineering students had a greater influence on the students' emotional experiences during the collaborative work sessions and on their feelings about collaborative learning than did individual cultural differences among students. Implications for engineering education and teaching English as a Second Language are discussed.

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CHAPTER ONE

INTRODUCTION

The purpose of this grounded theory study was to explore the experience and expression of emotion by members of collaborative learning teams in an undergraduate communications class for engineers. The study focuses on emotions experienced and expressed by team members during work sessions for a collaborative assignment and on their feelings about the collaborative learning experience as a whole and collaborative work in general. One contextual aspect of the group being studied was the cultural diversity present in the class. Therefore, the role of culture in the experience and expression of emotion in these collaborative learning teams was also a central question in the study.

Background

Proponents of collaborative learning assert that in collaborative learning environments, students are more engaged in learning, become more deeply and personally involved in the subject matter, and are better able to articulate more profound insights about the subject matter that they have learned in this context. However, critics of this approach to learning argue that it takes too much classroom time to implement and that students do not work effectively in groups. My own experience of collaboration, both in learning environments and in the workplace, has ranged from profoundly positive to disastrous, and most often,

time-consuming projects with disappointing, if adequate products. The variety of my own experiences with collaboration reflects both the experience of proponents and detractors and has led to my research interest in collaborative learning environments. I will begin this research report by providing some background information on collaborative learning and factors that may influence students' experiences in collaborative learning environments.

Collaborative learning is said to provide students with opportunities to be active learners in situations that require them to practice communication and interpersonal skills and apply content knowledge. This active engagement with course content through problem-solving activities resolved in the course of interaction with others is meant to lead to meaningful, or deep (Bain, 2004), learning and the development of higher-order cognitive skills. This focus on interaction in collaborative learning reveals, as Gerlach (1994) pointed out, that one of the underlying beliefs of collaborative learning is the Vygotskyian view that learning is socially constructed, depending on learners' interactions with others and the world around them.

From this social constructivist perspective, the extensive and intensive interactions required to complete collaborative learning assignments provide a rich environment for learning by allowing multiple opportunities for co-construction of meaning and engagement with the content through a variety of perspectives. This co-construction of meaning involves negotiations between

group members on a variety of topics: course content, assignment parameters, teacher expectations, among many. Thus, the rich interactions in collaborative learning contexts allow for multiple iterations of negotiation that result in co-constructions of meaning, the result of which is a more meaningful learning experience in terms of both process and product. However, as Yost (1997) noted, “The catch is that cooperative learning must be done well to realize the benefits described in the literature” (p 1).

It can, of course, be challenging for teachers to create collaborative learning environments that lead to these positive learning outcomes. Students, long accustomed to more teacher-centered and competitive models of teaching and learning, can be resistant to a collaborative approach (see Wilhelm, 1997, for an interesting discussion concerning teachers-in-training). In addition, it takes time to teach students how to work effectively in groups, and that can take away class time from other curricular goals (see Gillies and Ashman, 1998, for an example of a two-session training period that included work processes and interpersonal skills for group work in elementary classes).

Collaborative learning can also allow teachers an opportunity to provide students with authentic tasks for application of content knowledge and to integrate authentic forms of assessment into course and curriculum design. Authentic tasks are useful pedagogical tools because they engage students’ motivation in terms of face validity of instructional content by demonstrating to students how course

content is relevant to their lives. In the best uses of authentic assessment techniques for collaborative learning activities, instructors are able to provide students with feedback on learning that is formative as well as summative, thereby providing greater learning opportunities for students. When done well, collaborative work provides educators with a means to assess higher-order skills such as application of content and synthesis of material rather than the procedural knowledge of content that is typically assessed in many traditional objective assessment measures.

One factor that may influence the collaborative process is the ease with which individuals can establish working relationships with team members. Hirakawa, DeGooyer, and Valde (1997), in a study of characteristics of successful and unsuccessful teams, found relationships to be a theme that emerged in participants' recountings of successful group experiences. They also found that emotions related to the group experience were present more often in tales of successful group experiences than they were in unsuccessful experiences, noting that participants indicated emotions as influencing individuals' behaviors and, consequently, the performance of the group as a whole.

Effective interpersonal communication skills can facilitate the development and maintenance of relationships in a team environment and, thereby, positively influence the collaborative process. Bosworth (1994) identified interpersonal skills as one of five skill sets important for team members to possess to optimize the collaborative process. Of interpersonal skills, Bosworth stated, "In the collaborative process, these skills must be present if rapport is to be

established among group members. They are essential throughout the process if group interaction is to remain smooth” (p. 27). Therefore, by facilitating group processes, effective interpersonal skills can help students achieve four goals that Bento (1997) suggested should be considered when assessing the success of group projects in college classes:

degree of progress in team cohesiveness, development and growth; the desirable level of satisfaction or dissatisfaction with the team experience; and the growth experienced by individuals in their own learning of the discipline, as well as their ability to effectively work with others. (p. 143)

Effective interpersonal communication skills relate most directly to the goals of team cohesion and working well with others through its role in, as Bosworth suggested, establishing relationships with others and facilitating group processes. Team cohesion and working well with others can then lead to student satisfaction with the project and to disciplinary knowledge.

One factor that may affect the ease with which interpersonal relationships, or rapport, are established within work teams is the degree to which team members have similar styles of expression in interpersonal communication. Cross-cultural relationships within the context of culturally diverse work teams, where participants’ styles of expression may vary greatly due to differences among cultures, would be particularly vulnerable to this component of establishing relationships. One aspect of communication style that may have an effect on the interactions in culturally diverse work teams is the expression of emotion. Differences in emotional expression across cultures may vary in what emotions may be acceptably expressed in this context and how emotions may be expressed.

Thus, as we can see, the work on emotions is very important in the context of collaborative learning and reflects a junction between the social constructivist underpinnings of collaborative learning and the social constructivist theories of emotion. Oatley (1993), for example, explored the concept that emotions are socially constructed. He compared emotions to language, saying that

Repertoires of emotions, according to this approach, are like languages: Although there is no doubt a common basis for language in all human beings, each culture has its own vocabulary, its syntactic forms, its meanings, and its range of pragmatic effects. (p. 341)

In other words, while there may be some emotions that are common to all cultures, just as some linguists theorize that there is a basic set of principles common to all languages, there may still be variety in the instantiation of emotions cross-culturally, just like language principles are instantiated in a variety of ways cross-linguistically. Insofar as emotions are culturally constructed, the events that cause an individual to feel anger may be different across cultures, and when and how, or if, one expresses the anger one feels would vary across cultures as well. As a result, misunderstanding may occur when individuals from different cultures interact and one expresses emotions in circumstances and in ways that the other considers inappropriate.

Researchers such as Gallois (1994) have looked at communication of emotion between people of different social groups. Gallois investigated self-disclosure as an aspect of intergroup communication, noting that "...self-disclosure is not necessarily emotional communication. Many aspects of self-disclosure, however, involve emotional expression..." (p. 308). Further, she remarked that self-disclosure is a method by which one might increase intimacy in a relationship. If self-disclosure involves emotional expression, and emotional

expression varies cross-culturally, then this variation would have an impact on the development of relationships between members of different cultural groups. (See Yook, 1997, for a study on cultural differences in communication and negotiation in the classroom).

Planalp (1993) observed that mutual knowledge (e.g. knowledge that interactants share about each other and about the topic of conversation) is a distinctive characteristic of communication in interpersonal relationships. Interestingly, she also noted that mutual knowledge, a presumably cognitive factor within interpersonal communication, seems to play a role in emotion. She stated that perhaps, "...we feel lonely, not so much because we are alone, but because we feel that others don't understand us. That is, we share no mutual knowledge" (p. 5). If cultural aspects of cognition and interaction prevent the establishment of mutual knowledge between participants in a collaborative work setting, then participants' feelings about those interactions and the relationship among the team members may be negatively impacted, and negative feelings about the members and the collaborative work may result.

Planalp seemed to suggest that cognition and emotion are connected, and other researchers, from diverse disciplines, seem to agree. Damasio (1994) suggested that emotion and reason are intimately linked in the brain. He told the story of a man who suffered brain damage only to the emotional centers of his brain. However, even though all other cognitive centers appeared to be undamaged, the patient no longer seemed to have the ability to perform higher order cognitive functions such as planning and decision making. The conclusion

drawn was that emotions seemed to play some important role in higher cognitive functions: Emotion and reason seem to be interdependent.

In the field of second language acquisition, Schumann (1994) provided an account of language acquisition in which emotion is a crucial component. In the field of bilingual education, a study by Vañó and Pennebaker (1997) suggested that when children have the words to express negative emotions, they may be less likely to act out behaviorally. While these studies are not concerned with adult interpersonal communication skills or collaborative learning environments, they do suggest the important relationship between emotion, cognition, and behavior. That relationship may be an important factor in students' experience and expression of emotion during collaborative work sessions and their perceptions of the experience of a particular collaborative project as a whole.

Thus, current models depict emotion and reason to be interdependent and, therefore, both to influence behavior. Consequently, in an intercultural interaction, where participants' experiences of emotion may be different, there may also be different behaviors resulting from those experiences, including but not limited to manner of emotional expression. In a cross-cultural collaborative learning context these culture-bound differences may impact group members' ability to communicate effectively with each other. This may negatively impact team members' abilities to establish personal relationships and, consequently, the collaborative process. Ultimately, this would negatively influence participants' affective response to the collaborative experience as a whole.

Rationale

The rationale for this study centers on the need to address gaps in the literature regarding students' affective experiences of collaborative projects and the role of emotion and culture in those experiences.

Collaboration

While the proponents focus on the positive aspects of collaborative learning, there are numerous potential problems that arise from the use of collaborative work in instruction. Students may lack the skills needed to participate effectively in a collaborative learning, and teachers may not have the knowledge of collaborative processes needed to adequately prepare students for successful collaborative projects. Even with such knowledge, course and curriculum developers may not feel the time needed to train students to be successful collaborators is worth the loss of time spend on developing content knowledge that would necessarily be sacrificed to training students on how to be successful collaborators. Furthermore, both students and teachers, accustomed to teacher-centered learning environments, in which learning is lecture based and objectively assessed, may resist the additional time requirements needed to successfully implement collaborative learning projects.

In addition, given the demanding schedules of many university students, collaborative learning projects that require team members to meet together outside of regularly-scheduled class meeting times can create tremendous obstacles for students attempting to complete the project. Vast differences between team members' grasp of the content knowledge necessary to complete the project, communication and social skills needed to facilitate the project, and motivation to

complete the project, learn the course material, and get a good grade on the project and in the class can also create friction within the group and result in a collaborative learning environment that may, in fact, harm the student more than it helps.

Students' experiences in collaborative learning projects have not been sufficiently explored in the literature. Studies that explore students' experiences in this context are needed to enable instructors better to better and implement collaborative projects that benefit students and have a greater potential to live up to the promise that proponents of collaborative learning attribute to this educational approach. This study addresses this gap in the literature by exploring students' experiences of collaborative learning environments.

Emotion

Students' affective experience in diverse learning contexts is an emerging area of research. Do and Schallert (2004) examined this aspect of student experience in the context of classroom discussions. Emotions have emerged as a factor in studies that have examined the collaborative process in both work and educational settings. This suggests that emotion plays an important role in the process of collaboration. However, the role of emotion in a collaborative learning environment has not been a central focus of studies on collaboration in educational contexts.

Therefore, this study addresses a gap in the literature by focusing on students' affective experiences of collaborative learning. In addition, this study explores the students' affect in collaborative learning at multiple levels: specific

interactions during work sessions, overall feelings about a specific collaborative project, and feelings about collaborative learning overall. By better understanding the role of emotion in collaborative learning, teachers can better help students to adapt to the emotional demands that collaborative work entails and, thereby, equip them to achieve positive outcomes from collaborative learning projects.

Culture

International students involved in collaborative learning projects in U.S. classrooms may encounter additional challenges because of language skills. Cultural expectations of student behavior in educational contexts and in interpersonal communication styles may also lead to qualitatively different experiences for international students involved in collaborative learning in U.S. universities. Dee and Henkin (1999), Senyshyn, Warford, and Zhan (2000), and Ridley (2004) examined aspects of U.S. and U.K. educational culture that created challenges for international students. The expectation that students should express their ideas, a behavior central to success in collaborative learning contexts, was one cultural expectation that international students identified as quite challenging to adapt to.

Leki (2001) looked specifically at international students' experience in collaborative learning projects in U.S. educational programs. In Leki's study, language proficiency and social skills in managing group relationships and interactions emerged as factors in students' experiences in collaborative projects and students' feelings about working on these projects. In addition, one aspect of interpersonal communication that may affect a student's ability to manage

interactions and relationships successfully in collaborative settings may be the expression of emotion itself. Culturally-defined expectations for the regulation and expression of emotion may impact students' ability to negotiate collaborative interactions successfully and affect their overall affective experience of the collaborative process. Few studies have looked at the role of culture and emotion in collaborative settings. More studies looking at the experiences of international students in collaborative learning environments and looking at the role of culture and emotion in culturally-diverse collaborative contexts are needed. My hope for this research was that it provide a body of knowledge that would help instructors who prepare international students for study in U.S. universities to equip their students with the linguistic skills and cultural knowledge they need to be successful in such environments.

Disciplinary culture is another aspect of culture that may affect students' experiences of collaborative learning. Leki's (2001) study looked at students in nursing and in a general educational requirement course. The nursing student in this study seemed better able to adapt to the collaborative learning environment than did the students in the general education course. This leads to a question of whether successful acculturation into a specific discipline or feelings of identification as a member of the discipline may help international students cope with the demands of the collaborative process and this new learning context.

Present Study

In this study, I looked at emotions from the social constructivist and cognitive perspectives. My assumptions were that emotions to a large extent are

socially constructed, and the parameters for appropriate expression of emotions are, at least to some extent, socially defined. Therefore, it would seem that in intercultural interactions and the development of relationships through those interactions, there is potential for disparities between participants in what situations give rise to emotions and the appropriate form of expression for emotions. In addition, I assumed that emotion and cognition are interrelated. Therefore, culturally-based differences in emotional experience and expression could lead to behavioral differences in addition to those associated with emotional expression. These disparities could lead to differences in the participants' perceptions of the quality of the interactions, the relationship among group members, and overall satisfaction with the collaborative effort. Furthermore, such disparities could influence participants' desires to engage in similar types of interaction and collaboration in the future.

The participants for the study were undergraduate students at a U.S. university with a large international student population. I looked at international students' interactions with U.S. students in a collaborative learning environment that was part of a communications course offered in the electrical and computer engineering program. I videotaped and observed work sessions and interviewed student participants as they worked on a collaborative project for their communications course. While the principal area of investigation was the role of emotion and culture on the interactions during work sessions and satisfaction with the collaborative process, I did not want to restrict the participants to responses concerning only that aspect of their collaborative experience. In addition, I did not want to bias participants' responses with an overt focus on emotions and culture.

Therefore, I adopted a grounded theory approach for the study, one that allowed me to focus both on a particular area of the phenomenon, emotion and culture, but also to look at the students' experience of the collaborative effort from a broader perspective as well. The analysis resulting from this approach painted a more complete picture of the students' perceptions of the collaborative experience, including the role of culture and emotion in that experience, than would have been possible with an approach that was more heavily driven by theory and focused exclusively on one particular aspect of the experience. Therefore, grounded theory was a particularly appropriate approach because the focus of the study was on students' perceptions of events. Grounded theory allowed those perceptions to emerge.

Research Questions

By looking at interactants' perceptions of emotional experience and expression during collaborative work sessions of culturally diverse teams, I hoped to discover what role emotion and culture may play in student perceptions of their experiences during individual work sessions and the collaborative project as a whole. Specifically, I was looking at the following questions.

- (1) How do interactants perceive, describe, and explain the emotions of others during collaborative work sessions?
- (2) How do interactants describe their responses to the emotional messages of others during collaborative work sessions?
- (3) How do interactants describe and explain their own emotional experience during collaborative work sessions?

- (4) What role does culture play in interactants' descriptions, explanations, and perceptions of emotion during collaborative work sessions?
- (5) How do participants describe and explain their feelings about collaborative work sessions, the project as a whole, and collaborative work in general?
- (6) What role does culture play in participants' descriptions and explanations of their feelings about the collaborative work sessions, the project as a whole, and collaborative work in general?

Terminology

Before proceeding to a description of the study in the following chapters, I will define some terminology that is used throughout the study and explain how it is used here compared to conceptualizations of these terms within the literature.

Affect, Feeling, and Emotion. Throughout the study, I use the terms *affect*, *feeling*, and *emotion*. These terms are differentiated within the literature on emotion. Batson, Shaw, and Oleson (1992) explained the distinction between *affect* and *emotion*. They characterized affect as having "...valence....and intensity..." (p 298). Valence is a positive or negative characteristic. Intensity is the strength of that valence. Therefore, affect is a feeling of positivity or negativity one can experience in different degrees of strength. Emotion, according to these authors, is more specific and characterized as a response to a specific goal and one's perspective on that goal: for instance, how far it is from being met, or how close it is.

LeDoux (1996) described the distinction between feeling and emotion as being one of consciousness. Emotions are unconscious physiological responses to stimuli. Feelings, according to Le Doux, are conscious emotions. He used the term *emotional feeling* and described this as a “conscious emotional experience” (p. 296). Damasio (2003) presented a model of emotion and feelings similar to that of Le Doux. In Damasio’s model, *emotions* are physiological responses to an “...emotionally competent stimulus (an ECS)...” (p 53). *Feelings*, according to Damasio, are preceded by emotions and are a result of the combination of emotions and thoughts about those emotions. Therefore, Le Doux and Damasio seem to agree that feelings require conscious awareness of emotions; however, emotions can occur as physiological responses without conscious awareness. Damasio further identified three categories of emotions: background, primary, and social. He seemed to refer to all categories of emotions and feelings as *affective states*. Thus, *affect* is used within the emotion literature as the most inclusive term, with the least specificity. *Emotion* is the most specific term, and *feelings* may be the most complex as they involve both physiological responses and conscious awareness and thoughts.

In this study, similar to Do and Schallert (2004), I adopted the stance that, for the purposes of this study, precision with terminology in a naturalistic, compared to experimental, context is not as important as capturing participants’ descriptions of their affective states. Nonetheless, I use the term *affect*, in its most inclusive and general sense, to designate a state of a generalized sense of positive or negative valence.

Dyads, Teams, Groups. Throughout the study I use the terms *group*, *team*, and *partner* to refer to the collaborative entities under investigation. The collaborative units in the study consisted of two or three individuals. Therefore, I do not make the distinction between *dyads*, *teams*, or *groups*. While the dynamics and roles in each of these configurations are different, it is not the focus of this study to make a distinction between these configurations. Therefore, the terms are used interchangeably in this study.

Organization

In Chapter Two, I will discuss the literature relevant to the present study, providing a brief introduction to the history of emotion research and examining literature from a variety of disciplines that shed light on the context of collaborative learning. In Chapter Three, I describe the methodology of the study, including information on the class context, the participants, and the method of analysis. In Chapter Four, I present the results from the study in two parts. In Part One of Chapter Four, I present data that address research questions one through 5 above. In Part Two of Chapter Four, I present profiles of three collaborative groups from the study. This part of Chapter Four will begin to show the relationships between the categories described in Part One of Chapter Four. In Chapter Five, I present a model of emotions in collaborative learning environment for engineers that emerged from the analysis of the data presented in Chapter Four and address Research Question Six in more detail. In Chapter Six, I discuss the

results, address limitations of the study, present some implications for practice, and suggestions for future research.

CHAPTER TWO

LITERATURE REVIEW

In this section, I review research relevant to the present study. This includes research on the following three areas: emotion, engineering education, and education and culture. In the first section, I provide a brief history of emotion research, following by a more detailed look at cognitive and social models of emotion. Within the discussion of social cognitive models of emotion, I include research on connections between emotion, interpersonal communication, and culture. In the second section, I move to a discussion of engineering education, which includes a discussion of the role of communication and collaboration training in the discipline. I also include a section on the culture and engineering. Finally, I discuss culture and education on a broader scale than a single discipline. In this section, I point out some of the challenges that students may encounter when pursuing degrees outside of their home countries.

Emotion Research

In this section, I discuss a brief history of models of emotion, focusing on cognitive and social-cognitive models. This includes research on emotion and interpersonal communication. I also present research specifically on culture and emotion.

A Brief History

The study of emotions has a long history. Cornelius (1996) in a review of the research in emotion theory identified four schools of thought that have emerged. He categorized these schools of thought as (1) Darwinian, (2) Jamesian, (3) Cognitive, and (4) Social Constructivist. Barbour (1999) identified the following five approaches in studying emotion: (1) evolutionary, (2) body-response, (3) cognitive, (4) social, (5) neural. Both authors characterized these schools of thought not as competing theories, but as analyzing different levels of the emotion phenomena.

Physiologically Based Models of Emotion

Evolutionary and body-response orientations to emotions explain emotions as an immediate physiological response to stimuli in the environment. These stimuli result in a physical response from the individual, the purpose of which is to keep the individual safe and to ensure survival. Consequently, emotion from an evolutionary perspective is primarily a non-conscious, physiological response to environmental stimuli. For example, a stimulus that arouses the emotion of fear would result in a more rapid heart beat, increase in blood pressure, and perhaps movement away from the stimulus.

Cognitive Models of Emotion

From a historical perspective, the next school of thought on emotions that emerged included cognitive processes in the experience and expression of emotions. Cognitive approaches portray emotion as arising from evaluations of

environmental stimuli. These evaluations, or appraisals, arise in time between the perception of the stimuli and the physiological response. The sequence can be described in the following way: I see a stimulus; I evaluate the impact of the stimulus on my well being; I assign an appraisal as a result of the evaluation; the appraisal leads to a physiological response that is appropriate to the appraisal.

Very early theories of the relationship between cognition and emotion described them as separate systems, just as mind and body were long thought of as separate. This dualistic conceptualization of cognition/emotion and mind/body also carried with it a judgment: cognition and mind were superior to emotion and body. Emotion was seen as something that was an enemy of reason (cognition), and reason was more desirable by far. Cacioppo and Gardner (1999) described the Greeks (and other rationalists) as believing that reason "...can be hijacked by the pirates of emotion" (p. 194).

More recent models continued to describe cognition and emotion as separate systems. For instance, the triune brain model (MacLean, 1987) associated the mental processing of emotion with parts of the brain that had developed early in the evolution of human beings and were, therefore, more "primitive" than the higher cognitive functions that developed later in the human brain's evolutionary history. Other models divided mental functions into three categories: cognitive, affective, and conative.

However, cognitive theories of emotion that began to emerge in the 1960's initially with Magda Arnold in the 1960's (see Cornelius, 1996), described a relationship between cognition and emotion in which emotions actually played a positive role in cognition although they were still seen as separate systems.

Emotion in these early theories was seen as emerging from a cognitive attribution associated with an environmental stimulus.

An individual would perceive a stimulus in the environment, then the individual would cognitively assign an evaluation, or make an attribution to that stimulus based on approach/avoidance criteria; the stimulus would be categorized as being of harm or benefit to the individual. If the stimulus received a positive attribution, a positive emotion would result that would be followed by a particular behavior that was specific to that emotion. If the stimulus received a negative appraisal, a negative emotion would result that would determine specific behavior: for example, running away or fighting. So, this approach, like the earlier Darwinian approaches, viewed emotion as a tool for survival. The cognitive attribution provided information about the stimulus, and its role in the survival of the individual then determined the appropriate emotion and behavioral response.

Many cognitive theories of emotion have emerged in the time period following Arnold's contributions to the field. While there are significant differences among these various models, they all seem to share the belief that attribution is an important component of the relationship. Lazarus (1995) stated,

Cognitive theorists have always regarded emotions, ...as expressions of how one apprehends one's place in the environment. They differ, however, in how meaning is produced psychologically, and whether cognitive activity is regarded as a necessary or simply sufficient condition of emotion (p. 31).

So, while it is apparent that the status of emotion has risen from the days of the Greeks when emotions were wild, dangerous entities that could hijack hallowed reason and have come to be viewed as an essential element (working with cognition) of human's ability to interpret their environment and survive, the exact

relationship between cognition and emotion was still far from clear. Some emotion theorists posited that emotions led to attributions rather than attributions leading to emotions. Others proposed that there was a one-to-one correspondence between attributions and emotions. Schemas were proposed that described a set of dimensions that determined emotional response, and prototype theories emerged that attempted to account for more complex emotions as well as “basic” emotions and explore cross-cultural differences in emotional expression. However, the essential relationship between cognition and emotion remained unchanged. They were essentially seen as two separate systems that worked together for the survival of the organism.

Social Cognitive Models of Emotion

Social approaches were the next stage in the historical development of emotion research. These approaches combined the evolutionary focus on physiological response to the environment with cognitive appraisals and added social factors to the exploration of the experience and expression of emotion. Therefore, researchers working within this school of thought did not discount previous theories of emotion as a survival mechanism. However, they were interested in exploring an additional aspect of the role of emotion in human life: the relationship between emotions, social roles, and social interaction. In this view, emotions are seen not simply as a tool for physical survival but also for survival within a social group. Therefore, social rules for behavior are seen to play a role in how emotions are both experienced and expressed. Investigations of

emotion from a social-constructivist perspective are concerned with the relationship between social behavior and emotions.

Averill (1996) was instrumental in developing the social constructivist approach to studying emotion and cognition. Averill conceptualized emotion as playing an important role in social systems. He proposed that emotional experiences and displays help individuals to negotiate their social roles. One line of thought that emerged from this approach was that social roles are culturally determined; therefore, display rules for emotions that regulate these roles would also be socially determined. Attributions, and the relationship between cognition and emotion that is instantiated in the concept of attributions, are still seen as a crucial part of the social constructivist approach to emotion studies. The difference in this approach is its inclusion of the role of social factors that affect these attributions. This approach has the advantage of helping to explain the variability in emotions that some researches asserted were found across cultures.

Research based on the idea that social relationships impact the experience of emotion and the cognitive processes that lead to the experience of emotion seem to be growing in recent years. Conway, Di Fazio, and Mayman (1999), Greenspan (1997), Baum and Andersen (1999), Planalp and Fitness (1999), Parkinson (1996), Yook and Albert (1999), and Forgas (2000) have all explored the relationship between emotion, cognition, and social interactions. In addition, Scudder (1999) extended the analysis of emotions and cognition in social contexts by exploring appraisal theory in the context of commercial advertising. He reasoned that beliefs are antecedents of appraisals and examined how individuals' beliefs influence how they feel about positive and negative advertisements. This

study is interesting because it takes the study of emotion and social interaction to a new level, from actual interpersonal interactions in a society to individuals' interactions with socially constructed artifacts.

In the history of research on emotion, there has been a shift from a conceptual dualism that positioned mind/body and reason/emotion as separate and unequal methods of expression to a more egalitarian perspective on the relationship between them. As described in the preceding discussion, the relationship between emotion and cognition emerged from one that characterized emotion as less desirable than and separate from cognition to one in which both emotion and cognition played equally important roles in human beings' survival, both physically and socially. One trend that seems to be emerging in recent literature goes one step further. The interrelatedness of cognition and emotion seems now to be joined by a move toward unifying cognition and emotion with the body; it is addressing the ancient separation of mind and body as the research has questioned the separation of emotion and cognition.

Winter and Kuiper (1997), Santostefano (1995), Clark (1997), and Harré and Parrott (1996) have all explored the relationship between emotion, cognition, and body. Varela, Thompson, and Rosch (1997) were instrumental in introducing the concept of embodied cognition into the literature. This concept asserts that cognition is dependent on physical experience, one's interaction with the environment. These recent studies are bringing that concept to the study of emotion. This trend in research, along with the continued exploration of cognition in social contexts, particularly interpersonal, are two that will prove to be most interesting for the field to explore in the future.

In my study, I looked at emotions from the perspective of social constructivism. This simply means that I was concentrating on the role of social factors in the experience and expression of emotions during social interactions. Specifically, I was looking at the role of emotion and culture in the context of collaborative learning project. Therefore, the discussion of emotion in the following sections of this chapter I focus on literature in the areas of interpersonal communication and culture.

Emotion and Interpersonal Communication

The role of emotion in interpersonal communication has been addressed by a number of researchers (Burleson & Planalp, 2000; Andersen & Guerrero, 1998; Planalp & Fitness, 1999; Planalp, DeFrancisco, & Rutherford, 1996; Shimanoff, 1985; Conway, Di Fazio, & Mayman, 1999). For example, Burleson and Planalp (2000) explored the role of emotion in producing communicative messages and Shimanoff (1985) investigated display rules for positive and negative emotions in conversations and suggested that knowledge of such rules may be important to communicative competence. Similarly, Conway, Di Fazio, and Mayman (1999) discussed display rules and expectations of emotional experience and expression relevant to an individual's status.

Planalp, DeFrancisco, and Rutherford (1996) and Planalp (1998) discussed cues that individual interactants use to interpret the emotional states of others in interpersonal interactions, identifying the following cues as relevant: facial expression, gestures and body movements, activities (e.g. cleaning house), physiological changes, voice, direct and indirect verbal cues, context, and

personal knowledge of an individual's traits. Guerrero, Andersen, and Trost (1998) discussed the distinction between emotional experience and emotional expression, pointing out that emotional experience is intrapersonal while emotional expression is interpersonal. These authors went so far as to state that "although emotions can be experienced and not expressed, the natural condition of emotion is that they are interpersonally expressed" (p. 9). Andersen and Guerrero (1998) explored further the role of emotions in interpersonal communication, asserting that not only are display rules socially defined, but that the emotional expressions are evolutionarily selected for their role in social interactions and the positive effect these social interactions have on the survival of the species. They posited six principles of the emotional expression in communication and suggested that the exploration of emotion as a function of social communication is an area of research that has significance for numerous professions, including education.

Emotion and Culture

Burleson and Planalp (2000) indicated that there is a "paucity of research examining differences in emotion knowledge structures associated with factors such as culture and gender" (p. 241). However, there is a tradition of research that has investigated the identification of emotions across cultures. These studies principally attempt to answer the question of the universality or relativity of emotions across cultures. For instance, Graham, Hamblin, and Feldstein (2001) examined the ability of Japanese, Spanish, and English speakers to identify emotions from listening to the voices of English speakers with the actual words

masked. This study found that English speakers were much better at correctly interpreting the emotion expressed by English speakers using only voice as a cue. Spanish speakers and Japanese speakers did not fare as well, with Spanish speakers having greater accuracy than Japanese speakers. These results led the authors to suggest that the greater cultural and language differences between the Japanese speakers and the English speakers compared to the Spanish speakers and the English speakers were factors that led to the Spanish speakers ability to be more accurate in interpreting the emotions of English speakers from vocal cues alone.

Camras, Oster, Campos, Campos, Ujie, Miyake, Wang, and Ming (1998) explored the emotional expressions of European American, Japanese, and Chinese infants. They found that Japanese infants' facial expressions were more similar to the facial expressions of European American infants than to Chinese infants. The authors suggested that this difference may be partially a result of the education level of the mothers. Shioiri, Someya, Helmeste, and Tang (1999) looked at the ability of Japanese students to identify accurately the emotions of facial expressions depicted in the Japanese and Caucasian Facial Expression of Emotion (JACFEE) photos. The researchers concluded that differences in the interpretation of these photos, compared to interpretations of the same set by Americans, was significant enough that the set should be modified for cultural differences before it could be used in psychiatric settings.

Appropriateness of emotional expression has also been shown to vary across cultures and even across ethnicities within a single culture. For example, Matsumoto (1990, 1993) conducted studies in both of these contexts, comparing

judgments on both the identification of emotional expression and appropriateness of displaying those emotions. He found that when comparing responses from individuals from Japan and the United States, there were different judgments of appropriateness (1990). He found the same result when comparing the responses of different ethnic groups within the United States (1993). Harré (1998) described the display of emotions as a social act and compared emotion display to speech acts. In other words, emotional displays can accomplish a social act in the same way that a speech act can. He mentioned jealousy as an example, stating that it accomplishes the social act of protesting the action that gave rise to the emotion.

Empathy for Other's Emotions

One area of research that has looked at the ability of individuals to identify the emotions of others as they occur during interpersonal interactions is that of empathic accuracy (Ickes, 1993; Gesn & Ickes, 1999; Ickes, Buysse, Pham, Rivers, Erickson, Hancock, Kelleher, & Gesn, 2000). Bui (1981) described empathy as the ability to perceive another's internal state during an interaction and says, "The central quality of empathy...is that of feeling a state of mind which seems qualitatively to match and be held in common with the patient" p. 290. Ickes (1993, 1997) identified empathic accuracy as one of four areas of study concerned with individuals' abilities accurately to infer information about others' personality, thoughts, and feelings. These four areas involve one's ability to determine another's (1) personality, (2) "attitudes, values, and self-conceptions" (p. 588), (3) general emotional state, and (4) "the ability to infer the specific content of another person's thoughts and feelings" (p. 288) – empathic accuracy.

One method that has been used to obtain data on empathic accuracy in naturalistic settings is stimulated recall (Levenson & Ruef, 1997; Ickes, Stinson, Bissonnette, & Garcia, 1990; Hancock & Ickes, 1996). In stimulated recall, participants are asked to view a videotape of an interaction in which they have participated and comment on the thoughts and feelings they were experiencing during the interaction. The form of comment may vary. Levenson and Ruef had participants use a "...rating dial to provide continuous ratings of how they had been feeling moment-to-moment during the interaction" p. 50. Ickes, Stinson, Bissonnette, and Garcia (1990) provided their participants with a form on which to record their thoughts and feelings as they reviewed the videotape of the interaction. Bissonnette, Rusbult, and Kilpatrick (1997) reported on a study that used a rating sheet on which participants indicated the degree to which they felt particular feelings that were specified on the coding form.

The role of culture in an individual's ability to perceive another's emotion has not yet been well explored in the literature, nor has the role of empathic accuracy in collaborative or educational settings. My study addressed some aspects of this area of research by exploring whether culture had an influence on individuals' perceptions of their partners' emotions during interactions in a collaborative learning environment. I also explored if these perceptions influenced participants' satisfaction with the interactions and the collaborative experience as a whole. The collaborative learning environment exploring was within a computer and electrical engineering department at a U.S. university. Therefore, the next section of the literature review now turns to research in engineering education and

the role of communication and collaboration in engineering curricula and professional standards.

Communication and Collaboration in Engineering Education

The study I am reporting here involved an exploration of emotion as it occurs in interactions in culturally diverse collaborative work groups in a communications course for engineers. Therefore, the rest of this chapter presents the research on communication in the training of engineers and the importance of communication skills within the profession. In addition, I address the area of collaboration within engineering education. Finally, I explore the topic of the culture of engineering: the practices and expectations of the profession.

Language and Communication Skills for Engineering Students

Engineers and engineering educators often profess that communication skills are important to engineers. Engineers are often called upon to represent their ideas orally and in writing to engineers as well as to non-engineers. In addition, they frequently engage in collaborative problem-solving. Therefore, it is recognized that it is beneficial for engineers to be skilled in written and oral communication and effective collaboration. Realizing this, and encouraged by requirements from the Accrediting Board for Engineering and Technology (ABET), engineering programs have begun to incorporate training in oral and written communications and collaborative projects into their curricula. With a large number of students in engineering programs in English-speaking countries, this integration of communication skills into engineering curricula can be

particularly problematic for students for whom English is not a first language. Some programs recognize this problem and have instituted special assistance for non-native English speakers.

McGregor, Saunders, Fry, and Taylor (2000) described a method for revising an engineering curriculum to include more completely the communication skills that have been identified by ABET as being important to engineering programs. They cited the need for engineers not only to communicate effectively with other engineers but also with non-technical people, cross-functionally within the organization, extraorganizationally, and with a variety of cultural groups. Acknowledging the special needs of engineering students for whom English is a second language, the authors discussed the need for all engineering students to become acculturated to the practices of their profession in order to become full members in their field.

However, there is disagreement within the discipline about the issue of content within the curriculum and what constitutes the essential content knowledge of the field (MacGregor, Saunders, Fry, & Taylor, 2000). There is concern that incorporating communication skills instruction across the curriculum will diminish the time that is needed for content instruction. Therefore, if a communication across the curriculum approach is to be implemented in engineering programs, a discussion needs to occur regarding the essential elements of content knowledge.

While ABET has increasingly become aware of the need for more oral and written communication training in engineering programs, research has suggested that engineering students, too, think that more training in communication skills is

needed in engineering curricula. Freeman (2003) reported results from a survey of students in an engineering program at the University of Toronto. Students wanted more training in both oral and written communication skills. Interestingly, the results of the survey also showed that students felt less confident in their communication skills the closer they came to graduation, as many students had participated in internships and discovered the extent of communication skills that were needed in the workplace. In addition, over the last several decades, as communication skills have become increasingly important in the curricula of engineering departments in the United States and in other countries, communication skills among engineers from diverse linguistic and cultural backgrounds has also become of interest. Because a large number of engineering students in English speaking countries are international students whose native language is not English, special courses and workshops have been developed to address the linguistic needs of these students.

Freeman (2003) described a course designed to provide training in conversational skills to NNS engineering students in an English-speaking university. This course was implemented as a result of a survey conducted with undergraduate engineering students that revealed that NNS students found conversational skills to be the most difficult of the oral communications skills needed for the collaborative activities required in engineering projects. Therefore, the focus in the class was on helping NNS engineering students develop skill and confidence in conversational English within their discipline.

Nord (1988) described a course for International Teaching Assistants (ITA) specifically for engineering students, citing the large number of non-native

English speakers in engineering programs in the U.S. She described a joint program with ESL professionals and engineering faculty to address these needs. Nord (1989) suggested a Writing Across the Curriculum model for engineering programs to help implement the requirement for communication skills specified by ABET.

Levis and Levis (2003) described a course in teaching scientific writing skills to NNS in scientific and technical fields, including engineering. In their course design, they used a collaborative approach in which students worked in small groups to produce both a written and oral report describing research the students had conducted during the course. The authors asserted that this approach to teaching writing is better in helping students acquire the skills needed in their particular graduate degree programs. They also pointed out the need for training in English for NNS within the discipline of engineering, citing the high number of NNS in engineering programs in U.S. universities.

If communication across the engineering curriculum is to be implemented to support ABET's criteria for professional training in engineering, and international students continue attend engineering programs in English speaking programs, then the impact of culture on communication style is an area of research that is pertinent to the development of communications components within the curriculum.

Collaboration in Engineering Education

Collaboration is an essential function of engineering work. The importance of collaboration skills, as communication skills, has been recognized

by ABET as an important aspect of the engineering curriculum. The collaborative activities of engineers focus on group problem-solving. The distributed cognition features of group problem-solving have been of such interest to engineers that the field has been developing technology to assist with the process of on-site and geographically dispersed work groups. Emotion has proven to be a feature that is desirable in these technologies. Garcia, Favela, and Machorro (1999) described a computer collaborative system that incorporates emotion in the interactions. The computer system is programmed with affective features for computer-mediated communication. The addition of emotion into the interaction supports an assertion for the importance of emotional awareness in interpersonal interactions, including collaborative contexts.

Emotion has also proven to be a valuable aspect of collaboration in distance learning situations. An example is a study by Nishihori, Okabe, and Yamamoto (2002) who described a distance learning experiment that connected students at a U.S. university learning Japanese with students in classrooms in Japan. The purpose of this distance learning experiment was to provide the U.S. students of Japanese and Japanese students with an opportunity for collaborative learning opportunities that incorporated cultural training. The classroom set-up allowed students in both classes visual access to each classroom through real-time video and verbal communication through synchronous chat technology. Students in Japan cited the visual aspect of the classroom set-up as beneficial because they could see the facial expressions of the people with whom they were interacting and, therefore, had an impression of the feelings of their distance classmates. The authors described this experimental classroom set-up as a method by which to

implement the increasingly communicative focus of English language education in Japan. For this group of students, then, awareness of the emotions of collaborators proved to be a valuable aspect of the collaboration.

Another aspect of collaborative learning contexts that has proven to be important is the ability and willingness of group members to express their ideas. In a study that examined the relationship between face-to-face (FTF) communication and computer-mediated communication (CMC) among group members in a collaborative learning situation, Mochizuki, Egi, Ozawa, Shibahara, Inoshita, and Kato (2002) described a relationship between these two contexts. They found that effective communication in FTF contexts was characterized by more open communication, in particular with group members contribution of ideas. Furthermore, they suggested that FTF communication in the groups they studied was facilitated, or enhanced, if the group members expressed relatively similar knowledge about the topic and about how groups communicate effectively.

Collaboration is also increasingly a component in the engineering curriculum. Importantly, Murphy and Hennessy (2001) suggested that collaborative learning is not only a tool in learning but an object in learning within the engineering curriculum. Hara, Solomon, Kim, and Sonnenwald (2003) looked at collaboration among scientists in a geographically dispersed situation. They described characteristics that affect collaboration and recommended factors that make collaboration successful. Studies like this, that identify components that

make collaboration successful, are critical to define instructional objectives in training students in engineering and other disciplines to collaborate successfully. My study adds to this body of research by exploring the role of culture in collaborative learning situations where member of the collaborative team are from different cultures.

Pogner (2003) discussed the collaborative writing process in engineering contexts. Specifically, he described the writing of a particular text as a collaborative, social act that reflects and tests the rules of a discourse community. In this case, the community was a group of Danish engineers. Interestingly, this collaboration took place between two different engineers, one a client and one a consultant. Results highlighted the adaptations needed on the part of the consultant to fulfill both his role as an engineer and as a consultant, pointing to the multiple roles played by a single individual within the situation of writing the proposal. Pogner described these double roles as a functional role and a social role, and focused on the negotiations made during the writing process to produce the final document. Also highlighted were the importance of context to the negotiation process and the decisions that lead to the final version of the document.

This study is particularly interesting because it points to the social role as a factor in the collaborative process. In a learning environment where members of a collaborative team are from different cultures, culturally-based expectations of the social roles of teachers and students may create a very challenging environment for international students whose cultural beliefs do not support a belief in experiential or team learning. This clash of cultures may affect students'

performance in collaborative learning situations and their affective experience of the collaborative project.

The Culture of Engineering

The changes in engineering curricula described above, the integration of communication skills and collaborative learning into the engineering curriculum, have occurred because they are important skills in the work place. Norlyk (1996) described communication within an organization in the following way:

“...Communication in organizations can be seen as a function of the compatible, partly compatible or non-compatible discourse practices of different occupational cultures and their value systems” (p. 10). Furthermore, she stated that, “Occupational cultures and occupational value systems clearly influence the way in which different professionals in the organization think, speak, and write” (p. 13). Thus, professional cultures can have significant effects on communication within organizations. However, it should be noted, also, that professional culture may show variations across organizations that reflect modifications as a result of interaction with the larger organizational culture. Therefore, employees may have to adapt their professional culture to the culture of the organization for which they work. When entering a new organization, a period of adjustment may follow, during which the new employee learns the culture and the organization. Gundy (1993) investigated this issue when looking at the establishment of cultural norms in her study on newcomers in an engineering firm and made recommendations for acculturation of engineers new to a firm.

This conceptualization of professions as cultural groups to which new members must be acculturated can be extended from the workplace into educational programs. If new hires in engineering firms must be instructed in the cultural norms of the organization, then students in engineering programs must be instructed in the culture of the profession. Baba and Pawlowski (2001) suggested this role of a professional program as instructing students in the culture of the profession in their definition of culture as “a shared system of meaning and practice emerging from collective learning and taught to a group’s newcomers as the correct way to think and behave” (p. 6). This concept is similar to Lave and Wenger’s (1991) concept of situated learning, in which newcomers to a profession are gradually acculturated to the practices of the profession as they participate in it. Incorporation of collaboration into the engineering curriculum may be seen as an attempt to acculturate students to the beliefs among professional engineers that this is a valuable, important aspect of the profession. Therefore, it may be said that international students in U.S. engineering programs experience, to varying degrees, acculturation to their profession, to the new educational system and teaching methods, and to the host culture.

While culture, emotion, culture and collaboration have been studied individually, the interaction between emotion, culture, and collaboration has been less well studied. However, there is some research that suggests emotion does play a role in the interaction between culture and collaboration. However, that interaction has not yet been clearly articulated, and there is not an abundance of empirical data upon which to model the relationships between culture and emotion in collaborative contexts. Baba and Pawlowski (2001) depicted a model

of culture in which the role of emotion acts as motivation. In this model emotion as motivation is developed through a series of experiences with a particular group.

Kelly and Barsade (2001) reviewed a body of literature that examined affect as a group phenomenon. Finn and Chattopadhyay (2000) proposed a model for the role of emotion in culturally diverse work groups. In their explanation of their model, they suggested that differences among the cultural groups represented on a team would lead to negative affect among the members. My study looked to see specifically if differences in emotional experience and expression in culturally diverse teams affects communication between team members and, ultimately, team members' satisfaction with the collaborative experience.

Workplace studies have looked at communicative and collaborative processes of engineers and the effect of culture on communication and collaboration of engineers in the workplace, both among engineers and in cross-functional interactions. Emotion does emerge within these studies as a factor in the interactions within the collaborations. However, few studies have looked at the relationship between emotion and culture in collaborative activities.

Education and Culture

As suggested above, educational systems and classroom methods reflect the values of the cultures in which they are developed and practiced (see Reagan, 2000, for an examination of philosophies of education in non-western cultures). Therefore, when an international student enters a new educational environment, he or she may also encounter differences in practice and procedures that can be

quite different from those to which he or she is accustomed. Numerous studies have looked at the challenges that international students face when pursuing studies in new academic environments.

Tomich, McWhirter, and King (2000) reported on factors that influenced international students' ability to adapt more easily to the challenges they faced when entering new academic environments. Factors that influenced their ability to adapt included language proficiency, cultural similarity, projected length of stay, prior knowledge of culture, contact with members of host culture, identification with home culture, age, gender, personality, and attitude of host members. In addition, Al-Sharideh and Goe (1998) found that international students in the U.S. were better able to adjust to life in the U.S. if they were able to establish relationships with individuals from their own culture as well as the U.S.

Dee and Henkin (1999) and Senyshyn, Warford, and Zhan (2000) discussed problems that international students had adapting to academic life in the United States. Among the issues that caused students difficulty were the language, including informal language usage and conversational style, the informal nature of interpersonal relationships, and loss of social status. Ridley (2004) also described international students' adjustment to college life in the United Kingdom. Most important for the present study were her findings that international students expressed discomfort with the expectation that students should question what they are learning in their disciplines and participate in discussions about disciplinary topics. Expressing one's opinion and being able to support that opinion was an experience that was quite difficult for students because it was not behavior that had been expected of them in their home

countries. In collaborative engineering environment, this may be a particularly difficult adjustment because an important skill of working in collaboration with others is the ability to express one's opinion.

In addition, Leki (2001) studied the experience of international students in collaborative group projects in U.S. academic programs. In the two group projects that Leki examined, she found that the international students in both cases were marginalized in the group. In one group, U.S. students automatically marginalized the students by taking control of the project. The international students in the group were unable to negotiate full membership in the group effectively. Even in the group where the international student was accepted socially by the U.S. members of the group, she was peripheralized when group tasks were allocated because of her limited English proficiency. The experience of international students in collaborative learning environments may be one situation where cultural differences and language limitations converge to create a situation that is particularly difficult for some international students. How international students fare in these situations is an area of research that needs more attention and is one aspect of my study, their perceptions of the collaborative experience.

In addition to cultural adjustments of international students studying in U.S. academic institutions, different conceptualizations of culture have been explored in the context of higher education. For example, Hermanowicz (2005) explored institutional cultures in U.S. institutions of higher education. By examining the beliefs and values of physics faculty in U.S. institutions, Hermanowicz was able to identify three classes of institutions and described each of them according to their cultural characteristics. Neumann (2001) explored

disciplinary cultures in the U.S. by examining the beliefs and practices of teaching and learning. She describes four cultural classifications among disciplines and identifies the practices, beliefs, and values about teaching and learning within these academic cultures.

Finally, some researchers have explored relationships between aspects of disciplinary and academic culture and aspects of culture that are typically associated with ethnic groups or nationalities. Language is one aspect of culture that has been explored in relation to disciplinary culture. For example, Dahl (2004) examined the relationship between language and writing in three academic disciplines. In this study, Dahl looked at writing in three disciplines and compared writing in those disciplines in three languages. Interestingly, she found that language played a greater role in writing in disciplines in which writing conventions were less structured. In disciplines with very structured conventions, those conventions were more influential in the writing than were the conventions of specific languages. In addition to language, Eilam (2002) discussed culture and education in terms of the collectivist/individualist dimension. In this study, she explored the experience of Arab students, from a traditionally collectivist culture, in an Israeli teacher-training program, which reflected an individualist culture. She described the experiences of the Arab students in this program as they encounter the cultural differences expressed in the individualist-oriented training program and then return to teach in Arab, collectivist culture. These studies demonstrate the various conceptualizations of culture within the literature and the influences different aspects of culture can have on each other.

Conclusion

While the study of emotion has a long history, the role of emotion in collaborative contexts has a much shorter history. In addition, the study of emotion and culture is a relatively new area of research, and studies that have examined the relationship between emotion and culture by looking at interpersonal interaction in naturalistic settings are a smaller subset of that research. Finally, the interaction of emotion and culture in collaborative contexts has been examined in the workplace to a limited degree, but investigation of this interaction in educational contexts is essentially unexplored. That was the focus of this study.

CHAPTER THREE

METHOD

In this chapter, I will describe the methodology used in this study. First, I will describe the overall methodological approach I adopted for the study before going on to explain the context of the data collection in the second section. Then, I will describe the data collection procedures and finish with an explanation of how I analyzed the data and what I did to establish trustworthiness of the analysis.

Methodological Approach

The overall methodological approach adopted for this study was grounded theory (Strauss and Corbin, 1998; Dey, 1999). Grounded theory methodology involves careful attention to context and data collection in naturalistic rather than experimental settings. It requires close contact with participants over a period of time and examination of participants' perceptions of the phenomena under investigation. Because the focus of this study was on students' perceptions of their own emotional experience during collaborative work sessions, their partners' emotional experience and expression, and satisfaction with the collaborative experience, grounded theory was determined to be an appropriate methodology to examine these perceptions.

This approach also influenced the data collection procedures for the study. Interviews are a common data collection technique in this approach, and it was an important component for my study. Data collection also involved observations of participants on multiple occasions during collaborative work sessions, thereby

reflecting the grounded theory requirement for close observation of participants over a period of time. Analysis of the data also followed grounded theory procedures. The constant comparative method was used to discover emergent categories and then discover the relationships between those categories to ultimately construct a theory of the phenomenon.

There are examples in the literature of the use of the grounded theory to study perceptions of group processes by group members in collaborative work contexts and of interactions within educational settings. For example, Zafeiriou, Nunes, and Ford (2002) used grounded theory to understand student perceptions of online collaborative learning. Data collection for their study was done through interviews. Zafeiriou, Nunes, and Ford (2002) also reported on a study of students' perceptions of interactions during online conferencing, with data collection again being interviews. Also using interviews as a primary data collection tool, Yokota-Adachi and Geva (1999) applied a grounded theory approach to explore cultural beliefs about education, comparing the beliefs of Canadian teachers to those of immigrant parents. In engineering, Darling and Dannels (2003) adopted a grounded theory approach to investigate the types of oral communication in which engineers engage in the workplace. The purpose of their study was to determine what types of oral communication engineers use in the workplace to inform decisions about oral communication within engineering curricula. The match between the purpose of the approach and of this study, combined with some history of its use in related studies, made grounded theory an appropriate choice for this study.

Context

The particular context for this study was a collaborative learning situation in an upper-division undergraduate engineering class. The class was a required technical communications class in the Electrical and Computer Engineering department of a university in the United States. This class fulfilled the departmental requirements for oral and written communication and collaborative learning projects recommended by the Accreditation Board of Engineering and Technology (ABET), the accrediting agency for engineering and technical schools in the U.S.

At the time of the study, the course was offered every semester and enrollment was capped at 25. The instructor for the course had taught multiple sections every semester for several years. The class was chosen for this study because it regularly used collaborative learning as part of the course design. In addition, the university had one of the largest international student populations in the country, with many of those students enrolled in engineering programs. Because this particular professor had a reputation for being aware of the linguistic needs of non-English speaking international students, his sections of this class typically enrolled a high number of international students. Therefore, the student population in this class was typically quite diverse, having both U.S. students and a large number of international students. Thus, the collaborative focus of the class and diversity of the students enrolled was a suitable setting for me to investigate the role of emotion in culturally diverse work groups.

Course Design

The purpose of the course as stated by the instructor was to develop students' oral and written communication skills and to provide students with opportunities for collaborative learning. Because these skills would be needed by these engineering professionals upon graduation and entry into the workforce, the course design reflected a focus on real-life communicative scenarios. The assignments in the course were sequenced to reflect the written and oral skills that would be needed as the students progressed through their careers. It began with a discussion of the job search, with students writing a resume and cover letter for a job application. Assignments then progressed to types of writing and oral presentations that would be required in their work lives and ended in a major group collaborative project that required both an oral presentation and a written report.

Examples of these assignments included an executive summary, a project briefing, and a formal project report. The assignments involved some role-playing on the part of the students, and the instructor provided reality-based industry scenarios for each assignment. For instance, for the final project of the semester, the students had to design a product for the fictional company they had created for themselves. They created the company, gave it a name, and completely conceptualized its purpose and product. The scenario stated that the company needed a new product because their market share was falling. The group had to design a new product, produce a feasibility study, present it to management, give progress reports, and finally, give a formal report and presentation to the management (other class members) of the organization they had created.

Because engineers commonly collaborate on projects, a collaborative project was the key component of the class. This collaborative feature of the class had typically come at the end of the class, in the form of the group project described above that had several components that lasted the entire second half of the semester and culminated in the group giving a formal oral presentation and producing a formal written report. The semester in which this study was conducted, the professor integrated another, less elaborate, collaborative project into the course at the beginning of the semester. Data collection for this study was conducted while students were completing this first collaborative project of the semester.

Assignment Design

This first collaborative project for the class included two possibilities. The first, designed for students who might choose not to participate in my study, was an assignment on writing instructions. In this project students were to write a five to six page paper that provided instructions for a technical operation. This assignment included consultation meetings with the instructor. The second possibility, and the project on which my research was based, was made up of two parts. The first part, an executive summary, consisted of a summary and evaluation of an article on a technological innovation and a recommendation on whether or not the group's fictional company should adopt this technology. The second part was a brief oral report to management on a new technology that students had read about in an article. In this part also, students had to explain the technology and make a recommendation for adoption. The groups for this

assignment were small: all pairs except for one group of three. The students had two weeks to complete the assignments.

Research Requirements

For this collaborative project being used for my research, there were additional components added to the assignment. First, to receive full credit for the assignment, students had to allow for the videotaping of at least two of their collaborative work sessions and to complete an individual interview with me. In addition, they were to complete a reflective paper on the collaborative process, which they turned in to their instructor. While students had to complete all the components to get full credit, their agreement with me to use the data collected for my research was completely voluntary and between each individual student and me. The students could, at any time, decide not to allow me to use the data collected. This decision would not affect their grade in the class and would not be communicated to the professor. This, of course, was explained to students in informed consent forms prior to data collection.

Students who did not want to participate in the study from the beginning, as for example those who did not want to be videotaped or interviewed, could choose to complete the assignment by choosing the “instructions” assignment. Of the 25 students in the class the semester this study was conducted, 23 chose to complete the collaborative assignment connected to the research project. All 23 students agreed to allow me to use their data. The instructor listed my name and contact information in the description of the assignment included in the extended course syllabus that students acquired at the beginning of the semester so they

could contact me with any questions they might have about the research component of the project.

Participants

The 23 students who participated in the study were diverse in terms of nationality and native language. Eleven students were native speakers of English. Twelve students spoke English as a second language. Their proficiency was not independently assessed. However, because I am an experienced instructor of English as a Second Language trained in oral proficiency assessment, I could ascertain that oral proficiency was at least at a high-intermediate level for all international students. In addition, the TOEFL requirement for international students at the university is typically around 550 on the traditional paper-based test.

The group was diverse in culture and native language. Languages represented included Bengali (1), Chinese (2), English (11), Gujrati (1), Hebrew (1), Hindi (2), Urdu (2), and Vietnamese (3). All international students had resided in the U.S. for at least two years. There were 17 men and 6 women in the class. Most students reported at least one experience with collaborative projects in school, and many reported experience with collaboration in work settings. One student had training in teamwork in a U.S. military context. All students were undergraduates in the Electrical and Computer Engineering program; however, they represented a variety of subspecialties within that discipline.

All 23 participants completed the assignment and the research component. These students were randomly assigned to ten pairs and one triad of collaborative teams. Three of the pairs had members who were all native speakers of English. Three of the pairs had only non-native English speakers, none of whom spoke the same first language as his/her partner. Four pairs and the triad had both native and non-native speakers of English as members. Most students had not worked together prior to this project, and most did not know each other before the assignment. However, all members of the triad had known each other previously, and several members knew their partner by reputation as a good worker or knowledgeable in a particular content area. Participants were randomly assigned to groups by the course instructor.

The instructor for the course also participated in the research. The instructor had taught this course for several years and, therefore, was very familiar with the curriculum of the program, the course design, and the importance of the course within the program and how it helped to fulfill professional accrediting standards for the program. He also had many years of industry experience as a technical writer. In addition, he had special training in teaching English to non-native speakers. As a result, international students often selected his section of this required course because he had a reputation for knowing how to work well with students for whom English was a second language. His own research interests included collaborative learning environments. However, the focus of his

research was quite removed from the focus of this study, and while he knew generally that my research involved looking at collaborative learning, emotion, and culture, he was not informed in detail about my interest in emotion and intercultural communication in collaborative learning environments. He was interviewed at the end of the study after data from the students had been collected and analyzed.

Researcher as Human Instrument

Lincoln and Guba (1985) describe the role of the researcher as human instrument to be imminently suitable to naturalistic inquiry essentially because human beings have the ability to adapt to variability and complexity that arises from research conducted in naturalistic settings. However, it is also important to acknowledge that researchers serving in the role of human instruments may inadvertently influence the behavior and responses of participants in the study. Consequently, it is usual in describing qualitative studies to give an accounting of the experiences, biases, and positionings of the investigator.

I teach English as a Second Language at the university where this study was conducted. I had known the instructor participant for several years prior to the study. We were in the same graduate program at the university. I had not met any of the student participants prior to my first meeting with them when I attended class to schedule videotaped work sessions with the groups.

My interest in collaborative learning arose from my own experience as a student involved in collaborative learning environments and as a teacher attempting to incorporate collaborative learning opportunities into my own classes, with varying degrees of success. In addition, my work experience outside of the academy led me to see the benefits of working in successful team environments and the frustrations of working in such environments when they did not work. I had no previous experience working in the engineering field. My experience working with engineering students had been restricted to those who happened to be in my ESL classes. However, I had some training in technical writing and editing as a graduate student.

My interest in emotions has been so long-standing that I do not recall its origins. No critical incident emerges from my memory that seems to have initiated the interest. It is most likely an accumulation of personal experience and observation that has led to my interest in this topic and my belief that emotion plays a greater role in our behavior, day-to-day decision making, and response to the world around us than we may realize or care to admit, being a society that puts a great deal of value in rationality. When I began working with international students, I observed that student behavior was often interpreted in very different ways by classmates of different cultures. Sometimes these interpretations led to emotional responses by classmates. In addition, at times the differences in expression of emotion was quite striking, some being very expressive and other

extremely reserved. These observations, along with my interest in collaboration, led me to questions about the role emotion may play in collaboration when collaborators are from different cultural groups.

Data Sources

The data sources for the study included multiple videotaped sessions of each work group, observation notes from these sessions, individual interviews with each participant, including the course instructor, written responses to follow-up questions from the interviews, and the instructor's reflection on the students' reflective papers that were handed in as part of the assignment for the course.

Procedure

In semesters prior to this data collection, I had attended several classes for this course and had taken field notes on my class observation. In the semester in which the study was conducted, I began my first contact with the students through e-mail the week before the project began. I e-mailed all the students describing what they would be required to do if they chose to participate in the project and encouraging them to contact me if they had questions. The next contact came in the classroom. The day the assignment was formally introduced in class, I went to the class, introduced myself, explained once again what I would be asking them to do as a participant in the study, and answered any questions the students had. The instructor then announced the teams, and I made appointments with each group for the first videotaped work session.

Each group was videotaped at least two times in the two-week period given for the assignments. The average time for these work sessions was 1 1/2 hours. Two groups were taped three times. In addition, I interviewed each participant individually. The average time of these interviews was approximately 45 minutes. I also interviewed the instructor after the semester had concluded and after my first analysis of the data collected from the students. This interview was approximately one hour in length.

The videotaping sessions were conducted in four different locations: two classrooms, my office, and a conference room at the university, all in the same building and within easy walking distance of the engineering building where students meet for class. One or two video recorders were present at each session as well as at least one audio tape recorder. Interviews were conducted at two locations: my office and a conference room on campus. These were the same rooms that were used during the videotaped sessions, so students were familiar with the location and setting. All interviews were audio taped and transcribed.

The first week of videotaping all taping was done in the same classroom. However, all videotaping after the first week was either in my office or in the conference room. The location was moved due to the poor sound quality of the recordings made in the initial location. During the videotaped work sessions, I was always in the room with the students observing and keeping field notes. Approximately 35 hours of observations were completed in the two weeks of the study.

A stimulated recall methodology (Gass & Mackey, 2000) was adopted for use in the interview portion of this study. This method was particularly well-suited for this study because I was interested in the perceptions of participants regarding the phenomena under investigation. Stimulated recall allows participants more easily to remember what they had experienced, thought, and felt at the time of the interaction, and to reflect on the experience as they re-experience the event through viewing the videotape.

Stimulated recall has been used to study participant perceptions of group work and interpersonal interaction in both work and educational settings. For example, Shim (2003) used a grounded theory approach to examine student perceptions of miscommunications within an ESL classroom. Stimulated recall was used by Cegala, McNeilis, McGee, and Jonas (1995) in a study very similar to the present one, but in a medical context. The study examined doctor and patient thoughts and feelings about the interactions in an effort to determine if these thoughts/feelings affected participants' feelings about the outcome of the interviews. Of their selection of the stimulated recall procedure to examine these interactions, they stated that

These and other studies indicate that the stimulated-recall method is capable of eliciting thoughts and feelings that relate to communication participants' perceptions of self and other, concerns about task-related matters, and relational issues. Such thoughts and feelings appear relevant to the attitudes doctors and patients form of each other and their perceptions of various communication functions during the course of an interview. (p. 182)

Levenson and Ruef (1997) reported when using stimulated recall to look at empathic accuracy between couples that, while using this technique, their

participants, "...began actually to reexperience the feelings they had in the original interaction and thus could report them quite accurately" p. 50.

I chose to use stimulated recall for my study for similar reasons. Using stimulated recall during the interviews allows participants to reflect on specific moments in the interaction process, to re-live the experience to recall more accurately what they were experiencing during the event. Showing specific clips of the video also allowed me to focus on specific events during the collaborative sessions while also retaining the flexibility required to permit students to reflect freely on what they perceived to be important aspects of the work sessions.

When asked for a strictly narrative account of the experience without using stimulated recall to allow students to re-experience the event, participants may not remember specific incidents that led to conclusions that they may discuss in an interview. For this study, stimulated recall was combined with narrative recounting to look at the process of the interactions as well as perceived outcomes of those processes, looking at the experience as a whole as well as at specific parts of the experience. Therefore, while the first half of the interviews used stimulated recall, allowing me to focus more closely on information that would address my specific research questions, the second half of each interview involved participants providing narrative accounts of this group experience as a whole and other collaborative experiences they may have had in the past. A narrative approach was used to look at positive and negative group experiences by Hirakawa, DeGooyer, and Valde (2000). However, the narratives used by Hirokawa et al. were the product of written surveys. The use of oral interviews using both a stimulated recall and narrative procedure was determined to be the

best approach for my study to explore the research questions because my questions were focused not only on the process of the interactions (as revealed in participants' perceptions of self and others) but also on the effect of those interactions on participants' perceptions of the collaborative work as a whole. In addition, interviews allowed me follow-up on lines of thought that the student initiated and to ask for clarification when needed.

Most interviews were held within two days of the last videotaped session. However, one group, because of time conflicts, was not interviewed until one week after the last videotaped session. Approximately 18 hours of interviews were completed during the two weeks of data collection with the students. An additional one hour interview was conducted with the instructor subsequent to the analysis of student data.

During the student interviews, the participants were shown clips from the videotaped sessions. I selected these clips based on field notes and observations. The selection was based on three criteria: (1) a critical incident seemed to be occurring during the work session, (2) a new phase of the collaborative process seemed to be occurring, (3) a change in interaction seemed evident. A critical incident would be a moment in the work session when I thought I had seen some sign of a particular emotion on the part of one of the participants. Clips were also selected to represent the beginning, middle, and end of a work session. In most, but not all cases, clips were viewed from both work sessions.

After viewing each video clip, the participant was asked to describe what was happening at that particular point in the work session. Then, he/she was asked to describe what he/she was thinking. I then asked the participant what his/her partner was thinking at that point in the work sessions. Then, I asked what his/her partner was feeling at that particular point in the video. After viewing clips from each work session, participants were asked if there was anything that was particularly memorable for them about that session. They were also allowed the opportunity to go to a particular place in the video that they found to be important. After viewing all the video clips, participants were asked if there was anything particularly memorable about the collaborative work sessions overall.

At times during the interviews, it was apparent that students were explaining their feelings as they looked at the video clips rather than what they were feeling during the interaction itself. At these times, I would ask the participant to clarify if their response was referring to what they were feeling at the time of the original interaction in their work session or now, during the interview. I also asked for clarification if it was unclear to me to which point in time the participant was attributing a response. This portion of the interview was specifically designed to solicit information about participants' emotions and their perceptions of their partner's emotions during the work session.

After viewing the video clips of the work sessions, participants were asked more general questions about the work session and previous collaborative work

they had experienced. First, I asked participants if the current collaborative project had been a positive or negative experience, and why. Then, I asked them to describe previous collaborative work experiences and to tell me about an experience that had been particularly positive or particularly negative. Again, I asked them to explain why the experience was particularly good or bad. Finally, participants were asked to evaluate three aspects of the current collaborative project: the overall planning and process they had used to complete the project, their writing process, and the interaction during work sessions and overall communication with their partner throughout the project. At the end of the interview, I asked students if there were any other comments they would like to make about the collaborative process or their interactions with their partner during the collaborative work session.

The purpose of the questions during this part of the interview was to allow students the opportunity to reflect on their overall experience of the collaborative project and of other group projects. Because in the first part of the interview I asked specific questions about emotions during the group sessions, the narrative portion of the interview allowed the students to expand on their experience. In this way, I was able to capture in the data information that may have influenced their level of satisfaction with the collaborative project. I was interested in what they particularly noticed about the interactions and about collaborative work as a whole, what attracted their attention, what was important to them about the

experience. These questions also allowed me to compare their experiences in these culturally diverse groups with other experiences they had had in collaborative groups that may not have been culturally diverse. Finally, they allowed the students to reflect and relate the value they placed on the experience as a learning tool. In this way, I hoped to make the interview a valuable learning experience for them while at the same time collecting data for my study.

I transcribed all the interviews myself. After the interviews had been transcribed and analyzed, I found I had a few questions to ask of the study participants. At this point, I sent e-mails with follow-up questions to all participants: (1) to compare/contrast the first collaborative project of the semester, the one for my research, with the final collaborative project for the class, and (2) to discuss what role, if any, they felt that culture had played in their interactions with their partners in the short project and in the more comprehensive end-of-the-semester project. The purpose of these follow-up questions was to test my initial analysis of the data to see if additional data would add any new information or simply support the information that I had already acquired. Seven participants responded to the follow-up questions.

I then interviewed the instructor of the class. This interview was conducted in the instructor's office and was semi-structured. In this interview, I asked the instructor to summarize the student's reflective papers. Because I had inadvertently left out gaining access to the students' papers directly, the instructor

and I decided it would be unethical for me simply to read the papers but that it would be appropriate for him to speak more generally about what the students were describing in their papers. In addition, I asked him if he felt there was a culture of engineers and if so, what were its features. I also asked questions about the class and the curriculum, and to describe, in general terms, the performance of students on the group products that resulted from the collaborative project that was the subject of this study. This interview, like the follow-up questions to the students, was to test my analysis of the data. I wanted to see if additional information emerged or if the new data simply added additional support to the existing analysis.

Data Analysis

Grounded theory (Glaser and Strauss, 1999) was the general approach adopted for analysis in this study. The purpose of grounded theory is to generate a theory of a phenomenon based on close analysis of the data through a method of constant comparison. Analysis begins with coding of the data (Strauss and Corbin, 1998). I began analysis for this study with open coding, initially using a line-by-line focus. However, this line-by-line coding yielded a large number of codes that did not seem relevant to the research questions. Therefore, as I continued open coding, I coded only those lines that yielded information on the specific research questions of the study. As a result, the categories that emerged at

this step in the analysis reflected, to a large extent, the specific research questions of the study. These categories that emerged in this initial analysis are described in Chapter Four.

I then returned to the data, adding axial coding to the line-by-line open coding. Coding and categorizing (axial coding) was an iterative process in which axial coding often co-occurred with open coding, as continued coding revealed new categories or new subcategories. It was at this stage of axial coding that the relationships between categories began to emerge as additional data were added to the coding process and description of categories became richer. At this point, selective coding came into play as continued examination revealed a central category within the data. At this time, a consequential matrix was also constructed to analyze any processes represented among the categories that had emerged from the coded data. Analysis continued until all potential categories had been examined. The picture of the phenomena that emerged from additional open, axial, and selective coding, and the consequential matrix is described in Chapter Five.

In addition, a limited descriptive analysis was conducted to compare responses across categories of the different participant groups and individuals. First, I totaled the number of responses for each category by participant groups and by individual. This was done to ensure that the categories did indeed represent responses of the group rather than an overrepresentation of data from a

few individuals or groups. I then totaled the number of responses for native speakers compared to non-native speakers.

Trustworthiness

Lincoln and Guba (1985) describe the principles underlying the development of trustworthiness in a naturalistic study such as mine.

Trustworthiness refers to establishing the worth, the value, of the study. Put another way, trustworthiness refers to establishing the credibility of the study, that the results described do, in fact, reflect the experiences they proclaim to describe.

Lincoln and Guba suggest specific techniques researchers can use to use to establish the trustworthiness of their study. A number of techniques were used in my study.

Prolonged Engagement

Due to the short period of the project that the students were working on this project, engagement with the particular participants from whom data were collected was limited to a two week time period. During this two-week period, I meet with each student three to four times. These meetings lasted anywhere from two and one half hours to 30 minutes and included videotaping of group work sessions and interviews. In addition, I introduced myself to the class via e-mail prior to the class assignment and in person on the day the assignment was made in class. Additionally, in order to become familiar with the class, I completed

observations of the class previous to the semester in which the data were collected. I also had opportunities prior to data collection to discuss with the instructor of the class the course design, course requirements, and course objectives. Therefore, while the two week period of data collection was a brief period of time, the extent of observation during that time and prior to the data collection procedure, allowed me sufficient knowledge of the class to help in interpreting the data within this specific context.

Persistent Observation

Persistent observation was achieved in this study through multiple observations of students during their group work followed by individual interviews. Each stage in the observation process allowed for the possibility of more accuracy in the analysis by generating additional data to confirm or disconfirm the on-going analysis. In addition, the number of groups and individuals observed was in itself a dimension of persistent observation, allowing extensive observation for the group as a whole within the two-week period.

Triangulation

Triangulation was achieved through the use of multiple sources of data: class observations and discussions with the instructor prior to collection of data, field notes from observation of group work sessions, individual interviews with student participants, follow-up questions to student participants, and a interview

with the instructor. The follow-up questions to participants were structured to test the theoretical model emerging from analysis. In addition, the interview questions I asked during the interview with the instructor were aimed at testing the theoretical model that was emerging from the analysis. Finally, during the interview, I asked the instructor to summarize patterns that he had seen in the reflective papers that students had turned in to him at the conclusion of the collaborative project. This provided a check on my analysis of the students' statements regarding the projects that were the content of the interviews I had had with them.

Member Checks

Member checks were not performed after the analysis because a considerable amount of time had passed between data collection and the final data analysis. The class was no longer intact by the time transcriptions had been completed and analysis had begun. The length of time between data collection and analysis led me to select other methods to establish trustworthiness. During the interviews, however, member checks were done through asking questions of clarification such as, "Do you mean you feel that way now as you're watching the video, or do you mean you felt that at the time, during the session?"

Peer Debriefing

I engaged in peer-debriefing, presenting my preliminary conclusions and developing model to a number of colleagues at various points in the process.

Negative Case Analysis

Negative case analysis is a process of testing hypotheses emerging as the analysis progresses by looking for data that disconfirm the hypotheses. Negative case analysis was performed periodically throughout the data analysis process, particular at the end of each stage of the analysis. This type of analysis was done not only to look for data that disconfirmed the hypothesis but also to make sure that no data had been overlooked in the analysis.

Referential Adequacy

Referential adequacy refers to data that is available for review to test the accuracy of the analysis. In my study, the transcriptions from interviews and responses to follow-up questions can be seen as fulfilling this requirement for trustworthiness.

Thick Description

Thick description refers to the adequacy of the data descriptions within the study report. In this case, Chapter Four describes in detail the categories that

emerged from the analysis and contextualizes these categories by provided narrative profiles of representative group experiences.

CHAPTER FOUR

RESULTS: DESCRIPTIONS AND CATEGORIES OF STUDENTS' EXPERIENCES

This chapter describes the results of the initial stage of data analysis. This stage in the analysis is the result of open coding, where the data are broken down into small units in order to identify categories represented in the data. I have organized the results in Part One of this chapter by research question and have listed all the research questions again here for ease of reference. In Part Two of this chapter, I present three team profiles to illustrate how the categories presented in Part One interact in the context of particular teams and how categories are represented across teams. In Chapter Five, I will describe the results of the second stage of the analysis, an examination of the relationship among the categories described in Chapter Four.

- (1) How do interactants perceive, describe, and explain the emotions of others during collaborative work session?
- (2) How do interactants describe their responses to the emotional messages of others during collaborative work sessions?
- (3) How do interactants describe and explain their own emotional experience during collaborative work sessions?
- (4) What role does culture play in interactants' descriptions, explanations, and perceptions of emotion during collaborative work sessions

- (5) How do participants describe and explain their feelings about collaborative work sessions, the project as a whole, and collaborative work in general?
- (6) What role does culture play in participants' descriptions and explanations of their feelings about the collaborative work sessions, the project as a whole, and collaborative work in general?

Note that throughout this chapter I use “???” to indicate places in the transcript where I could not understand what was said. Also, in the codes that follow each transcript excerpt, the first digit indicates native speaker of English (1) or non-native speaker of English (2).

Part One

This part of the chapter describes the categories that emerged from the data analysis. The results are organized by research question.

Research Question #1: Interactants' Perceptions, Descriptions, and Explanations of Others' Emotions

In this section, I discuss the descriptions that participants gave of the affective states they perceived in their partners. Then I describe the cues that participants indicated led them to perceive these affective states during the collaborative work sessions for this class assignment. Finally, I discuss the explanations that participant's supplied for their partner's affective states, why they thought their partners felt a particular way during the collaborative session.

Descriptions

Two categories emerged from the data regarding how participants described their partners' emotions during the collaborative work sessions. These two categories were (1) general comfort level and degree of satisfaction with the work process or product and (2) specific concerns about how the work was proceeding in terms of quality, speed, or interaction within the group.

Comfort Level and Satisfaction

The items in this category are concerned with participants' statements about their partners' comfort level or feelings of satisfaction/dissatisfaction with either the process of the collaboration, including interactions between group members and with the product itself. Items 1-5 below exemplify this subcategory of description of partner's feelings during work sessions.

1. "She might have been *a little less comfortable* than I was but...like when she pulled ??? look like that. But in general it seemed like she was taking care of stuff the way I was and felt like *pretty comfortable* with the situation." 1-2-10-21
2. "I guess maybe he might have been *a little frustrated* at first, but I think that's just the whole process." 1-1-10-20
3. "He was kind of *content*, I think." 2-1-2-2
4. "I mean, he seems to be *satisfied* with the ???? I guess." 2-1-4-7
5. "I think [partner's name] seemed a little bit more *not as worried* about all this." 1-1-9-18

Specific Concerns of Process and Product

Another category of interpretation of partners' affect was related to participants' concerns about how the work was proceeding in terms of quality, speed or

interaction within the group. In this subcategory, the words used by participants to describe their partners' feelings were often, though not always, more specific than those in the first subcategory; however, there was always a specific referent for the feelings. For example, in Item 6 below, "how to write the evaluation well" was the source of the partner's "concern."

6. I guess, as I say he's more *concerned* about how to write the evaluation well and "???" his evaluation would be requirement of [professor's name]." 1-2-7-15
7. "He was *hoping* that [partner's name] would pay attention, I suppose." 2-2-5-10
8. "He seemed kind of like *worried*, too. It just seemed kind of like we didn't really have a feel for each other." 1-2-9-19
9. "I think he was excited. He was *relaxed and excited* because we did the assignments way too early before the due date. Yea, I think he was excited." 2-2-3-6
10. "I guess he was *a little bit not satisfied* with the way that...that I was not really prepared for it." 2-1-7-1

Interestingly, one type of referent that was given more often by international students than U.S. students was a reflexive reference. Item 10 above exemplifies this type of referent. In this example, the speaker identified the source of the partner's feeling as to something the speaker had done, rather than something external to the speaker such as the paper, or the writing process, or an interaction, or a partner's behavior.

Perceptions

The following categories emerged as cues that both U.S. and international students indicated led them to perceive a particular affective state in their partner:

verbal expressions, specific behaviors, facial expression, body movement, and knowledge of the situation, It is interesting to note that while both U.S. and international students used the same types of cues to perceive their partner's feelings during the work sessions, international students were often able to provide more cues for a specific event and were often more specific in their descriptions of cues.

One thing to keep in mind when looking at the descriptions of categories that follow is that the focus on the study was on participants' perceptions of what their partner's were feeling during the collaborative sessions. Furthermore, it is important to remember that a grounded theory approach generates theory from the data rather than imposing theory on data. Therefore, some items in the categories below may not fit a theoretical definition of *affect*, *feeling* or *emotion*; nevertheless, they are legitimately included as such for the purposes of this study because (1) they were provided as a direct response to an inquiry about feelings, and (2) in some instances participants did not make a distinction between thought and feeling, making the same response to a question about thoughts and one about feelings. Since perceptually the participant did not make the distinction between the two in these cases and the focus of the study was on participant perceptions, I chose not to make the distinction in the analysis.

Verbal Expressions

Verbal indicators of emotion state were described by participants as something a partner did, or did not, say. In other words, the participant indicated a particular verbal message as indicating affect on the part of a partner. These items did not necessarily name a particular feeling or emotion, and in some cases the participant indicated manner of speech (Item 14) rather than the specific words used (Item 11) that led to a perception of affect. In fact, on occasion, the participant indicated an absence of a verbal message as an indicator of affect (Item 15). Furthermore, as mentioned above, from the perspective of existing theory these cues may not seem to indicate affect at all. However, as indicated by the participants, these were cues that led to the perception of affect as experienced by a partner during a collaborative work session and are, therefore, included.

11. “He would indicate his agreement like *yea I like that.*” 1-1-11-22
12. “And so she...after she read it she did have a positive reaction. She was like *yea, this is much better than what we started out with, so...*” 1-2-8-17
13. “Because she say...*oh, didn’t take a look this?*” 2-1-8-16
14. “So he was saying pretty *short sentences.*” 2-2-3-6
15. “When he *didn’t say anything.* If he didn’t like it he would say no. If he didn’t say anything, so that’s fine...good.” 2-2-3-6

Specific Behaviors

The second category of cues to partners’ emotions that emerged was a reference to specific behaviors. There were few items in this category, and it could be argued that the items in this category might fit into the verbal category described

above. However, I decided to keep them as a separate category because the descriptions as given by the participants seemed to focus on the message being conveyed by a particular behavior rather than on the words themselves. This category includes topic of discussion, topic shifts, attentiveness, and willingness to respond.

16. “Yea, because *he didn’t want to go deeper into that topic*. He was trying to get off.” 2-2-3-6
17. “...he would seem *a little bit hesitant*.” 1-1-11-22
18. “...it would make *some kind of point of saying something or indicate his enthusiasm*.” 1-1-11-22
19. “Oh, just when I said what I was thinking she kind of like was *less agreeable* like I said.” 1-2-10-21
20. “He *continued to be attentive*. He’s *not like trying to slack off* along the way. He basically *keep up the momentum* that he worked on.” 2-1-4-7

Facial Expression

Facial expression cues to partners’ emotions included non-specific descriptors (Item 21) as well as specific expressions like smiling and laughing (Items 22 and 23). There were very few of this type of cue, and each instance of this category was indicated by international students.

21. “Yea, the *way she look at me*.” 2-1-8-16
22. “You see, he’s *smiling* a little bit there.” 2-2-5-10
23. “He was *smiling*. He was *laughing*.” 2-2-3-6

Body Movement

Body movements as cues to partners’ emotions were mentioned a few times, usually with specific examples that were pointed out in the videos of the work

sessions or demonstrated by the participants (Item 123). However, participants also mentioned that, in general, body movements were used as a cue to their partners' emotions but were unable to provide a specific description of a body movement.

24. "He go like this...with his head." 2-2-3-6

Knowledge of the Situation

Knowledge of situation and context was also mentioned as a cue to partners' feelings. However, there was only one occurrence of this type of cue. It was in a native speaker group and, interestingly, was identified by both members of that group.

25. "Just kind of the knowledge of the situation, you know, he didn't have any classes and just how people are in general. People don't like to stay at school on Friday unless they have to, as a general rule." 1-1-11-22

Explanations

Frequently participants were not able to identify a specific cue that they had used to interpret their partner's emotions or a specific source for the partners' feelings. However, they were, nevertheless, able to provide an explanation for their interpretations of their partners' feelings. This often occurred when participants also were not able to be specific about naming partners' feelings but gave more general descriptions of affect and were not able to identify a specific

reason at a particular point in the interaction for a feeling that they had identified.

In fact, sometimes these explanations involved generalizing based on past experience across contexts (Items 26 and 27).

26. “He was ??? was feeling the same thing, *how I will be helping him*. That’s what my feeling is *because when you do a collaborative work...what with experience...with my past experience, for the reason why I couldn’t come to you was that my partner didn’t do his job on time.*” 2-1-2-2
27. “*Like if someone is giving you comments regarding something and he is kind of cool, relaxed at the time, that means he is really fine, doesn’t have any problem with it.*” 2-1-2-2
28. “And maybe [partner’s name] felt a little bad about that. He was really enthusiastic about doing his part. And I saw his work, and it was pretty good job. *I think that was reason for the enthusiastic and excited about that he did a good job.*” 2-1-3-5
29. “*No negative feelings*. Because whatever our levels of understanding of the subject, *he was thinking along the same lines. ??? the same as with me*. And the basic things [partner’s name] wanted...I mean, he seemed fairly convinced and he seemed pretty relaxed. Pretty...he was... I would say...I’m not sure the feeling, it’s when you ...he was relieved.” 2-1-3-5
30. “So, we were trying to come up with that, and [partner’s name] *was in a fun mood. He wasn’t paying attention because he was just slapped*. That was funny. And so I just drew his attention and I ...yea.” 2-1-5-9

Research Question #2: Interactants’ Descriptions of Responses to the Emotional Messages of Others During Collaborative Work Sessions

Only a few participants indicated a particular response to the emotional messages that they perceived in their partners. In these cases, response is described as a particular behavioral change that resulted from a participant’s

perception of a partner's affective state. Interestingly, participants typically explained their change in behavior as being related to the work process rather than an interpersonal strategy.

In other words, when participants indicated a change in behavior at a point in the collaborative work session when they perceived a particular emotion state in their partner, they decided to change their own behavior based on factors related to the outcome of the project itself. These factors included facilitating the work process during the collaborative session, concern about grades, and relative importance of the situation that the participant perceived had led to the partner's emotion. Participants did not indicate a change in behavior for specific purpose of facilitating the collaborative relationship (as opposed to the collaborative process) or personal relationship between members. Two sub-categories of change suggested by the data were responses resulting from perceptions of a partner's feelings about the (1) product, and (2) about the process.

Item 31 below exemplifies participants' decision-making process in determining a response to a perceived emotional state of a partner regarding the product. In this example, the participant had responded to several questions about the feelings of his partner during particular points in a collaborative session by indicating how his partner was feeling about the document they were working on, whether she liked a particular part or not. As with other participants, the explanation for the partner's feeling about a document (or presentation) included

an expression of whether the partner agreed or disagreed with something that his/her partner had written or proposed for the product. The partner explains how she decided to modify her behavior in response to her perceptions of her partner's feelings about the document. In this case, as with other participants, she frames her response to her perception of her partner's feelings about the document being written in terms of arguing for a particular position about that document. She describes the criteria she used to determine the degree to which she argued for a particular point of language on the written part of the assignment. These criteria included her interpretation of the professor's view of the writing and, subsequently, how that view may impact the project grade.

- 31.** “Well, I guess on how, like, well I’ll look at the line I’m like, well is really going to matter to [professor’s name] if I were to change it to my way instead of her way. Then if it didn’t matter, then I didn’t say anything. But if I thought he might make a case of it whenever he’s doing the grade, I’d say well, [professor’s name] might like it better if we did it this way or what not. I try to let my own opinions stay out of there.” 1-2-11-23

Item 32 below exemplifies participants’ decision-making process in determining a response to a perceived emotional state of a partner regarding the process. In this example, the participant was describing how he and his partner responded to the behavior of the third member of the group. To a question on what the partner was feeling at a particular point in the collaborative work session, the participant responded that the partner was not paying attention. He mentioned that they often

had to bring the third member back on task with a variety of methods, primarily verbal.

32. “I mean, I didn’t really know [partner’s name] before this. I knew of him. I didn’t really know him. But [partner’s name] mind wanders a lot. So, we’ve been repeatedly bringing him back on topic.” 2-2-5-10

Research Question #3: Interactants’ Descriptions and Explanations of Their Own Emotional Experience During Collaborative Work Sessions

In this section, I describe the descriptions that participants gave of their own affective states. Then I describe the explanations that participants gave for the emotions they identified. Interestingly, both native and non-native speakers were equally able to describe their own emotions and the reasons for them. This is in contrast to participants’ descriptions of the emotions of their partners during collaborative work sessions, where non-native English speakers identified a partner’s emotional state more often than did native English speakers.

Descriptions

Native and non-native speakers of English were able to identify and articulate the feelings they experienced during collaborative work sessions with approximately equal frequency and facility. Furthermore, although both native and non-native participants did describe specific positive emotions during the

work sessions, both groups were more likely to identify and describe negative emotions with greater frequency and specificity. Positive feelings were more often, though not exclusively, described in general affective language rather than through the identification of specific emotions.

Negative

The negative emotions expressed by the participants clustered in five general areas: (1) frustration/dissatisfaction, (2) confusion, (3) concern/worry, (4) disinterest, (5) regret/guilt. The first three categories of negative emotions (Items 33- 36) typically arose as a response to some aspect of the process of working on the project or the quality of the project.

- 33. “And it just kind of *frustrated* me because you’re reading along and it kind of flows, and then there’s like this kind of break” 1-1-11-22
- 34. “ Maybe a little *dissatisfied* because they didn’t agree, not at the moment ...” 2-1-5-9
- 35. “...I was really *confused*...” 1-1-10-20
- 36. “So I mean, like I was more *concerned* ...” 2-2-1-3

The fourth category (Item 37) included expressions of disinterest or desire to be somewhere else, to have the project completed, or simply not paying attention. These feelings were not a result of anything in particular concerning the project but to factors that extended beyond the context of the collaborative project; for example, the time of day, other things happening in the participant’s life at the time, personality.

37. “A little bit *distracted*.” 1-1-11-22

The fifth category (Item 38) specifically concerned participants’ feelings of guilt or regret about their own actions during a collaborative work session.

38. “Actually I feel a little bit *bad*.” 2-1-8-16

Positive

Expressions of positive affect clustered into four subcategories: (1) excitement, (2) happiness/confidence, (3) relaxation/lack of tension, and (4) comfort. These categories reflect the varying degrees of specificity with which positive feelings were described. These descriptions ranged from identification of a specific emotion to more general terms. Interestingly, only non-native English speakers used specific positive emotion terms. English speakers exclusively used very general terms to describe their positive affect. The most common expression of positive affect was in general terms reflecting an overall comfort level with the interactions in the work sessions and the progress or quality of the project.

The first two subcategories included descriptions of positive affect with very specific emotion terms (Items 39 – 41). In category three (42-43), non-native speakers of English expressed positive feelings in terms of level of tension they felt during a work session. This was completely absent in the native speaker accounts. The non-native speakers labeled this feeling as “relaxation”. While native speakers did not identify this state in their descriptions of feelings during

work sessions, they did describe the opposite, negative, feeling of “stress”. Non-native speakers also described experiencing this feeling during work sessions. However, they did not cite it as a feeling experienced during work sessions for this particular project, but rather when describing situations that led to stress within collaborative work groups in general.

- 39. “I was *excited*” 2-2-3-6
- 40. “I’d say *happiness*.” 2-1-3-5
- 41. “*Confidence*.” 2-2-3-6
- 42. “One was I guess *relaxation*...” 2-1-3-5
- 43. “So I a little bit *relief*.” 2-1-8-16

The fourth category includes more general terms used to describe positive affect (Items 44 – 46). These general terms typically indicated comfort level with the interactions between the group members or overall attitude held during the work session. General terms also indicated feelings of overall positive affect or positive feelings specifically about how the project was progressing during a work session.

- 44. “I feel very *comfortable* because...” 2-1-8-16
- 45. “...the overall attitude was definitely *more laid back*...” 1-2-11-23
- 46. “I was feeling *fine*.” 2-1-2-2

In general, non-native speakers were more likely to describe having positive emotions during the group session than native English speakers. However, this did not mean that native speakers had less positive experiences than the non-native speakers while working on the collaborative projects. This can

be seen later in the descriptions of overall satisfaction with the group process and product.

Explanations

Explanations for positive affect experienced during collaborative work sessions fell into three categories: (1) knowing or being familiar or becoming familiar with the partner and trusting his or her subject knowledge and ability to do the job, (2) making progress on the project or achieving a high quality of work product, and (3) good communication and sharing of ideas between the members of the group. Negative emotions fell into four categories: (1) uncertainty about the project, (2) behavior of a participant, (3) lack of project quality or progress, and(4) difficulty in negotiating effective communication with the partner.

Positive

The three categories of explanation for positive emotions all reflected the concern of the participants for the completion and quality of the project. This concern for the project was the superordinate category that affected most of the emotions that the participants expressed experiencing during collaborative work sessions for this project and about collaborative work more generally. I discuss this relationship between categories in detail in the next chapter. Here I describe the three categories of explanation for positive feelings that emerged from the data.

Familiarity with partner. Participants indicated experiencing positive feelings during the work sessions as a result of knowing that their partner was knowledgeable in his/her content area and produced high quality work. This feeling of trust and comfort or reassurance that the collaboration would have a good outcome because of these qualities led to positive feelings (Items 47 – 48).

- 47. “I was kind of *positive* since I told you *I knew him*. And that *he was a hard working guy* and all that stuff.” 2-1-2-2
- 48. “I’d say *happiness*. Because certain *satisfaction* at least one *part of presentation was done*. I was *feeling good too*. Because *I know he’s good*.” 2-2-3-6

Progress and quality of work. Participants described positive feelings as a result of making progress on the project or having a productive work session. Feelings that the project was going going well in terms of quality as well as completion also resulted in positive feelings (Items 49 – 51).

- 49. “And when were working, *we had a lot of interaction, and I got to know him better*. I got to know how he thinks better, and we progressed a lot when we worked together, and that made me feel more comfortable about the project and the assignment.” 2-1-1-1
- 50. “Because we were pretty close to getting done by then. We were towards...I guess...another 15 minutes and then we would be done. *Yea, I was kind of happy that ...because we were getting a lot of work done*. We had a lot of...we went over a lot of points. Which is pretty good. ????” 1-2-4-8
- 51. “Exactly. Exactly. I remember I been trying to get a schedule because I knew schedule 99% of the time you cannot keep to that honestly, but I at least have a *good feeling we on the right track*.” 2-1-4-7

Communication and sharing ideas. The third category of explanation for positive affect involved communication during collaborative sessions. Features of

communication that led to positive affect involved the free flow of idea. In other words, when participants contributed ideas to the collaboration negotiation of meaning occurred. This led to problem-solving that resulted in progress toward the completion of the project and a quality produce. Items 52 –53 below illustrate participants’ explanations of this category.

- 52. “I feel very *comfortable* because you ...*people take your comments, right, and just work out together.*” 1-1-8-16
- 53. “I feel *comfortable*, very comfortable because she...*she kind of listening to me and if something that we disagree she...I ask her why and she would tell...would give her reasons.* And then we tried to compromise things together. 2-1-8-17

Negative

As with explanations of positive feelings, explanations for negative feelings also centered around the ultimate outcome of the product. The relationship between these categories will be explored in more detail in the next chapter. Here I describe each of the four categories of explanation for negative feelings during the collaborative work sessions.

Uncertainty about the project. Uncertainty usually resulted from not understanding the assignment itself or not understanding the articles selected by the work group for the project. Several participants struggled to understand the articles they had chosen to summarize for the first part of the collaborative project. In general, the harder it was to understand an article and the longer it took to comprehend the meaning of the article, the more negative the feelings became.

In addition, when participants were not sure that they were fulfilling the requirements of the assignment correctly or that they understood exactly what the requirements were, they reported negative feelings. Also included in this category is uncertainty about the project as a result of partners' having different concepts of the assignment.

54. "Particular feelings? *I just want to know what's going on in the paper. Yea, just....confusion and just want things to clear so I can just go ahead and write the paper.*" 2-1-6-12
55. "Maybe a little *frustrated* just because *I think he had a different idea for our paper.* And I think just after I read the paper I just thought that since the paper covered a number of topics within it that it was going to be more general. And I think he thought that it would just be more specific and certain parts and I don't know. I guess I just was more *concerned* that we wouldn't be able to fit everything inside the ??? So I guess *more concerned than frustrated.* So..." 1-1-10-20
56. "I remember thinking like we had to...walking out...*we had two different impressions of what the project actually was about.* Because we left...we actually left the session *not really grasping* like yea we need something really technical or no we didn't. So I was kind of...walking out of the session I kind of remember yea, we don't really have that grasp yet. *And I was kind of bothered about that,*" 1-2-9-19

Behavior of a participant. This category includes the behavior of a partner as well as one's own behavior. Negative feelings resulted when a participant's behavior negatively impacted the progress of the group toward the completion of the project or the quality of the product. Dissatisfaction with a partner's behavior resulted most often when the partner did not come prepared to the work session.

Dissatisfaction resulted from one's own behavior when it led to an impediment in the progress of the project. Items 57 – 59 illustrate this category.

57. “I was kind of, like, not say it was a waste of my time, but it was a bit *frustrating* that *he didn't just call and tell me he didn't finish reading* the whole thing and he would like me to do the summary...” 1-2-7-15
58. “Well, I *kind of wish* she had *already read it* ahead of time because I really didn't have anything to do when we were, you know, in a group setting and we're meeting together. That's kind of why I meant to send it to her ahead of time so she could look at it and then we could do more of the oral presentation planning and stuff that we had to do together instead of just quick reading.” 1-2-8-17
59. “*I was frustrated there. Just because I expected him to have it read.* Granted I didn't have it completely read myself. I thought we could use the time to finish up reading it and work on it, but when he said he didn't have it read at all I was kind of like okay well what are we going to do. So I kind of walked in with a plan of what I thought we might want to do. For that session, but...and it was completely blown away when he said he didn't read it. *So I was kind of frustrated there.*” 1-2-9-19

Lack of project quality or progress. Most of the negative feelings regarding the progress of the group came at the beginning of the project. Specifically, the search for an article appropriate for the executive summary writing assignment caused many work pairs concern because of the need to select an article of a topic and scope appropriate to the assignment. Also, the short two-week time limit for the assignment was cause for concern to many participants. The awareness of the time limitations combined with the difficulty of completing the first step of the assignment, finding an appropriate article, created negative feelings on the part of

many participants. Difficulties with writing collaboratively also gave rise to some negative feelings. Items 60 – 63 illustrate this category.

60. “First time, it was *confused*...*looking for articles*...really not doing particular thing. Just trying to find something.” 2-2-1-3
61. “I was kind of *worried* about getting a right article, a right size and about length that we were looking for because it had to be...it was supposed to be more than ten pages ???” 2-1-2-2
62. “I had *hoped to get farther along* in the process than we did, so... But in the time I was *frustrated* that we hadn’t gotten further.” 1-2-8-17
63. “*And it just kind of frustrated me* because you’re reading along and it kind of flows, and then there’s like this kind of break. And it’s like a loss of thought. And then it kind of...so those were some things that I kind of had to deal with in the sense of finding a way of letting him know, okay well, I think it’s good that we ought to put this thought in. I think that is something that needs to be included in this sections, but let’s see if we can make it fit a little bit better.” 1-1-11-22

Difficulty in negotiating effective communication with the partner. The final

category of explanations for negative affect was communication with partners.

This category included not being able to negotiate an agreement between the partners. It also included problems with mode of communication: for example, e-mail systems down, no cell phone. Items 64 and 65 illustrate this category.

64. “Maybe a little *dissatisfied* because they *didn’t agree*, not at the moment. And I was trying to, you know, convince them. 2-1-5-9
65. “What I feeling at this point? Actually *I feel a little bit bad*...Because she supposed to send me my paper last night, but I couldn’t check my e-mail because my system’s down. So, *I didn’t have a chance to look at this thing before I came to the meeting*. But actually the thing...turned out she got the wrong e-mail.” 2-1-8-16

Research Question #4: The Role of Culture in Interactants' Descriptions, Explanations, and Perceptions of Emotion During Collaborative Work Sessions

Two categories of culture emerged as influencing feelings during collaborative work sessions: (1) cultural factors particular to individuals and (2) those related to the culture of the class. In this section, I will discuss those cultural factors particular to individuals. In chapter five I discuss cultural factors related to the culture of the class. The single aspect of individual-specific culture that was mentioned by participants as reasons for emotions either they or their partner felt during collaborative work sessions was language.

Language was the only individual-specific, culturally-related explanation for feelings that participants described in the stimulated recall portion of the interview when they reflected on specific points during the collaborative work sessions. Non-native English speakers were much more likely to bring up language as a factor affecting emotions than were native English speakers, and their explanations of language-associated emotions fell into two categories (1) concern about their own understanding of the article they were reading for the collaborative assignment, and (2) the ease with which they could communicate with their partner.

Difficulty understanding the article chosen for the collaborative writing project led to frustration during the collaborative work sessions and in the

preparation for these sessions. Participants indicated that they may have difficulty understanding an article because of their English skills, and it may take them a long time to read the article. This led to negative feelings during the collaborative sessions because they might feel self-consciousness about their understanding of the article and their need for a partner to help because of self-perceived limited English proficiency. They also expressed feelings of frustration during the work sessions because discussions involving understanding the articles were slowing down the work process.

The impact of language proficiency on the communication process during collaborative work sessions was the other language-related factor that led to emotion during collaborative work sessions for non-native speakers. Participants mentioned they were concerned that their speaking skills made it more difficult for their partners to understand them, and more difficult for them to articulate their ideas to their partners. In other words, it made participation in the collaborative process more difficult. In the examples below, non-native speakers talk about how their English skills influenced their feelings during the collaborative work sessions and the interactions with their partners during those collaborations. In Item 66, the participant was explaining how her language skills led to her feelings during a particular point in a collaborative session.

- 66.** What is she thinking? At the first time, since English not my first language, so I just kind of nervous. The first time I afraid she...how do I say that...I'm afraid that she doesn't understand

what I'm going to tell her. But after awhile, I think that we can talk. 2-1-8-16

Interestingly, no one expressed concern about their writing skills.

However, most groups, including non-native/native pairs mentioned having someone else read over their paper before turning it in: either a friend or a consultant at a campus writing center. In addition, many groups consulted with the instructor about the papers during the drafting process.

Language was the only individual-related cultural factor category that native English speakers mentioned as a reason for feelings during a collaborative work session, but they cited this reason much less frequently than did non-native speakers. For native speakers, the extent of the emotional response to language skills of a partner was related to the extent that language skills inhibited the completion of the project. This inhibition was caused by (1) misunderstanding, (2) difficulty understanding each other, and (3) difficulty understanding the article.

In Item 67 below, a native speaker explained how her partner's non-native pronunciation made it difficult at times to communicate and may, in fact, have led to miscommunication. The result of this misunderstanding was an unproductive work session, which resulted in negative feelings on the part of this participant. The partners had spoken on the phone before the work session, and the participant felt that they had understood each other and the work they were to have completed by the time they met for their work session. However, when they

arrived at the work session, she discovered that she and her partner had not understood each other on the phone. She reported her irritation at this miscommunication because it resulted in a non-productive work session.

67. And then actually I'd called her like Thursday evening...Sunday evening I think because I'd asked to give it to me by then, I was concerned...or, you know, make sure I got it. So I thought I'd asked her, "Have you gotten my e-mail," because I'd sent her two since then. I'd thought she'd said yes, but apparently there was a lack of communication because she hadn't gotten those. 1-2-8-17

Research Question #5: Participants' Descriptions and Explanations of their Feelings about the Collaborative Work Sessions in General, the Project as a Whole, and Collaborative Work in General

In addition to the reporting of feelings during particular work sessions, participants also discussed their overall feelings about the collaborative work sessions for this project, their experience of the project as a whole, and their experiences with other group projects, both at school and at work. In these discussions, participants revealed what factors they felt contributed to a positive and negative collaborative work experience in these contexts. The factors they identified are discussed and illustrated below.

Collaborative Work Sessions: Current Project (Feelings and Explanations)

When describing feelings about the collaborative work sessions in this project, participants expressed positive feelings under two conditions: 1) they felt

they had made progress in the work session, or 2) they felt they had reached some understanding with their partner on some aspect of the project or in their working relationship. For example, one participant felt positive about a particular work session because he felt he and his partner had similar ways of looking at the project and communication styles.

Negative feelings were expressed under two conditions: 1) if they did not believe they had made progress on the project during that work session, or 2) if they did not feel that they had reached some common vision of the project with their partner. For instance, one group left their first collaborative work session without having decided on a topic for the summary article they were to write. As a result, one member of this group described his overall feelings of the work session as frustrating because he thought at the end of the session that he and his partner had very different ideas about what the topic of the summary should be about.

Collaborative Project as a Whole: Current Project (Feelings and Explanations)

Most participants indicated that the current project had been a positive collaborative work experience for them, if not overwhelmingly so, then at least more positive than negative. A few participants simply indicated that the project had been neutral in terms of affect, not particularly good or bad (Item 68).

- 68.** “Probably somewhere in between. Parts of it have been positive and parts of it have been negative. 1-1-11-22

Some participants indicated that they just preferred to work alone and, therefore, did not feel it had been a particularly positive experience.

Some factors that made the collaborative aspect of the project a meaningful experience for participants were 1) equal distribution of work load and 2) partners taking equal, or approximately equal, responsibility for the completion and quality of the product and negotiation of project features. For example, in Items 69 – 70 below, the participant indicates that the collaborative project had been more positive than negative because there was more equal “give and take,” or equal exchange and contribution of ideas between partners than he had experience in previous collaborative situations (Item 69) and an equal distribution of work load (Item 70).

- 69. P:** But this one I guess was more of a positive because a little more of the give and take than I was used to. So I guess that works out for the better. I got to get used to that.
1-2-11-23
- 70. P:** I'd say it's slightly more positive than...neutral to slightly positive.
I: Okay. Anything in particular that makes it that way?
P: Yea, I guess so because on projects before I was used to doing it all pretty much myself. 1-2-11-23

Participants who indicated a negative feeling about the collaborative experience for this project identified three factors that led to the negative feelings: 1) partner's lack of preparation for work sessions, 2) partner's failure to communicate important information regarding completion of assigned tasks, and

3) not contributing ideas to the work sessions. Item 71 below exemplifies an explanation of negative feelings about the collaborative project as a result of the partner not coming to work sessions prepared.

- 71. P:** Well, I kind of felt like when she came to our group presentations she wasn't as prepared for them as maybe she could have been.
- I:** Uh-huh.
- P:** Like reading pap...finishing reading the article before she got there and then reading the article before...or the paper that we'd written. 1-2-8-17

Collaborative Work: Previous and Current Work (Feelings and Explanations)

In reflecting on past projects that were both positive and negative experiences, participants mentioned many of the same factors as contributing to the negative/positive quality of those collaborations as they did the current project. These factors included 1) contribution of ideas by all group members, 2) equal distribution of the workload, 3) quality of work produced by team members, 4) coming to meetings and being prepared, and 5) communicating completion of assigned tasks. For example, in Item 72, the participant explains that one thing that contributed to the good experience she had with this collaborative experience, and in others, is communication between the good members. In this instance, she was referring to her partner's willingness not only to contribute ideas but to listen to her ideas.

- 72. P:** I think that's good experience. I think if people can work together, can *communicate*, that's a good thing to do.
2-1-8-16

In Item 73 below, the participant explains how unequal distribution of work load led to negative group experiences for him in the past as well as in the current project. This participant was unique among others in this class because he concluded that all group projects involved unequal distribution of labor. This perspective was unique among participants because he did not have an experience to disprove this belief as other participants did.

73. P: I mean, all projects have their own problems. I've done probably two other projects besides this. One was back in high school. That one I didn't contribute that much because I wasn't really interested. It was actually a project for competition we had. So, obviously we had to put a lot more work than like this project. I signed on for it, and I kind of regret it because I really wasn't interested in what they were doing. So I guess that's why I say I understand. Because thinking back I really didn't do much compared to the group leader. Because he did most of the work. And for the presentation he did most of it. Me and my group really didn't do much.

I: Okay.

P: So that was not such a nice thing to look back on. The other one was when I first came here. It's for one of the classes. ??? I'm not sure??? Introduction to Electrical Engineering. We had to do a group project. And ??? how it was and things like that.

I: Okay.

P: Kind of like of like ??? engineering but not that deep. In a group there are four people, and that one...two of the group members...one of them was really bad. Quite...not too good *because he doesn't come for meeting and didn't do any work, and what he did do is very bad.* When he does it, we have to...me and my friend ...actually, the group had four, *but me and my friend did most of the work* because when we turned it....after they finished their parts and turned it to us, *it was not that great.* So, we had to *rush.*

That was not such a good experience, but I learned a lot. I realized that group projects are always like that. They are always like that. There are always group members who are not interested and there will be group members who are more interested. So it is a balance.

1-2-7-15

In Item 74 below, the participant is explaining a negative feeling about the collaborative experience for this project because his partner did not communicate his progress on an assigned task. In this situation, the partner was unable to complete his assigned task, but he did not contact his partner to inform him of the situation. His partner describes his negative feelings about this behavior and the negative impact of lack of communication on the progress of the project. He explains that his partner's failure to complete the assigned work and failure to communicate that situation to his partner negatively impacted the progress of the project and possibly the final outcome of the project, which led to his negative feelings about the project.

74. “But he also didn’t tell me, you know, if we would had more *communication*, open communication, then this would have...because there is some kind of communication if you ask somebody he will tell you, okay don’t do it I’ll do it, don’t worry about it. I’ll take care of it. There should be more open communication, like whether he ???? but since you are working in a group, something, you can put somebody else in trouble.”
2-1-2-2

In the following example (Item 75), the participant explains his perception of what led to his positive and negative experiences with collaborative projects. He characterizes factors that lead to negative experiences as lack of

equal communication or contribution of ideas between members and unequal distribution of workload. He characterizes positive experiences as having all team members contributing to the project and assisting teammates in accomplishing the goal of the project.

75. P: Okay. You want me to just...Okay. There's always...I've always had the...I've had negative experiences in the past working with people whether it be on small little like puzzles or whatever. And it just...those aspects...are negative...I consider negative because there wasn't really a communication within the group. Like there's just...there's just too many like leaders and not enough followers within the group. And so it just didn't...like work doesn't get done. It kind of divides the group and stuff like that. And I'm referring to like in [organization name] we do these...they call them group leadership projects where they give you like a puzzle and tell you like figure it out within 30 minutes. So it puts you under pressure and it makes group dynamics and stuff like that. So, you get to see...you get to see the ??? and most negative experience comes from like one person trying to take charge while other people are like...you know...they have the right answer, but like, and they're trying to take charge. But that main person won't step back.

I: Okay.

P: And that's where my negative experience is. Positive is when all this clicks. Like when you have a large group that realizes, yea, this is my role in the group and so they take that role. And they're willing to help out other people and they just...and it just comes together. They just gel together.

Research Question #6: The Role of Culture in Participants' Descriptions and Explanations of their Feelings about the Collaborative Work Sessions, the Project as a Whole, and Collaborative Work in General

Culture emerged as a factor in participants' feelings about collaborative work sessions, and collaborative work more generally, in both expected and unexpected ways. I expected that aspects of culture associated with individual participants' cultural backgrounds would influence their behavior during collaborative work sessions and that when interacting with a partner from a different cultural background, differences in expected behavior would create emotional responses. Even the act of collaboration itself could create an emotional response in an individual from a culture not accustomed to collaborative learning contexts and the need inherent in such contexts for participants to express their ideas.

Interestingly, while the data do show evidence of cultural effects on participants experience during collaborative work sessions and feelings about collaborative work as a whole, the influence of this category of culture, which I will refer to from this point on as "individual culture," was less pronounced than was the second category of culture that emerged from the data. This second category was defined by the values and beliefs of the class as a whole. In other words, the individuals in the class proved to share a set of values that acted as a culture of the class and affected students' feelings about interactions during work

sessions for this project as well as their feelings about collaborative work in general. In most, but not all instances, the culture of the class more frequently led to an emotional response from the participants, and a stronger emotional response, than did aspects of individual culture. Here I restrict the description of the role of culture on the participants' collaborative experiences to the category of individual culture. In the next chapter, I describe the second category of culture: the culture of the class.

Two aspects of individual culture led to emotional responses in participants: language and conversation topics. Those participants who indicated language as a factor in feelings they experienced during collaborative work sessions, or influencing their feelings about collaborative work in different contexts, typically described it as leading to negative feelings. These negative feelings included (1) frustration in not being able to express one's ideas fully and clearly or understand the readings easily, (2) anxiety about or discomfort with communicating in English, (3) and concern that one's own or a partner's English skills may have a negative impact on the presentation part of the collaborative project. Item 76 below is an example of a participant who experienced negative feelings during the collaborative work sessions as a result of his perception of his speaking proficiency.

- 76.** I guess because the main point is that my English is really limited. It's not really good. So when it comes to that communication stuff, I'm really kind of shy ???? I guess that's one of the things that I'm

not comfortable with. 2-1-7-14

However, positive feelings were also expressed in connection with language. Positive feelings associated with language centered around a positive feeling upon realizing that one's partner was patient and allowed the participant to contribute ideas, even though it might take longer or require more effort than exchanging ideas with someone speaking the same native language, and relief that partners could communicate with each other and would do well on the oral presentation part of the project even though English was not the first language for one or both partners. Item 77 below exemplifies both a positive and negative affective response within a collaborative work session as a result of perceived speaking proficiency. In this example, the participant feels both anxiety about speaking in English with her partner and relief at her partner's willingness to help her communicate her ideas in English.

77. I think she's a nice person to work to, and she very open, like I'm afraid I can't pronounce something correctly or I can't say my thought clearly, and she try to help me through it. 2-1-8-16

The second factor related to individual culture that was referred to as being a source of feelings during collaborative work sessions was topic of conversation. In Items 78-79 below, the participant explains how topic of conversation was influenced by the individual culture of the participants and the affect that that had on his feelings during the collaborative work session.

78. “It was...because we learned how to understand another person. How to deal with ??? in the discussion ???? So, it was a pretty good experience to learn how to interact with people because there are certain things I wanted to ask him, but I know I shouldn't. Because you know, I wanted to ask him hey, you know, you have a girlfriend? But I knew that his culture, did ??? because I've talked to his friends before and he said that. I was like, okay, what's going on? You know. Because if we're just talking among the guy, you know, like American, I mean you always say, oh, do you have a girlfriend? You guys going to go see this movie. I couldn't. At least I shouldn't ask him because he would say something different or ???? or something. That's something like word choice, or the way that I'm saying you have to be careful. To be comfortable. So we learned a lot”. 2-2-3-6
79. **P:** Yea, certainly. And technically if you're talking about technical stuff, like designing, just per boring designing, it's okay. But like, general meaning. ??? In an hour you cannot talk about the design the whole time, you know. Sometime you have to go off the topic a little bit and talk about something else. You know, family or girlfriends or wives or whatever. Make more relaxing, but, I mean, different culture like ...I'm talking to a Chinese or an American or French, we wouldn't have the same problems that I had with [partner's name] because his culture is really different than...from mine. Like, more differences. 2-2-3-6

In Item 80 below, the same participant described working with members of his native culture compared to people from the U.S. He mentions not liking to work with members of his home country because they were dependent. He also mentions feeling left out when U.S. students talked about things that he had no experience of, like shared high school experiences. However, this seemed to bother him less than the dependency he associated with members from his home country.

- 80.** “Because I don’t want to do the project with [people from my home country], it’s hard. Because ???? And [people from my home country]. I don’t know. Most [people from my home country] that I know they like they so they kind of like we do. This thing is bad. So they’re dependent. I don’t like it. So if anything happens, they call you. ????? It really bothers me. For the American. Talking about high schools. I don’t care. We can get the project done. I can go home. I don’t have to hang out with you guys. 2-2-3-6

Interestingly, this participant also compared his experience with groups at work.

He mentions even though he may feel excluded because he didn’t have shared social experiences like high school, the communication was pleasant because his co-workers were very focused on helping him do the work and therefore communicated clearly to be sure he understood what needed to be done (Item 81).

- 81. I:** So the project work was okay with the Americans, it was just that socially you felt a little excluded.
- P:** A little bit excluded. But for the [people from my home country] yea, maybe we can talk about something in common. But I don’t think I would want to do that because I don’t time. You know. Easier. I really don’t have time to do that. For the projects at work, it was ???? because all the people I work with are engineers. Well, it was easy because basically they were just trying to help me. And I didn’t have to handle the main thing. So there’s no 50/50. They were about 80%. So it was lighter. Communications were. They want you to understand. So ??? but my friends friends, you sometimes you say it, they don’t want you to understand. Well, they want you to understand, but they don’t know how to make you understand. At work they make you understand. 2-2-3-6

Part Two: Team Portraits

In this part, I describe three work groups in more detail. This description will provide context for the categories described above and show how emotion was experienced and explained by members of these groups. This contextualization of the data is useful in showing the relationships among the categories discussed above. These relationships will be explained in detail in the next chapter as I discuss the model of emotion and culture in these collaborative work groups that emerged from the analysis of these relationships. All three of the groups described below have one partner who is a native English speaker and one partner for whom English is a second language. These groups were chosen to illustrate the nature of the culturally diverse groups represented in the class. Pseudonyms are used throughout.

Group #1: Patricia and Emily

Patricia and Emily reported rather different feelings about the project as a whole. Patricia expressed an overall positive feeling about the group project. She expressed some concerns about her English language skills, and she voiced her appreciation that Emily was patient and allowed her time to express her thoughts fully. Emily mentioned some frustration with Patricia's language skills, saying that at times it was difficult to understand her and at other times she was not sure that Patricia had understood her. Her feelings about the project as a whole were

more neutral. This was one of the few groups whose members had different feelings about the project.

Patricia

Patricia is a native speaker of Vietnamese and works for a major U.S. technology company. Her feelings about the project were positive overall although she expressed some concern about her language skills. She was able to clearly express her feelings at specific points during the collaborative work sessions, and she also supplied interpretations of her partner's feelings during work sessions.

Most of the positive feelings that Patricia reported during the collaborative work sessions were specifically related to communication with her partner and focused on exchange of ideas and the effect her language skills had on the pair's ability to communicate and exchange ideas during the collaborative sessions. Patricia felt that sharing ideas in collaborative work sessions was a critical aspect of a positive collaborative experience. Patricia characterized this exchange of ideas as the partners' listening to each other's ideas, clearly explaining their positions, and making compromises when there were different perspectives. She felt that her English proficiency was an obstacle to this important exchange of ideas. However, she felt the exchange of ideas in this team was successful because her partner allowed her time to express herself and because both partners

fully explained their ideas and individual positions on issues where they disagreed.

Therefore, the aspect of individual culture that most affected Patricia's feelings about the collaborative work session was language. She said that at first she was "nervous" about the group project because of her language skills. She said, "The first time I afraid she...how do I say that...I'm afraid that she doesn't understand what I'm going to tell her." She then explained that she became more comfortable when she discovered that the interactions were characterized by both members listening carefully to the other and carefully explaining their own ideas. She described this as "both talking and listening together." She also mentioned that at times she felt uncomfortable about her ability to express her ideas, but she felt better when Emily at times helped her to express her ideas fully. She said, "I'm afraid I can't pronounce something correctly or I can't say my thought clearly, and she try to help me through it."

The fact that her partner gave her time to express herself lessened her anxiety about her language skills and led to her positive feelings about the work sessions and the project as a whole because it allowed the partners to accomplish what Patricia felt was essential to successful collaborative work, an exchange of ideas. She said

I feel comfortable, very comfortable because she...she kind of listening to me and if something that we disagree she...I ask her why and she would

tell...would give her reasons. And then we tried to compromise things together.

Patricia also expressed feeling negative affect during the work sessions.

Patricia's negative feelings during the work sessions were related to her perceptions of her performance on the project. She did not report negative feelings as a result of interactions with her partner or anything her partner did or said. An example of this is a situation concerning a draft that was to have been sent via e-mail. Emily sent a paper draft to Patricia for review so they could talk about it at the next meeting, which would be the second videotaped session. However, when the pair met for this session, Patricia had not read the paper. She explained that at that point during the session, when she told Emily that she had not read the paper, she felt "a little bit bad." She explained the situation below.

Because she supposed to send me my paper last night, but I couldn't check my e-mail because my system's down. So, I didn't have a chance to look at this thing before I came to the meeting.

She "felt bad" because she had not completed the work that she had been assigned as preparation for the next work session. She also felt that Emily was "disappointed" in her because she had not read the paper. The cue she mentioned for this interpretation of Emily's feelings at this point was her facial expression and her verbal response. She explained that she felt Emily was disappointed, "because she say...oh, didn't take a look this? And she gave me a look like this, and I feel a little...I feel bad." Later in the same work session, Patricia and Emily

discovered that Emily did not have Patricia's correct e-mail address. Patricia felt much better after this discovery because, as she explained it, "Yes. And she...even though she sent it to me but I still couldn't receive it. So I a little bit relief. So I said, oh yes, so it's not...that's not my fault."

Another aspect that led Patricia to express positive feelings about the work sessions and the project as a whole was the distribution of labor during the project. Distribution of labor was another feature that she identified as being necessary for collaborative work, and she felt that she and her partner had accomplished an equal distribution of work and, therefore, the collaboration had been a positive experience for her. She said this was positive "because we divided work and she do her own part. I do my own part. And we cooperative everything together." She characterized the experience as being one of real "team work," and she felt that was the word that best summed up this aspect of the collaborative project that led her feel it was a positive experience for her.

In summary, Patricia's negative feelings about the collaborative work sessions and the project as a whole centered around her insecurities about her speaking skills and her failure to do the assigned task in preparation for a work session. In contrast, her positive feelings resulted from her experiences in communicating with her partner during the work sessions and her realization that they were able to communicate and effectively exchange ideas and equally contribute to the project through that exchange of ideas and an equal distribution

of the workload. Both Patricia's positive and negative feelings were related to the partners' abilities to engage in these two behaviors that Patricia identified as being essential to successful collaboration: open and full exchange of ideas and equal distribution of work load. Patricia's language skill was the single factor associated with individual culture that had an impact on these behaviors.

Emily

Emily had very different feelings about the collaborative work sessions and the overall collaborative project. Overall, the reasons she gave for her negative feelings about the project as a whole seemed more to do with working preferences than with the interactions and collaborations between the partners. For example, when asked if this collaborative project had been a positive or negative experience, Emily said it had been "one of the less pleasant ones that I've had just because a lot of it was writing, which I prefer to do individually."

However, some of the reasons that Emily gave for her negative feelings about the project focused on the collaborative work sessions and were typically related to the process on the project. For example, usually Emily mentioned experiencing negative emotions during the collaborative work sessions when she was frustrated at the progress of the project, when it was going slower than she had hoped for some reason. In one case during the first videotaped work session, she expressed frustration that the writing process was going so slow. She

attributed it to writer's block and the difficulty of writing collaboratively, something she does not feel she was good at. She described her feelings below.

- P:** So I was trying to...it was a busy day. We were trying to get...that's what's kind of frustrated we were not being able to actually get very much of it done sitting in that room.
- I:** Because of...
- P:** I had hoped to get farther along in the process that we did, so... But in the time I was frustrated that we hadn't gotten further.

Another example of Emily's frustration with the process of the project occurred as a result of a miscommunication between Emily and her partner, which in turn resulted in her teammate being unprepared for the work session. It was during this session that Patricia took the time to read a paper draft that Emily had attempted to e-mail to her so she could read it before the meeting. Emily was frustrated at this because she didn't feel that they were using the group time well. In other words, this was time when she felt that she and her partner should be discussing aspects of the project, and instead she was waiting for her partner to finish reading the paper draft. Her description of her feelings is below

Well, I kind of wish she had already read it ahead of time because I really didn't have anything to do when we were, you know, in a group setting and we're meeting together. That's kind of why I meant to send it to her ahead of time so she could look at it and then we could do more of the oral presentation planning and stuff that we had to do together instead of just quick reading.

In addition to the particular example of how her partner's lack of preparation had led to negative feelings because it resulted in inefficiency in the work process, overall, Emily felt that her partner could have been more prepared for work sessions. She expresses her feelings on this below, using the incident mentioned above as an example.

P: Well, I kind of felt, like, when she came to our group presentations she wasn't as prepared for them as maybe she could have been.

I: Uh-huh.

P: Like reading pap...finishing reading the article before she got there and then reading the article before...or the paper that we'd written.

Emily did mention one aspect of communication with her partner that made the collaborative experience less than positive for her. She said that personally she and her partner got along quite well. However, the one aspect of their interactions that had a negative affect for her at times was related to her partner's English proficiency. Her feelings on this topic are included below.

Well as far as communication...it's not her fault, but she has an accent, so I had a little bit of difficulty understanding what she was saying sometimes. So, that kind of didn't help the communication process any. Which is probably kind of what...when I had problem when I called her that night I didn't realize that she hadn't gotten my e-mails because she must have said yes to something else that she thought I said. I mean, I don't know how that happened. But that was a little bit of a problem for me.

Emily also talked about features she felt made for positive collaborative projects. Factors she thought were part of positive group experiences included 1) interest in the topic, 2) contributions by all team members, 3) equal distribution of

work, 4) having enough time, 5) efficiency, and 6) quality. In the case of this collaborative project, the linguistic aspect of individual culture negatively affected Emily's perception of efficiency, in particular. In addition, her perception of her partner's lack of preparation for work sessions also resulted in a lack of efficiency that led to negative feelings about the project and about specific collaborative work sessions.

Group #2: Charles and Richard

Charles and Richard had similar feelings about the collaborative work project. When asked whether the project had been a positive or negative experience, both participants said neutral. This group was in the minority in its less than positive response to the project. The reasons for this response to the project are discussed below.

Charles

Charles is a native speaker of Vietnamese. He had been living and working full-time in the U.S. for a major U.S. based multi-national technological company. He had recently returned to school to complete his degree and was continuing to work part-time at the same company. Charles was finding it very difficult to readjust to school after working full-time. Time management had proven to be challenging for him without the structure of the workplace hours. In addition, he had a fiancé in another state whom he visited every other weekend.

Like Emily, Charles indicated part of the reason for his less than positive evaluation of the collaborative work project was due to a personal preference for working alone rather than in groups. He indicated that he was “not a social like person.” Like Patricia, Charles expressed an experience of negative affect during the work sessions because of his English skills, and this was one reason that the collaborative project was not a positive experience for him. He talked about his English skills and feeling uncomfortable talking in English during the collaborative work session. His comments on this topic are below.

- P:** I guess because the main point is that my English is really limited. It’s not really good. So when its come to that communication stuff, I’m really kind of shy ???? I guess that’s one of the things that I’m not comfortable with.
- I:** Okay. So,it was...do you...are you saying that you feel it’s your language skills that made it kind of...not as good an experience for you?
- P:** Right.

He indicated that his English skills and his preference for working alone were equal factors in his feelings of his experience in the collaborative project he worked on during this study.

Charles did not contribute a great deal to discussions during work sessions. For instance, during the second session, Charles allowed his partner to contribute most of the ideas. His contributions were, for the most part, questions about formatting of the paper. He was comfortable with his partner’s suggestions as far as content and interpretation of the text. He said, “Seems that he really

knows what he was talking about all that stuff. He read the article really thorough.”

In addition, Charles came to work sessions unprepared. For example, during the first videotaped work session, Charles came to the meeting unprepared, having not read the article the team had chosen for the executive summary writing assignment. So, instead of discussing the article together, the pair began the session by reading the article together. Charles expressed satisfaction at this procedure; however, he noted that he felt his partner was dissatisfied with this approach. Charles’s explanation of his interpretation is included below.

- P:** I guess he was a little bit not satisfied with the way that...that I was not really prepared for it. ??? I didn’t read the article. So, and he’d read the article already. So he ...I think he just wanted to do his summary and let me worry about ??? to get it done.
- I:** Okay. Was there anything that he said or that he did that made you feel that he was...what did you say...dissatisfied...is that the word you used?
- P:** Uh-huh.
- I:** Okay.
- P:** Well, he was like trying to like scan through the article and kind of like the main point. After a while he said he didn’t...this was taking too much time and he just start telling...he said he’d write the article and the summary part. So, I think he was ????.

In summary, Charles indicated that his feeling about his experience of the project as a whole was “neutral.” Factors that led to negative feelings about the project were a dislike for the collaborative nature of the project because he preferred to work individually and discomfort in communicating in English. Factors that he indicated led to feelings of satisfaction were his partner’s contributions of ideas

during work sessions and the progress made during the work sessions toward completion of the project.

Richard

Charles's partner, Richard, was a native speaker of English. Richard also labeled his overall feeling of the group project as "neutral." Aspects of the collaborative work that led to negative feelings for Richard focused on Charles' lack of contribution to the project. Richard expressed frustration that his partner came to work sessions unprepared and did not contribute ideas during collaborative work sessions. In addition, during work sessions he felt that Charles asked questions that were not appropriate to the goal of the session.

The strongest emotion during the work sessions for Richard was when he discovered that Charles had not read the article that they had met to discuss. He said, "...it was a bit frustrating that he didn't just call and tell me he didn't finish reading the whole thing and he would like me to do the summary..." Once he realized that his partner had not read the article and, therefore, could not discuss it, his first response was to spend the work session reading through the article together with his partner. However, he became frustrated that this process was taking so long and that Charles wasn't contributing to the discussion, so he changed tactics. At that point, he simply gave Charles notes on his ideas of the

article so they could divide the parts of the paper and go write their assigned papers separately. Below is his description of this point in the work session.

Well, if we go on to the evaluation part, I don't know, but I feel that when we are doing the evaluation I was the only one giving out my points because he say he hasn't really read it so he has nothing to say. So once again, I was the one saying all. I was like, okay. So I think in the middle I tell him okay just put down my points, and then you go back and when you do the evaluation add your own points...

In addition to Charles' limited contribution to discussion during this work session, Richard also expressed negative emotions about the type of contribution that Charles made. Richard was focused on the article. He wanted to discuss it, understand it, and extract the main points so they could write the executive summary. While he was attempting to complete these goals, Charles began to ask questions about the structure of the executive summary and what it should contain. While later Richard said he realized that these questions were important and he appreciated the contribution that Charles had made to the work sessions by asking those questions and thereby calling attention to the necessity to follow the guidelines of the assignment, at the time of the work session, he indicated frustration at these contributions by Charles. His description of this point in the work session is below.

I was wondering why he was constantly asking me because to me the main thing was to discuss about the article, but for three to five minutes he was just asking me about how to write the evaluation. I was wondering why we're talking about this.

Richard responded to his initial frustration with the work session by changing his

tactics and goals for the session to adjust to the situation. By the end of the session, Richard, while not happy with the characteristics of the session, had come to a feeling of equanimity. He describes his feelings below.

At this point, I kind of accepted that I'll be the only one talking. I was hoping to, on the evaluation section, I was really hoping to have a two-way conversation.

In summary, the main reasons for Richard's negative feelings about the work sessions were his partner's lack of preparation and lack of participation in the collaborative process. This lack of preparation was perhaps the most significant factor in his dissatisfaction because he identified the exchange of ideas as being what he felt was the most valuable aspect of collaborative work. Below, he expressed why he felt this way.

Well I feel that if you discuss a point with someone, you find out...the chances of you finding out something new is higher because he might see something that I don't see and he can comment on that.

In addition to the current collaborative project, Richard's prior experience with collaboration had not been positive, either. When asked to describe a positive experience in collaborative situations, he responded, "...there hasn't been really any good ones." Based on these collaborative experiences, he indicated several factors that he felt led to negative collaborative experiences: 1) lack of interest, 2) not contributing, 3) unequal work distribution, 4) members not present at meetings, and 5) poor quality work. He felt that these were qualities of every group project, to some extent, and he had come to accept them as a normal part of

group work. He has, in effect, resigned himself to what he considers to be typical characteristics of group work.

Thus, after his initial frustration with his partner's behavior, he was able to adapt his own behavior to the situation in order to complete the project and produce a satisfactory product based on his experience with previous collaborative projects. Therefore, in the end, he said they were able to produce "tolerable work." Furthermore, he noted that this project was not a big one, in terms of the number of members and the amount of work. He compared this project to the collaborative project the class would be assigned in the second part of the semester, saying it would involve more people and be larger in scope. He indicated that for that project, it would be necessary to make sure everyone does his or her work.

Consequently, his judgment that the work they had produced was "tolerable," that he had been able to adapt to his partner's undesirable behavior, that the project was of relatively low in importance and/or scope, and his conclusion that all collaborative work has problems seem to have contributed to Richard describing his feelings about the project as "neutral" despite definite frustration with his partner's behavior.

Group #3: Donna and Annette

Donna and Annette had difficulty finding time to meet to complete the project. They had to coordinate their meetings with class, work, and bus schedules. They did try alternative ways to meet, attempting to use a synchronous chat to plan their presentation. However, because of time conflicts, that did not prove to be effective. They also used e-mail to communicate and send documents back and forth for revision.

The behavior of their partner was seldom the reason given for the feelings they experienced during work sessions. Rather, emotions arose because of the process of completing the project itself and artifacts associated with the process of completing the project. Both partners felt positive about the collaborative project, overall, and mentioned collaboration with a partner as being one reason for the positive feelings about the project. However, while their overall feeling about the project was similar, their feelings during the work sessions themselves seemed to be quite different. Donna expressed frustration and confusion related to understanding the article the group was reading, which was the subject for both of the work sessions that were videotaped. Annette, on the other hand, mentioned only one moment of confusion during the work sessions and was very positive about the interactive and collaborative nature of the project.

Donna

Donna is a native speaker of Chinese. She was taking five classes the semester this study was conducted. Most of these classes involved a lab component. Of her five classes, she said, “But, like, three have like labs, which don’t come credit. Sounds like you only have like five, but it’s like twenty-one hours. It looks like twenty-one hours.” She seemed a bit overwhelmed by the workload in her courses, and this seemed to have an effect on her performance and feelings during work sessions. At one point when asked what she was feeling at a particular point during a work session, she said,

I’m tired. I’m still tired of reading. Just not...I mean probably because I cannot like, really concentrate on that one. Also because it’s pretty boring the text, so I get, like, really tired. I don’t want to read any more.

When asked what she was feeling at particular points during the work sessions, confusion was Donna’s most frequent response. This confusion was a result of the difficulty she had understanding the article the team had chosen for their executive summary. She was clearly frustrated in trying to extract the main points from the article so that the pair could progress to writing the executive summary. On numerous occasions she described her thoughts and feelings during work sessions as she tried to solve, in collaboration with her partner, the puzzle of the article’s organizational strategy. In the transcript extract below, she describes

a particular interaction with her partner where one such collaboration was taking place.

And, like, I was trying to summarize what's going on in the article because this is, like, basically what the assignment is. So I was trying to summarize. Then I realized ...I summarized the first, like, first part and then on the later part I suddenly realized like probably the first part is not what the author wants. So he just want to get rid of this and start a new design. And then I was thinking about...like then I summarized...I make like a almost a half of the length of the summary. Then I thought, like, if doesn't want this one, then why I just summarize this...in a...like a pretty lengthy part. So I was just trying to figure out if the first part...the first half is the one she...he wants or he wants...or he does not want it.

The topic of the article they had selected was not one with which Donna was familiar, although her partner was. This, combined with fatigue from her heavy course load, the apparently ineffective organizational strategy of the article, and the short time period in which students were to complete the project seemed to create a situation where Donna depended heavily on her partner to help her make sense of the article so they could complete the project. Donna describes her thoughts on this situation in the following transcript excerpt.

I think he knows a lot about the topic because she the working experience. I mean, she knows a lot of this stuff. So, well, he said she knows something about networking so we go with networking because I don't have a lot of background on that. So, I think she knows...pretty much knows what's going on in the article so I just go...let her explain to me. It's kind of lazy but, that is better than just sitting there and wasting time I think.

However, this dependence was not as passive as the passage above might suggest. Donna clearly made efforts to understand the text on her own outside of collaborative work sessions, and during work sessions, she actively engaged in negotiations with her partner in collaborative attempts to understand the text. If she felt that Annette was wrong in an interpretation, she argued her position and listened and responded to her partner's argument for a different interpretation.

This collaboration in interpreting the article was the focus of both videotaped work sessions. The feelings that Donna reported during these work sessions included confusion about the article. For example, when asked about what she was feeling at a particular point in a work session, she responded, "Just confusion." She also expressed frustration that the difficulty in understanding the article was preventing progress on the project. The excerpt below exemplifies this feeling during the work session.

- P:** Particular feelings? I just want to know what's going on in the paper.
I: Okay.
P: Yea, just....confusion and just want things to clear so I can just go ahead and write the paper.

She also expressed dissatisfaction that the difficulty of the article would make writing the executive summary difficult. The transcript excerpt below is an example of this type of feeling during the collaborative work sessions.

- I:** Any particular feelings at this time?
P: Right now?
I: Here.

P: Oh, at that time, okay. I was thinking it's going to be hard to do this assignment, write this article. We have spent time on it, so I don't want to waste it time and effort ??? So I just go with this article. We don't have to change this ???

Thus, when asked about her feelings during the work session, Donna did not indicate that behavior on the part of her partner prompted any emotional response, nor did any interactions with her partner prompt an emotional response. All the feelings that Donna reported experiencing during the work session were negative and were a result of her interpretation of how the project was progressing. Furthermore, they centered on the difficulty of the article they had selected and how that difficulty in interpreting the article was slowing down the progress on their project, a project that they had very little time to complete in terms of the project parameters and which, personally, she had very little time to spend on because of her full schedule of course work.

Nevertheless, when asked about her feelings regarding the project as a whole, Donna reported that it had been a positive experience. Her explanation for her response is below.

P: All of it? I think it's a positive thing.
I: Okay.
P: Yea. I can learn a lot of stuff there. Like how to communicate with my partner. It's really important, and try to get some techniques for present things. It's really good project I think.
I: And so it was really valuable, you think?
P: Yea, it was really valuable.
I: Because you learned presentation skills and how to interact with a team mate.

P: That's a good word. I should learn that.

Thus it appears that cultural differences between members was not an issue with this work group, and emotions were not the result of interactions between the members. Instead, the negative emotions Donna reported experiencing during the collaborative work sessions for this project were the result of perceived obstacles to progress toward the goal of the collaborative work group: the completion of the course assignment. The overall positive affect she experienced from working on the project despite the negative emotions she reported during group work sessions were the result of a perception of the value of the activities. In this case, the value was learning the specific skills such as communicating with a team member and presentation techniques.

However, when asked about her experiences with other collaborative work projects, specifically about interactions within the group, Donna brought up the topic of language as a problem for her in working in groups with English-speaking group members. Her explanation of this situation is below.

P: I think that I got problem because of the English. I think most of the projects I'm not good at this. Because see like I was talking very really slow. So, I was just trying to get my idea expressed, but it's really hard. So, sometimes, you learn (?) really slow.

I: Okay.

P: So, well, and sometimes, you just cannot come up with words to say what's going on.

I: Okay.

P: To describe things. That's a barrier. You can say that.

- I:** Okay. So, it's difficult because you find it hard to come up with the right words to express yourself?
- P:** Yea. Sometimes like I really know what's going on or I really want to say this, but I just...there is no way I can like come up with words describe that.
- I:** Okay. That's frustrating, isn't it?
- P:** Yea. It's like the presentation. I think if you...use my native language, I'm going to, like, explain I, like, really smooth...thing can be really smooth because I know what's going on. But if like I use...I'm using English, I have to translate this into English and to make sure the grammar is correct, and the professor doesn't doesn't allow to memorize things. So, it's really hard to do presentations.

Despite this acknowledgment of the difficulty in communicating with group members and making presentations in English, when specifically asked about interactions with her partner in the project she worked on during this study, specifically if she would have changed anything about those interactions, she was very circumspect, not indicating strong feelings about how her English ability may have affected the process or outcome of the project. She said, "...I tried really hard to express myself, and I think that's the best I can do."

In addition, when asked about the differences between collaborating with English speakers and collaborating with speakers of her native language, she said the benefit of collaborating in her first language is the ability to express her ideas more clearly and completely. She did not indicate any other differences in communication style that would lead to better communication within groups of speakers of her first language. Her description for this effect is particularly interesting and is recounted below.

- I:** Yea. Okay. Is there any difference, do you think, between how you work in a group project in English and how you work in a group project in your native language?
- P:** I think it's a better communication with native speakers.
- I:** Okay.
- P:** If you ...????? The language better, ??? you can just express your ideas better and ??? better.
- I:** Is the style of communication different do you think?
- P:** Probably not. Because this is the kind of technical thing. There...we do a project there is not a lot of culture involved. So basically people just talking to each other. So there's not a lot of difference between if you were doing like technical things.
- I:** Okay. Because that's the focus?
- P:** Yea, that's the focus of the assignment. You have to present to your audience which is your coworker about technology and stuff.

In her explanation of the differences between working in an English-speaking group and a Chinese-speaking group, Donna cites the only difference as being the ease with which she can express her ideas. Furthermore, she specifically says that culture is not a factor in technologically-related group work. She suggests that this is the case because the goal of the group, the technical problem, is the focus of the interactions.

For Donna, the project seemed to be a test of endurance. The difficulty of the article, the time needed to meet with her partner, the demands of her full academic schedule, all created a situation in which she wanted to complete the project as quickly as possible, and negative affect in the group collaborative sessions arose from these factors, not as a result of features of interactions she had with her partner. Her positive feelings about the project overall were the result of skills she developed from completing the project.

Annette

Donna's partner, Annette, is a native English speaker. Comparatively, Annette was able to make more observations about her partner's feelings than Donna. However, her interpretations of the behaviors she observed were essentially the same throughout the work sessions. She described her partner as either "being confused" about or "trying to understand" the article. In addition, Annette made specific changes in her behavior as a response to her interpretations of her partner's feelings. Annette also played an interesting role in the interactions with her partner during the group collaborative sessions. She had background knowledge in the topic of the article that the pair had selected to complete their executive summary. As a consequence, during the collaborative work sessions, Annette played the role of expert. Both partners acknowledged this relationship by indicating that Annette was the more knowledgeable on the topic and helped Donna to understand the content of the article.

Therefore, the interactions during the work sessions of this group principally consisted of Annette explaining the article to Donna. Even though Annette clearly played the expert role in these interactions, Donna was also active in discussions of text interpretations, and in one exchange when she questioned the definition of a word that Annette was using, compared to the definition that the author was using, Annette realized that the author was using the word in a different way than she was. Therefore, even though Annette was clearly the

expert during these sessions, Donna made significant contributions in discussions of the text. In addition, Annette described Donna and herself as being on the “same level”. The full description of this aspect of their relationship is described below.

- P:** I think just we were on the same level, both trying to understand the paper and trying to see what to get out of it to summarize and put into our paper that we’ll have to turn in.
- I:** Okay. Anything in particular she said and did that made you...that brings you to that conclusion...that she was kind of on the same wavelength?
- P:** It was...I just could feel her like we were just both discussing the points and I felt like we were on the same level we’re like...I would say something about oh we need this in the paper, and then she’s like oh yea that’s a good idea to put in the paper. So, I felt that from her.
- I:** Okay. So...
- P:** I’m not sure if that was the first meeting or the second meeting. But just like in some of the times I felt like...yea, I agree that’s a good point to put it. Or she’d say something that she didn’t feel like I was quite...or like I would say something and she would like give her opinions and...that’s why I think she’s on the same level sometimes.

Therefore, it seems that even though Annette was clearly the expert on the topic of the article, this relationship was fluid in that as Donna brought ideas and discussion to the topic in order to clarify meaning and add meaning, the roles became more equal.

An interesting aspect of these interactions, with Annette serving in the expert role, was her change of behavior as a response to her perception of her partner’s understanding of the article. An example of this occurred in the first

videotaped work session. She felt that Donna was confused about the article, so she "...started to try and explain to her the general idea of what the paper was trying to say." She determined that Donna was confused because "she always asked me some questions." In addition, she observed Donna's highlighted text and questions that she had written on the margins of her text and interpreted them as places of confusion that Donna had about the content of the text.

Another instance when Annette adapted her behavior was during the first work session when both partners were reading through the text independently because they had not had time to do a thorough read of the text before the work session. As they read, Annette occasionally glanced over at her partner. She explains her behavior below.

Then, I know I like looked over at her, like, several times to see how far she was because I didn't want to, like...I know I'm sort of a slow reader. So I didn't want her to be like way ahead of me and I'd be behind.

Annette mentioned a single instance of negative feeling as a result of interactions during the work sessions that was a direct result of her partner's behavior. She describes what happened as follows.

- P:** I know at, like, one little tiny point in there I think it did bug me that she kept on sort of cutting me off.
- I:** Oh, okay.
- P:** And so, but I think she sort of picked it up too because she said sorry because I just saw that.
- I:** Oh, okay.
- P:** And so ...but I think that that problem is because I usually talk really fast and think really fast, and she probably English isn't really her...isn't like really her native language it might take her a

longer time. So I think that was probably the problem there. But so I just let her finish and then try to, like, explain to her.

I: Oh, so you thought she was cutting you off, though.

P: Yea, like, I was trying to, like...after she said something I thought she was done. Because when...instead, like, maybe she was thinking something or trying to get to her next point I would, like, start to explain something. And then she would start again. That's what I mean by cutting me off.

I: Oh, I see.

P: But, I mean, I would just let her continue and then try to explain to her when she was actually ready for me to explain.

I: Okay. So you picked up on that and you responded to that.

P: Yea.

Annette attributed her partner's behavior to her English language skills, that it might take her longer to express herself. Having made this connection, Annette adjusted her behavior to accommodate to that interpretation of her partner's behavior.

The only other mention of negative affect by Annette was at a specific point in the discussion of the article when Donna had raised a question about the author's use of a term. She felt that the author was using the term in a different sense than she and her partner were. Annette was trying to explain the author's use to Donna and was searching the article for evidence as she offered an explanation to her partner. While searching the article, she discovered a sentence that made her question her interpretation of the term. At this point she expressed "confusion."

Annette felt satisfaction from the discussion of the article because she felt that "after getting some of her input and discussing it further I think I did get a

deeper understanding. And that helped write the paper easily...or more easily.”

Therefore, the positive affect was a result of achieving a more complete understanding of the article. In addition, she felt that her partner felt satisfaction for the same reason. She expressed this by saying, “ ...I felt she got away much better understanding coming out of the meeting than coming [in to] it.” She explained further which of her partner’s behavior’s led her to this conclusion. She said, “Just like, after like I explained something she’s like...I could hear her like...oh, okay, yea I get it. So, I think that was just her ???? oh I get this point now.”

Overall, Annette thought that the group project was a positive experience because it gave her experience in skills that she felt she would need in the future in work contexts: specifically, giving presentations and working in teams. She describes her opinion more fully below.

- P:** Yea, because I’ve always liked to just work on assignments by myself. And, like, this project sort of forces me to work together and like split up tasks. I guess I’m, like, workaholic or something. I don’t know. I like to do everything myself. And I know I need to get rid of that later on, like, if I go into industry. And, like, it’s always a team on a project usually. So I can’t like do the whole project by myself. So this would help me split up the tasks more and not have too much control of the whole thing.
- I:** Okay. So that was...you felt that having the project of this nature was a positive thing.
- P:** Yea.
- I:** Okay.
- P:** It’s sort of, like, a personal, positive thing where, like, it may be totally different for [partner’s name] but, like, I think it will help

me personally later on, like, getting more experience with presentations. That's one thing. And then more team work.

She further describes the benefit she felt she received from working in a collaborative system. The main benefit she felt she received was the ideas that are generated in a group situation. For example, she commented that one aspect of the collaborative work for this project that she appreciated was the consistent exchange of information and ideas with her partner, Donna. In addition, she mentioned of her interaction with Donna that, "Like, it was just easy for us to like get along and discuss over. There wasn't like any tempers or anything going on." Therefore, the exchange of ideas in collaborative work were a benefit that Annette saw from that type of work situation and led to a positive feeling for her about the collaborative project. She said it added "interest and excitement," and described why in the excerpt below.

Oh, I'm just...you get, like, other feedback and other inputs instead of just, like, your own mind contained in itself, thinking about this whole thing. You've got, like, some other viewpoints and, like, what other people think. Some points that I may have missed and ??? like, I can point out something that maybe they have missed, too. So, it, like, builds the project better.

In some of her concluding remarks, Annette compared this collaborative project to others she had worked on, principally in work contexts. Her comments reflect those of her partner when she commented on the collaborative work of technical work groups. Both Donna and Annette expressed the opinion that collaborative work in technical contexts was characterized by a focus on the

outcome, on achieving the goal toward which the group is working. Annette summed up her ideas on successful collaborative work groups with the following words.

And so, it was all pretty good. I guess as long as everybody is on, like...focused and have the same ultimate goal in the end, like our class project our ultimate goal is, like, your summary. And for work it's like completing a project. I think as long as everybody has the same goal and are just concentrating, focused on getting that accomplished, I think it will just work out.

CHAPTER FIVE

RESULTS: A MODEL OF EMOTIONS IN COLLABORATIVE WORK

In the tradition of grounded theory (Strauss and Corbin, 1998), a theory or model of the phenomenon under investigation is developed that emerges from (is grounded in) the data. Thus, in a grounded theory study like this one, the analysis progresses from description of data to conceptualization of a model or theory that explains the data. The main purpose of this chapter is to present a theoretical model to explain the relationship between culture and emotion in culturally diverse collaborative learning environments and the factors that influence this relationship. This model is grounded in the perceptions and explanations of participants' experiences as they were described to me in the interview sessions, data from which were described in the previous chapter.

Emotion in Collaborative Work Groups

The student work groups that participated in this study were a combination of native-speaker pairs, non-native speaker pairs, and groups with both native and non-native English speakers. There were approximately equal numbers of each combination represented; however, overall there were more pairs with members representing more than one cultural group. In fact, there were only three groups that consisted of members from only one cultural group. All the members of

these three groups were U.S. students. Therefore, the collaborative work groups that participated in the study were quite diverse culturally and, therefore, presented an excellent opportunity to study the relationship between culture and emotion in a collaborative learning context.

The diagram on the following page (Figure 1) illustrates the relationship between the factors that affected emotion in the collaborative work groups in this culturally diverse class. The columns to the far right and far left of the page represent each partner in the collaborative team. The boxes in these columns represent the factors that participants attributed as giving rise to their feelings during the collaborative work sessions, their final evaluations of the current collaborative project, other collaborative projects that they had worked on, and collaborative projects in general.

In the model, these salient affective features (Damasio, 2004) pass through the three filters represented by circles in the lower half of the center channel. The sizes of the circles represent the relative impact of each of these filters for the members of this particular group of students. The overlapping portions of the circles represent the interactions between these filters. I use the word *filter* in the sense of an attachment one might put on a camera lens to change the visual effects. On a camera, light passes through an attached filter that is designed to create a specific effect on the visual image created on the film: for example, adding a color tint. The filters in the model work in a similar way. The salient

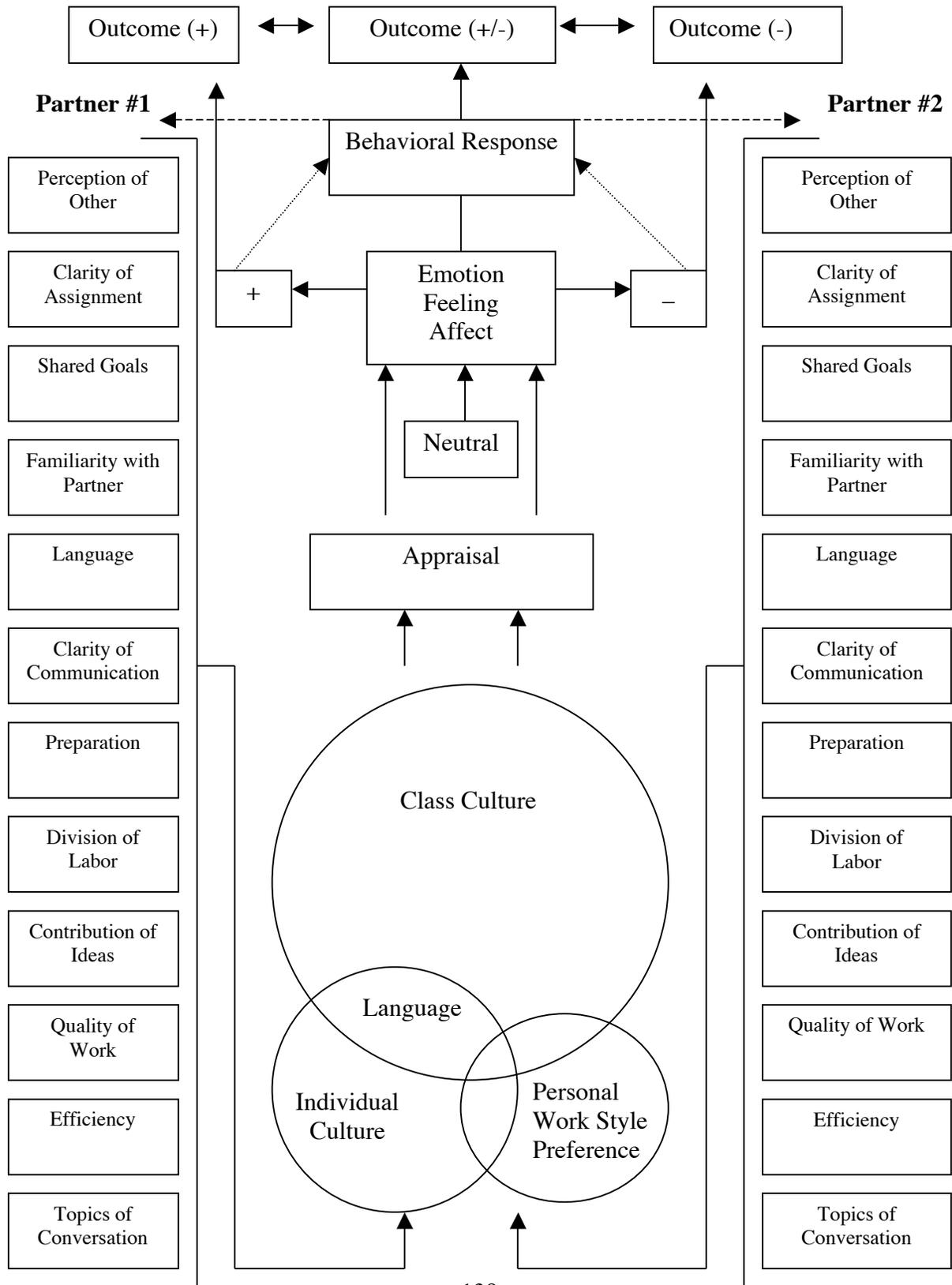
affective features pass through the filters, and each filter adds its own “tint” to those features. The features then emerge from the filters having been perceptually altered by them.

After passing through these filters, an appraisal (Lazarus, 1995) results in a negative, positive, or neutral affective response, which leads to a neutral, positive, or negative outcome, respectively. Either a positive or negative affect may result in a behavioral response. This cycle continues throughout the collaborative process. The accumulated affective evaluations lead to a final evaluative outcome for the entire collaborative process. The bidirectional arrows represent the interaction of a variety of affective evaluations that accumulated during the collaborative process, the unique combination of which resulted in either a positive, negative, or neutral evaluation of the project. Not shown on the diagram is that the accumulation of positive or negative evaluations over a series of collaborative work projects result in an evaluation of collaborative work in general: positive, negative, or neutral. I will now describe in more detail each of the features on the diagram.

Features Leading to Affect

Features leading to affect included perceived progress on the project, specific behavior by partners that affected the perception of progress on the

Figure 1: Emotion in Culturally Diverse Collaborative Work Groups



project, the perception of the partner's feelings, and features of the relationship between the two partners. Many of these features are interrelated, one feature impacting or interacting with others. In this sense, the features considered together acted as a system, each interacting with and impacting others. I will describe each feature below.

Perceptions of Other's Emotions

Comparing non-native English speakers to native English speakers, the ability to detect the emotional state of their partner was higher for non-native speakers. Native speakers who were in a native/native pair were slightly better at identifying their partners' emotions than those in native/non-native pairs. Elfenbein and Ambady (2002) reported that members of minority cultures were much better in accurately identifying emotions of the majority culture than the majority culture was in identifying emotions of the minority culture. The data from this study may reflect that phenomenon.

However, because native speakers were much less likely to identify emotions of their partners even if their partner were another native speaker, there may also be an influence for more attention to others' emotions in collectivist as opposed to individualist cultural orientations. However, while the data might suggest such a possibility as an explanation for the greater ability of non-native

speakers to identify their partner's emotions and to describe them with more specificity, the evidence is not sufficient for a conclusive finding.

Identification of a partner's emotions caused a self-reflective emotional response in a partner in only one case. In other cases, observation of a partner's emotions caused the observer to change his/her behavior as a negotiation tactic in facilitating the progress of the project and was only rarely accompanied by an emotional response. These changes in behavior were typically an adjustment in one's argument style or content for the purpose of persuading the partner to adopt the observer's viewpoint on an aspect of the project. In most cases, however, the observation of an affective state in another was background information that did not have an effect on a participant's own affective state or behavior.

Clarity of Assignment

Another feature that emerged as giving rise to affect for some individuals was the clarity of the assignment. Clarity of assignment refers to how well the participants understood the parameters of the assignment that the instructor had given. For example, some participants mentioned concern when they did not think that they understood the expectations of the professor. This lack of clarity regarding the professor's expectations was sometimes the result of a student's perception that the instructions for a particular aspect of the project were ambiguous. Another aspect of this feature involved questions about the purpose of

a particular aspect of the project: for instance, not being certain of the audience for the presentation. Questions about the validity of aspects of the assignment also caused instances of affect among participants. Feelings about this aspect of clarity typically concerned the writing portion of the assignments. Several students expressed concerns about the value of using a writing project as a collaborative activity. Lack of clarity led to negative affect.

Shared Goals

Negative affect arose when a participant perceived that her partner and she did not have the same goals for the project. This relates to clarity of assignment described above because it suggests some ambiguity in the interpretation of the assignment; however, goal sharing represented a slightly different dimension of that feature. For instance, if the partners had different visions for the project it would cause concern for some participants. This concern resulted from the participants' perception that this difference in vision slowed down the work process and, consequently, progress on the project. When partners identified the fact that they had different goals, they proceeded to negotiate to achieve a shared vision for the project, or some aspect of it. Successful negotiations resulted in positive affect. A common manifestation of this feature occurred when partners expressed different ideas for topics for the executive summary. Other manifestations of this features included partners having different ideas on the

content, organization, or purpose of the writing assignment or the oral presentation.

Familiarity with Partner

Familiarity with one's partner led to positive affect for most participants. At the beginning of the project, before students had an opportunity to get acquainted, some participants expressed concern about not knowing their partner and, therefore, not knowing if this would be a good experience for them or if they would produce a good product. As they got to know each other and it became apparent that their partner was going to be good to work with, then the feelings changed from concern, anxiety, or nervousness to positive feelings. A partner who was good to work with was characterized as someone who knew the subject area and contributed to group projects in significant ways. Also, as partners' initial goals for the project took shape and agreement was reached on the direction of the project, more positive affect emerged. This aspect of the feature is related to shared goals and clarity of assignment because both of these emerged as partners became more familiar with each other. In addition, some participants had prior knowledge of their partners as being someone who would be good to work with on a collaborative project. This knowledge came from either a prior relationship with that person, a report from someone who had personal knowledge of the individual, or knowledge of a general reputation of the individual as a good

worker and knowledgeable person. Essentially, familiarity provided students with an idea of how the collaborative process would progress for this project and reflected students' initial beliefs about whether this project was going to be a good or bad experience. The process of familiarization seemed to take about one or two work sessions.

Language

Language emerged as a feature that caused negative affect in some groups. Some non-native partners' English language skills were sufficiently low to create some negative feelings for those speakers and their partners. This was not the case with all non-native speakers, just those with lower oral and aural proficiency. The negative affect was a result not of the language skills themselves, but of the effect these had on the group process and product. An example of this was a misunderstanding that occurred that a native-speaker attributed to her partner's listening skills. However, the participant indicated the cause of the negative affect was that this misunderstanding had resulted in unproductive time during a work session. Non-native speakers also mentioned language as a reason for negative affect, saying that it caused them some frustration because they could not express themselves as well as they wanted.

Clear Communication

The ability to express one's ideas clearly and completely was another feature that was reflected in participants' responses. The feature of language is related to clear communication because, as described above, in some cases language did have a negative impact on clear communication; however, clear communication can also be a problem for speakers who are fluent in a language as linguistic competence does not necessarily entail communicative competence. This feature became salient as students were negotiating details of the assignment. As a function of completing the project, partners had to discuss the topic of the article, content of the summary and presentation, meaning of technical terms and concepts, organization of the paper and presentation, even sentence structure and word choice. Therefore, it was critical that each person be able to explain clearly his or her ideas. Lack of clarity in expressing one's ideas led to some perceived misunderstandings and, in some instances, negative affect. It also led to changes of behavior when participants restructured their arguments for persuasive purposes.

Preparation for Work Sessions

Preparation for work sessions was a feature that consistently led to affect in participants. If a partner arrived to a work session without having completed the work that had been assigned at the previous meeting, negative affect resulted.

Lack of preparation was perceived by the participants to slow down the process of completing the project, create an unequal distribution of labor, and negatively impact the quality of product because both partners could not contribute ideas equally to the problem-solving process. The intensity of emotional response to this behavior increased with the severity of the violation and the degree to which it impacted the productivity of the work session. The greater the impact on productivity, the greater the negative affect that resulted from the behavior. On the other hand, participants expressed feeling positive when members came to the work session prepared because that, in turn, led to a productive work session in terms of the amount of work completed and the ability of all participants to contribute ideas to the problem-solving process. Thus, lack of preparation for work sessions led to concerns of inefficient use of time and lowered quality of work product while adequate preparation led to positive feelings because of the perception that the project was progressing satisfactorily.

Division of Labor

Division of labor was frequently mentioned as a reason for affect during the work sessions and for feelings about this particular collaborative effort as a whole and collaborative projects in general. The expectation was high that partners would divide work evenly. If a member felt that he or she were doing more than his/her share of the work, this perception resulted in negative feelings.

Division of work load included actual labor on the project in the form of, for example, writing parts of the paper and performing parts of the speech, but it also included equal contribution of ideas, which is a feature discussed below. Equal distribution of workload was consistently reported as a reason for positive feelings about the collaborative project for this class and for collaborative work in general, both in school and the work place. It was also consistently reported as a factor for negative feelings about collaborative work. In fact, it was one of features that participants felt most strongly about and, consequently, their perceptions about equal distribution of labor had a significant impact on their feelings about the project and specific work sessions.

Contribution of Ideas

Contribution of ideas was seen by participants as a behavior that gave rise to positive feelings, if the contributions were considered adequate, and negative if considered insufficient. Participants expected their partners to be fully involved in the problem-solving process by continuously contributing ideas until the problem was solved. If this did not occur, for example due to lack of preparation for a collaborative work session, then negative affect resulted. In addition, one was expected to explain fully one's ideas, submitting them for evaluation, in a sense. Complete arguments and counterarguments were expected so that the quality of the idea could be evaluated by the group and the best solution to the problem

selected. Therefore, this feature also relates to the feature of clarity of communication described above. Participants who felt that their partner(s) helped the team make progress on the project during work sessions, by contributing ideas in an effort to solve the problems presented by the project, expressed greater positive affect about the work sessions and the project as a whole than those participants who felt their partners had not contributed in this way.

Contribution of ideas was also mentioned by participants as leading to increased knowledge by other members of the group. This was seen by participants as a positive outcome. In fact, it was a significant feature in students' accounts of overall satisfaction with the project and with collaborative work in general. This contribution of ideas by all participants was seen as providing participants the opportunity to view the problem from different perspectives. This variety of perspectives, in turn, was seen by participants as increasing the opportunities to discover the best solution to the problem as well as increasing opportunities to expand the knowledge of individual participants. The groups with the strongest positive feelings about the collaborative process were those in which all members contributed ideas "equally" to the problem-solving process.

Quality of Work

Perceived quality of the work product was also a feature that participants identified as leading to positive and negative affect. Participants valued the

quality of the work produced by the group. If a participant's behavior was perceived as negatively impacting the quality of the product, negative affect would result. One example of this, related to the feature of language, described above, was the concern that a non-native speaker's English ability might negatively affect the quality of an oral presentation. In one particular case, this negative affect was expressed as a concern for the grade received on the presentation and colleague/classmates not being able to understand the presentation because of a partner's English language skills.

Concern for grades is one dimension of this feature. As one participant stated, "The grade. I don't know whether it's only an issue with engineers, but grades matter a lot. Even if you are not satisfied with your partner, in the end if you get a good grade all ???? satisfied." Participants also mentioned that the relative importance of a particular grade may affect how intense a feeling may be experienced during a work session and how, or if, one would respond to the feeling with a change in behavior. For example, if a topic under discussion was thought to have a tremendous impact on the grade and a partner felt very strongly that his/her solution would result in a much higher grade but could not convince his/her partner to adopt the solution, then negative affect would result in an intensity corresponding to the participant's perception of the impact on the grade. In addition, in comparing this collaborative project with others in which they had been involved, some participants indicated that they experienced negative affect if

a partner did not have the desire or ability to produce a high quality product. The desire to produce a high quality product may be reflected in not coming to work sessions prepared, not coming to work sessions at all, or not contributing ideas to the problem-solving interactions. One example of lack of ability to produce a high quality product (in a previous project) was a partner turning in inferior work that then had to be redone.

Efficiency

Efficiency was another feature that emerged from the data as one that gave rise to positive and negative affect for participants. One aspect of this feature is related to the feature of preparation mentioned earlier. For example, if a partner arrived at a work session unprepared and, as a consequence, part of the work session was spent allowing the unprepared member to do the preparation that should have been completed earlier, then negative affect resulted because the time spend at the work session was not being used effectively and efficiently. Another example concerned e-mail. If the group members relied on e-mail to communicate with each other but one of the partners did not check her/his e-mail often, it slowed down the process, leading to a sense of inefficiency. Inefficiency led to negative affect. Communicating by e-mail rather than face-to-face was generally cited as being inefficient in itself, especially as part of the writing process,

although this varied by group depending on how e-mail was being used in the collaborative writing process.

In contrast, when participants perceived the collaborative process and the work sessions as efficient, positive affect resulted. Time was a concern for all participants. It was difficult for them to schedule meeting times because of class and work schedules and work for other classes. Therefore, when they felt that their time was being used effectively and not wasted, they were very positive about the experience. Anything that cost them more time than they felt it should gave rise to negative feelings, as described above. As a consequence, coming to sessions prepared and communicating clearly so there were no misunderstandings are two examples of features that interacted with efficiency to produce a positive or negative feeling.

Filters

The features described above, which resulted in participants' emotional responses, passed through three filters that impacted those responses: personal work style preference, individual culture, and class culture. The relative extent of influence for each filter was different across individuals. In other words, for some individuals personal work style preference played a larger role than it did for other individuals. The model shows the relative importance of each filter for all participants as a whole. Personal work style preference, represented by the

smallest circle, played the smallest role. Individual culture, represented by the middle-sized circle, was second in influence. The culture of the class, represented by the largest circle, played the most influential role as a filter. I describe each of these filters in more detail below.

Personal Work Style Preference

Every feature that gave rise to affect passed through the filter of personal work style preference. This refers to one's preference for working alone or working with a group. However, participants did indicate other personality-related explanations that influenced their feelings during the collaborative sessions, their affective response to the project as a whole and about collaborative work in general. Examples of these personality-related explanations included perfectionism and a tendency to "take charge." Even though the filter includes a broader spectrum of personality characteristics than the label might suggest, I chose to label the filter "personal work style preference" instead of "personality" because work style preference was the dominant influence within this filter. In addition, I had not administered an instrument to formally measure personality characteristics and, therefore, felt the label "personality" may be too broad to accurately represent the existing data.

For most of the participants in the study, the influence of the personal work style filter on emotion was not the dominant influence. However, the

personal work style filter was a powerful influence on the emotions reported by two individuals in the study: one native English speaker and one non-native speaker. These individuals reported negative feelings about the project as a whole because they did not care for the collaborative nature of the project. Both participants indicated a strong preference for individual work over collaborative work. This strong preference for individual work was the strongest factor in their evaluation of the project as a positive or negative experience, even though other factors played a role, too. Both individuals stated strongly that they did not like the project because they preferred to do work on their own. Furthermore, they did not, in contrast to other participants in the class, see any particular value in working with a group to problem solve. In fact, one participant indicated that the project may, in fact, turn out to be of lesser quality when done with a group as opposed to working on it individually. The non-native speaker indicated that he was not comfortable with his English skills, and this was also a factor in his negative feelings about the project. However, he indicated that he did not like to work in group projects in his native language, either.

Individual Culture

Culture was a factor in participants' experience of emotion in specific interactions during the collaborative work sessions, most frequently exemplified by language. Language resulted in an emotional response from participants in

three situations. First, some non-native speakers reported feelings of anxiety about their English language skills. They reported feeling nervous about interactions with their partners because of their language skills. One non-native participant indicated concern at the beginning of the project, before he had come to know his partner, that being paired with another non-native speaker might negatively impact the group's performance because of language skills. This was specifically due, he said, to difficulties that might arise in communications during work sessions and in the presentation of the oral report. Another indicated some frustration at not being able to express her ideas fully and being slow to express her ideas because of language. Only one native speaker indicated her partner's language skills as being a factor in her feelings about the project. Language was a factor in this case because it played a role in miscommunication and resulted in inefficiency during a work session. Overall, language gave rise to negative affect for participants when it resulted in either personal anxiety about one's performance, negatively impacted the group's functioning, or was perceived as possibly leading to a negative impact on the group's performance (quality of work).

One individual, a non-native speaker, brought up another aspect of culture as having a negative impact on his experience. His preference in working with a partner was to talk on a personal as well as professional level. However, he was not able to do that during this project because of the cultural beliefs of his partner.

He explained this by saying that topics he would typically talk about with people to get to know them would not be appropriate conversational topics for an individual from his partner's culture. Therefore, he was aware of the need to restrict his conversational topics even though he would have preferred to talk about such topics as girlfriends, to get to know his partner better. He indicated that this type of interaction would have made the experience more positive for him.

Class Culture

By far the most common reasons given for particular emotions, specific feelings, and general affect were related to the process, the quality of the product, and value of the project as a pedagogical tool in training students in the skills of professional engineers. The quantity of data related to filters regarding these aspects of the project is sufficient to allow for the identification of a group of values that were shared by the majority of participants in the study. When these values were supported by the collaborative activities of the group and behavior of individual participants, positive feelings resulted. When these values were violated by the collaborative activities of the group and individuals, negative feelings resulted. There were only two participants for whom this relationship did not apply: the two participants who had a strong preference for individual over collaborative work. In these two cases, individual preference was stronger than

the values of the group in influencing what, if any, emotions were felt about the collaborative process.

Therefore, the picture that emerged from the data regarding emotion and culture within these diverse collaborative groups was one that suggests the important influence of context on not only the relationship between culture and emotion, but on the definition of culture. In the context of the collaborative project for this engineering class, the culture of the class that emerged had a more profound effect on the emotions of participants than did the culture of any individual group member. The shared values that the students expressed in their reasons for negative and positive affect during group interactions and in evaluative comments regarding the group project and collaborative work in general represented the culture of this engineering class, and this culture seemed to reflect the culture of engineers to which these students were being acculturated through their academic classes.

Baba and Pawlowski (2001) discussed the culture of engineers in their study of culture change within an engineering program in the U.S. In this study, the authors defined culture in the following way. "Culture here is defined as shared systems of meaning and practice emerging from collective learning and taught to a group's newcomers as the correct way to think and behave" (p. 6). They further mentioned that acculturation into the culture of professional engineers begins in school in engineering departments.

Most participants in the present study seemed to recognize this process. Those participants who had positive feelings about the project expressed a recognition that collaborative problem-solving was a skill that they would need in the work place as a part of the culture of professional engineers. In fact, those students who had already performed internships had an even greater awareness of the nature of collaborative work in industry and valued the collaborative experience in this class as training for the work situations they anticipated encountering as they left school and entered the work force.

This culture of professional engineers was described by Norlyk (1996) in her exploration of the texts engineers produced in an industry setting. She described engineering culture as one that focuses on a technical solution. The instructor who taught the course in which data for my study were collected also mentioned the problem-solving focus of the engineers. When asked if he felt there were a culture among engineers, he said

And it's a ...you know, what is a culture. It's a common perspective of some sort, a common set of values. But, now you [have] here problem solvers. Anything that has to do with improving the process of problem solving has very high value. A tool, an instrument, anything like that is prized by engineers. And when engineers go into a situation, the first thing they do...How do I use this tool? How do I work it? How do I understand this software? How can I make this software be my tool to solve the problem? Okay. You get two heads, you get three head, you get four heads all crowded around a computer and all looking, looking. Have you tried [this]? Poke on this. You know that...that?

Overwhelmingly the reasons that students gave for their emotions during interactions, their affective evaluations of the current project and other collaborative work demonstrated their adoption of the values shared by the culture of professional engineers. The emotions that emerged did so in response to the problem-solving process and the proposed solutions to the problems the collaborative groups were working on: the production of the executive summary and oral presentation required for the course assignment. Behavior that supported the search for a high quality solution resulted in positive affect. Behavior that did not, resulted in negative affect. Therefore, as the salient features listed in the columns on either side of the chart passed through the three filters, the filter of the culture of engineering became the dominant influence on the emotions experienced most participants.

Relationship Between Emotion and Culture

These results indicate that the relationship between culture and emotion is heavily influenced by context. In this case, the context was an undergraduate communications course for electrical and computer engineers. Within this context, the culture of the class, in most instances, superseded the culture of individuals within the group to determine what factors were sufficiently salient to arouse an emotional response. As a consequence, behavior or conditions that violated the cultural values of the class gave rise to negative emotions in greater

instances than did factors represented by individual cultural features. In the same way, behavior in accordance with the cultural values of the class gave rise to positive emotions. There is no evidence to suggest that factors related to individual cultural features gave rise to positive affect. However, language, as an individual cultural feature, was reported as a factor that resulted in negative affect.

Relationship Between Culture and Personal Work Style Preference

As for the relationship between culture and personal work style preference, personal work style preference was reported by only two participants as playing a dominant role in their emotional response to the project and the interactions during the work sessions. Nevertheless, it proved to have a powerful effect for these two individuals. For these two students, personal work style preference superceded both individual and class culture as an evaluative tool that determined the affective experiences of these individuals within the collaborative project. This is not to say that class culture and individual culture did not have an impact on the feelings of these two individuals. It does, however, mean that personal work style preference played a larger role in determining the emotions these two people had regarding collaborative work.

For instance, for the non-native speaker, language was a feature of individual culture that was mentioned as a reason for anxiety or discomfort about the project, both in producing the products and in the interactions required to meet

the objectives of the project. However, personal work style preference was the most salient feature giving rise to affect for this individual. His strong preference for working individually, even among speakers of his native language, was the primary reason for his negative feelings throughout the collaborative work project.

Similarly, the native English speaker strongly preferred individual work projects over collaborative work situations. This personality factor dominated his response to the project. However, in this case, despite the individual's preference for group work, he was still able to work within the cultural values of the class, values that he shared. Nevertheless, his strong preference for individual work led to a negative evaluation of the project itself and of the collaborative work sessions. In fact, the class value that he did not seem to support was the benefit of sharing ideas and multiple perspectives. He felt that work done alone was more efficient and had a better result. Therefore, he did not share the dominant cultural belief that sharing ideas and considering many different perspectives could lead to better outcomes. This, in combination with his stated preference for individual work, led to his negative affective evaluation of collaborative work.

Dominance of Class Culture

Responses from participants do suggest why class culture played such an influential role in the interactions between participants and, consequently, the

feelings participants had during the work sessions and about the project as a whole. The focus of the interaction was most often the problem at hand, not the relationship between the individuals. Participants described the desire to know their partners' on a personal level. Sometimes this desire was social in nature, yet more often it was related to facilitating the group process. Participants described the role of relationships within the context of the collaborative project.

Building a relationship with one's partner was a desirable outcome for some participants as a quality outside of the objectives of the assignment. Some participants mentioned wanting to talk about more than the project with their partners in order to establish a personal as well as a working relationship. Participants indicated that it made the experience more pleasant, more enjoyable to know collaborators on a personal level. One individual working on this project did not get to know his partner as well as he would have liked because the partner was very pragmatic and kept the focus on the work. Another participant also did not get to know his partner on a personal level, as he would have liked. He attributed this to the need to limit conversational topics out of respect for his partner's cultural beliefs and practices.

Working with friends was also mentioned as a more personal relationship between collaborators that led to positive feelings in a work group. A number of participants mentioned that collaborative projects with friends had been positive experiences for them. However, while positive affect as a result of working with a

friend could enhance an already positive experience, it would not guarantee a positive experience. For instance, one participant mentioned a negative collaborative experience in the past when he had worked with a friend. The overall affective evaluation of the project was negative because of the ultimate quality of the project. Therefore, while working with a friend, with people with whom one has established a more personal relationship, could add positive-value, ultimately the greater value was quality of product. Thus, the focus of the problem-solving culture of engineers seems to be the project, not the relationships. As one student said,

He is like...I think people in the liberal arts are ...they think in new perspective. People in engineering are boring. No, they're not boring. They're just pragmatic. They are, hopefully trying to be logical and things like that. So the meeting is very dry. So it's okay, here's what has to be done. Some ideas. Okay, so then someone saying some ideas. Oh yes, let's do it. I mean, there's not so much about contact, here. It's all about getting things done ultimately.

Thus, the context of the collaborative work groups, problem-solving, seemed to shift the focus of the interactions from relationship-building between individuals to the task of searching for a solution to the problem. This shift in focus affected the interactions between group members. The interactions became instruments, tools, in the service of problem identification and solution. In some ways, they still served the purpose of relationship-building, but the relationships themselves became instruments assisting the problem-solving goals of the group. In the words of the professor who taught the course, building relationships in this

context was important in “a problem-solving sense.” Relationship features that contributed to a problem solution resulted in positive affect. Relationship features that did not lead to creating a quality solution to the problem resulted in negative affect. The following quote from the professor of the course contrasts this problem-focused interaction with interactions among engineers without such a focus.

Yes. They all get excited by the same things. And that’s the culture of engineers. I have...however, I will say, lunch time counts. And now it gets time to stop being an engineer. Then the other forms of culture...let’s, I would call dimensions rather than cultures, really. Then at that point, the axis has changed and an old dimension goes in the background and a new dimension comes out. And other cultural factors begin to assert themselves and become apparent. Now you know we can’t talk that much because we don’t have anything to talk about. We can’t talk at lunch because he doesn’t know the Dallas Cowboys from the Tabernacle Choir, you know. And so on and so on. And this person lives with... you know, he has 14 relatives in a small home in up in East Austin, you know. Whereas I live in this palatial place for a home, you know. This guy sends all his money to China, you know. I spend it on boats. You know, they don’t have anything to talk about. So all the other stuff starts to come out, and all the accents become a problem. And it’s very difficult for them to talk to each other when they move off of the technical area...move out of the technical area.

One aspect of relationship-building as a tool of problem solving was the feature of familiarity, described above. Interactions during collaborative work sessions at the beginning of the project helped students to become familiar with each other’s areas of expertise and personal interests. This type of familiarity helped students to decide what article to select for their executive summary, which was the first step of problem-solving in this project. This selection of topic

also helped pairs to establish common goals for the project. If this type of familiarity led to agreement on a project goal, positive affect resulted. If it led to disagreement or no agreement, negative affect resulted, as when a student felt “frustrated just because I think he had a different idea for our paper.”

Appraisal

The columns on the far right and far left of Figure 1 represent features of the interactions of participants during the collaborative work sessions for this project. During the interactions, each feature was processed by participants through three cognitive filters: personal work style preference, individual culture, and class culture. The filters determined the relative affective salience of each feature of the collaborative work sessions. The three filters are depicted as circles in Figure 1, and their sizes represent the relative influence each filter had in determining which features in the collaborative interactions were affectively salient.

The output of the filtering process was features of the interactions that had been tagged as affectively salient or non-affectively salient. Those features that had been tagged as salient were then appraised for affective valence. Those features that were appraised as salient and beneficial to the individual resulted in positive affect. Those that were appraised as being salient and harmful to the individual resulted in negative affect. Non-affectively salient features were not

appraised at the level of specific interactions. They do, however, play a role in affective evaluations of the outcomes of collaborative work. I will describe that relationship in the Outcome section below.

Behavioral Response

If the appraisal resulted in a positive or negative affective, a behavioral response may result. The dotted arrows from the + and – affect boxes to Behavioral Response indicate that this is an option but that it does not occur in every instance. Behavioral responses were typically the result of negative affect. For instance, several participants reported negative feelings as a result of lack of preparation by their partner's that resulted in inefficient work processes during a collaborative session. They became frustrated with the inefficient process and proceeded to change the process. The behavioral response in this case was to announce their frustration with the process and to propose an alternative process and then proceed to enact that process. Another example is when a participant expressed concern that she was slowing down the work process because the partner was reading an article during the work session and she was a slow reader. Her behavioral response to this concern was to look periodically at her partner to see how far she had read so she could adjust her speed if needed to match her partner's.

The dashed arrow from Behavioral Response to the outside columns that represent features of interactions between the participants during the collaborative work session indicate that this process is recursive. The process of perceiving interactional features, assessing their affective salience through cognitive filters, and appraising their affective valence and, perhaps, enacting a behavioral response, occurs continuously throughout the collaborative work session.

The solid arrows that lead from the + and – affect boxes intersect with the dashed lines going from Behavioral Response to the Feature columns. This indicates two possible paths. As long as the collaborative work session is in progress, the recursive path of the dashed line is followed at the intersection and the process loop continues. If the collaborative work session is completed, the solid line is followed to Outcome.

Outcome

In this model, the outcome of the process was an affective evaluation of a number of interactions. This affective evaluation could occur at several levels: work session, project, multiple projects. Outcome valence reflected the accumulated affect of multiple appraisals. For instance, if over the course of a work session the positive appraisals exceeded negative appraisals, the affective evaluation of the work session was positive. If negative appraisals exceeded

positive, a negative evaluation resulted. If positive and negative appraisals are balanced, then the affective outcome was neutral.

The bidirectional arrows between the outcome boxes in Figure 1 on the top of the page reflect the interaction between positive, negative, and neutral affective evaluations over multiple sessions. At any point during the project, and after the project had been completed, an affective evaluation of outcome could occur that reflected the experience of the participant through multiple work sessions or for the project as a whole. At this level of analysis, affective outcome valence was a reflection of the accumulation of affective outcomes across multiple work sessions, compared to accumulation of appraisals at the level of a single work session. For example, at the completion of a collaborative project, an affective outcome emerges as a result of the interactions between multiple sessions' outcomes. If positive outcomes dominate, the project outcome is positive. If negative outcomes dominate, the project outcome is negative. If positive and negative outcomes are balanced, neutral affect outcome results. The same process applies when affectively evaluating collaborative work in general. In this case, affective outcome for collaborative work in general would reflect the accumulated effects of affective outcomes from multiple collaborative projects.

Those features that were identified by the filters to be non-affectively salient were not appraised for affective valence at the level of interactions during work sessions. However, they did play a role in affective evaluations of the

project as a whole and feelings about collaborative work in general. This relationship is depicted in Figure 1 with an arrow going directly from the filters to the neutral outcome box at the top of the page, marked Outcome (+/-). These features became salient at this level of appraisal because for some individuals the accumulation of features resulting in positive and negative appraisals were balanced for a work session. This resulted in a neutral affective outcome for the work project. This same effect is possible at the project level and multi-project level. If positive and negative outcomes are balanced over multiple sessions or multiple projects, then a neutral outcome will result for the project or for collaborative work in general. In addition, it is theoretically possible that neutral outcomes could dominate at any level of analysis, resulting in neutral affect at the session, single project, and multiple project levels. However, this situation did not occur in this study.

Conclusion

This chapter described a model of emotion in a culturally diverse collaborative learning environment for engineers. The model describes the features of collaborative interactions that led to affect among group participants. It also describes the relationship between personal work style preference, individual culture and class culture in determining which interactional features are affectively salient and the dominant role that class culture, based on the problem-

solving focus of engineers, plays in the process of identifying those features.

Finally, it describes how accumulated appraisals during a single session lead to an affective outcome and accumulated outcomes lead to affective outcomes for single and multiple projects.

CHAPTER SIX

DISCUSSION

The purpose of this study was to explore the role of emotion and culture in students' experiences of collaborative work through the perceptions of students themselves. The following research questions obtain for this exploration: (1) How do interactants perceive, describe, and explain the emotions of others during collaborative work sessions? (2) How do interactants describe their responses to the emotional messages of others during collaborative work sessions? (3) How do interactants describe and explain their own emotional experience during collaborative work sessions? (4) What role does culture play in interactants' descriptions, explanations, and perceptions of emotion during collaborative work sessions? (5) How do participants describe and explain their feelings about collaborative work sessions, the project as a whole, and collaborative work in general? (6) What role does culture play in participants' descriptions and explanations of their feelings about the collaborative work sessions, the project as a whole, and collaborative work in general? In this chapter I will first summarize the findings that emerged from the research questions explored in this study. Next, I will relate the findings to existing literature. I will then explore implications for practice. Finally, I will discuss limitations of the study and offer suggestions for future research.

Summary of Findings

One of the most striking findings in this study was the identification of a class culture and the dominant influence that this culture had in participants' reported perceptions of feelings during the work sessions, about the collaborative project completed during this study, and about collaborative work overall. Factors related to individual culture and personal work style preference also had a strong influence on students' reported perceptions of feelings. However, for most students the factors related to the class culture were the most influential in their reports of emotion in collaboration. In order to discuss these study findings in detail, I will first summarize the findings related to each research question. Next, I will relate the findings to existing literature on collaboration, emotion, and culture. I will then discuss implications for practice. Finally, I will discuss limitations of the study and suggestions for future research.

Perceptions, Descriptions, and Explanations of Other's Emotion

Participants' descriptions of their perceptions of their partner's emotions during collaborative work sessions fell into two general categories. The first category included descriptions of general comfort level and degree of satisfaction with the work process or product. The second category was specific concerns about how the work was proceeding in terms of quality, speed, or interaction within the group. Participants identified five kinds of cues that they perceived

themselves to have used to interpret their partners' emotions during work sessions. These included verbal expressions, specific behaviors, facial expression, body movement, and knowledge of the situation. These cues are similar to those described in Planalp, DeFrancisco, and Rutherford (1996) in their study of cues that individuals reported using to interpret the emotions of others in their personal lives. However, participants were not always able to identify specific cues that they perceived themselves to have used to interpret their partner's emotions. Nevertheless, in these cases, participants were able to provide explanations for their interpretations, and sometimes these explanations involved generalizing based on their perceptions of past experience in collaborative situations.

Descriptions of Responses to Others' Emotional Messages

Only a few participants reported making some response during the collaborative work sessions as a result of a perception and interpretation of a partner's emotions during the session. When a participant decided to respond, participants explained that their decision was related to their concern about some aspect of the outcome of the project: for example, concern about grades. In other words, the responses were based on a concern about the product or process of the project rather than for the purposes of facilitating an interpersonal interaction.

Descriptions and Explanations of Interactants' Own Emotional Experience

Participants reported experiencing both positive and negative emotions during the collaborative work sessions. The negative emotions reported by the participants clustered in five general areas: (1) frustration/dissatisfaction, (2) confusion, (3) concern/worry, (4) disinterest, and (5) regret/guilt. The explanations for these perceptions of negative feelings clustered in four areas. These areas were (1) uncertainty about the project, (2) behavior of a partner, (3) lack of project quality or progress, and (4) difficulty in negotiating effective communication with the partner. Reports of perceptions of positive affect clustered into four categories: (1) excitement, (2) happiness/confidence, (3) relaxation/lack of tension, and (4) comfort. Explanations for positive affect that participants reported to have experienced during collaborative work sessions fell into three categories: (1) knowing or being familiar or becoming familiar with the partner and trusting his or her subject knowledge and ability to do the job, (2) making progress on the project or achieving a high quality of work product, and (3) good communication and sharing of ideas among the members of the group. Thus, the explanations for the perceptions of both positive and negative feelings during collaborative work sessions principally focused on the product and/or process of the project. Even when aspects of an interpersonal relationship were mentioned as explanation for emotions during the sessions, it was most often also related to how that relationship would influence the outcome of the project.

Culture and Emotion During Work Sessions

The role of culture emerged as a factor in participants' perceptions of emotions in two ways: emotions related to features of individual culture and those related to the culture of the class. The feature of individual culture mentioned most frequently as affecting participants' perceived feelings during collaborative work sessions was language. For non-native English speakers, language became a factor in their reports of their emotions with regard to (1) concern about their own understanding of the article they were reading for the collaborative assignment, and (2) the ease with which they could communicate with their partner. For native English speakers, language skill of a partner was reported as influencing emotions during a work session to the extent that language skills inhibited the completion of the project because it created (1) a misunderstanding, (2) difficulty understanding each other, or (3) difficulty understanding the article they had to read. Therefore, in most cases, language became a factor in participants' reports of their emotions during work sessions when there was a perception on the part of one or more participants that it was or might negatively affect the product or process of the project. The role of the class culture on participants' perceptions of emotion will be discussed below.

Feelings About Collaboration

When describing their perceptions of their feelings specifically about the collaborative work sessions for this particular project, participants reported perception of their feelings to be positive under two conditions: 1) they felt they had made progress in the work sessions, or 2) they felt they had reached some understanding with their partner on some aspect of the project or in their working relationship. Perceptions of experiencing negative feelings were also reported under two conditions: 1) if they did not believe they had made progress on the project during that work session, or 2) if they did not feel that they had reached some common vision of the project with their partner. Thus, reported perceptions of feelings about the work sessions were related to progress on the project. Interpersonal relationships were only a factor as they related to participants' perceived feelings about progress on the project.

When describing their feelings about the collaborative project as a whole, most participants indicated that they perceived the current project to have been a positive experience for them. Some factors participants mentioned were 1) equal distribution of work load and 2) partners taking equal, or approximately equal, responsibility for the completion and quality of the product and negotiation of project features. Participants who reported a negative feeling about the collaborative experience for this project identified three factors that led to the perception of negative feelings: 1) partner's lack of preparation for work sessions,

2) partner's failure to communicate important information regarding completion of assigned tasks, and 3) not contributing ideas to the work sessions. Again, according to participants' reports, emotions were focused on the process or outcome of the project that the groups were working on.

When describing their feelings about collaborative work overall, this project and others they had participated in, participants mentioned many of the same factors as contributing to the negative/positive quality of those collaborations as they did for the current project. These factors included 1) contribution of ideas by all group members, 2) equal distribution of the workload, 3) quality of work produced by team members, 4) coming to meetings and being prepared, and 5) communicating completion of assigned tasks. These findings are similar to those reported in studies of collaboration among engineers. For instance, Adams (1998) identified equal distribution of workload as a factor that engineering faculty identified as positively influencing their feelings about teamwork.

Culture and Feelings About Collaboration

As mentioned above, language was the feature of individual culture that emerged as being a factor in participants' reports of emotions during collaborative work sessions. However, a larger picture of culture emerged from the data that had a greater influence on participants' perceptions of feelings about

collaboration, both in this project and in other projects, than that of individual culture. The kind of cultural influence that had the strongest impact on these students was the culture of the class. According to the values of the class culture, positive/negative affect most often resulted when the values of the culture were followed or were being violated. The strength of the influence of the culture of the class on emotions in collaborative work as reported by these participants was an unexpected result that emerged from the study. It was also the most interesting result because it points to the need for flexibility in the conceptualizations of culture. In addition, because the class culture had, for most participants, a greater influence on their reported emotions than features of individual culture, it also points to the flexibility that individuals have in identifying with multiple cultures depending on context. In the context of this class, most participants seemed to identify more with the culture of the class than with individual culture in completing the collaborative class assignment. This flexibility of cultural identification has been explored in the literature. For example, Garcia-Prieto, Bellard, and Schneider (2003) presented a model that explained how team members' identifications with different groups are important and how they influence group experience and behavior. In contrast to the findings of this study, where individual culture most often was not as influential as class culture in influencing emotions, Stone-Romero, Stone, and Salas (2003) presented a model that explains that individuals from different cultures working in an organization

presumed to have an overarching culture may present problems because their individual cultures entail certain expectations that may be different from that of the organizational culture. Values of the class culture in this study included clear communication, preparation for work sessions, division of labor, contribution of ideas, quality of work, and efficiency.

Relating Findings to Existing Literature

In this study, I investigated the interaction between emotion and culture in a collaborative learning environment by examining learner perceptions of their own emotion experiences and those of their partner(s) within a culturally diverse engineering class. The picture of culture that emerged from the data was quite different from what I expected, and what might be hypothesized from the literature. The conceptualization of culture with which I began the research was one that considered culture as country-of-origin, geographic region, language, or ethnic group. Conceptualizing culture in this way is quite common in theoretical and empirical work on culture in a variety of disciplines (see for instance, Al-Sharideh & Goe, 1998; Bret, 2000; Elfenbein & Ambady, 2003; Grandin & Dehmel, 1997; Kitayama & Ishii, 2002; Leung, Lu, & Liang, 2003; Triandis, 2000). Using this conceptualization, I expected students from different home countries to have different expectations for communicative and collaborative behaviors. For example, in their proposal for facilitating collaboration and

teamwork in cross-cultural teamwork, Leung, Lu, and Liang (2003) described some of the cultural expectations for behavior that may be violated by team members from different cultural groups and result in impediments to cross-cultural group efforts. Specifically comparing Western and Asian cultures, the authors identified high-context/low communication style, collectivist/individualist orientation, consensus-building/conflict avoidance as cultural features that may inhibit effective collaboration across cultures. Furthermore, I had expected that these differences in expectations among group members from different countries of origin would result in differences in the reports of and perceptions of experience and expression of emotion during collaborative work sessions, and influence individual students' feelings about the collaborative project as a whole. I had predicted that those students who had additional experiences with culturally-diverse collaborative efforts would have a feeling about collaborative work as a whole that was influenced by issues of cultural diversity that they had experienced working in those groups.

However, the results of the study indicated that the more important influence for reported emotions and collaboration in this culturally diverse group was represented by a different conceptualization of culture. The concept of culture that emerged as the most influential in students' reported emotions concerning collaborative work was the culture of the class. This picture of culture that emerged from the data seemed to be to a large extent shaped by the academic and

professional culture of engineers. This alternative concept of culture is related to ideas of culture represented in the literature that include identification of academic disciplines (e.g. Hermanowicz, 2005; Neumann, 2001), and professions/occupations and organizations (e.g Curry & Moore, 2003; Gundry, 1993; Norlyk, 1996) as cultures.

In a discussion on the need for cultural change within the engineering education, Baba and Pawlowski (2001) defined culture as “shared systems of meaning and practice emerging from collective learning and taught to a group’s newcomers as the correct way to think and behave” (p. 2). They also presented a theoretical model of culture that they stated “incorporates the notion that professional communities share certain practices and associated systems of meaning that are commonly understood as ‘culture’ ” p. 3. Furthermore, they suggested their model can apply to faculty or students within an academic discipline. Interestingly, they did include emotion as part of a shared component within their cultural model. However, the important point here is not to explicate their model but to point out that the identification of culture as a group such as a particular group of students within a specific discipline is not a new concept in the literature. However, to my knowledge, it is not a topic that has been explored substantially from a theoretical or empirical perspective. Therefore, the description of class culture represented in my study is an interesting contribution to the exploration of this conceptualization of culture.

The values of the class culture that emerged in this study through participants' descriptions of their perceived emotions focused on behaviors that led to the successful completion of the project goal. These behaviors included clarity of communication, adequate preparation and contribution of ideas, equal division of labor, high quality of work, and efficiency. Of these values, a study by Adams (1998) on teamwork among engineering faculty identified equal contribution by members as leading to faculty team members' satisfaction with work in team contexts. Therefore, it seems the values of the class members in my study reflected, at least to some extent, values that are similar to engineering faculty. The values articulated by study participants may indicate that these undergraduate engineering students have, to some extent, begun to internalize the values of the discipline as they increase their knowledge and progress to full members of their profession, or community of practice (Lave & Wenger, 1991).

Emotions as reported by most students arose as a result of these values being adhered to or violated by team members. For example, if a partner came to a work session unprepared or did not contribute to the collaborative process during the work sessions, negative emotions were reported by participants. On the other hand, partners who perceived their partner to be completing an equal share of the work, for instance, reported positive emotions regarding the collaboration. Overall, the results indicated that those students who knew and adhered to the cultural values of the group and had partners who knew and adhered to those

values reported experiencing more positive emotions during collaborative work sessions and with the project overall and reported more positive emotions about working in other teams where these values were adhered to by other members. Most students in this study fell into this category. As a result most students reported their perceptions of their feelings about the collaborative project overall to be positive.

However, there were a few participants who did not share a perception of their feelings about their collaborative project as positive. These individuals seemed to fall into two categories. The first category represents individuals who knew the rules and could apply them while at the same time not liking them. Only one student fell into this category. This individual had a strong preference for working alone. Nevertheless, he was able to function effectively according to the rules of the class culture. As a result, his own perceived feelings about the group project were negative because he could not work in his preferred style; however, because he was able to behave within the group in a way that was deemed appropriate by the group, his team members reported their perceptions of their feelings about the work sessions and the project as a whole to be positive.

The second category represented individuals who did not adhere to the group values, either because they were unable to or because they were unwilling to apply them in a consistent manner. Only one individual fell into this category. This individual, too, had a strong work-style preference for working alone. In

addition, he violated the expectations of the class culture by failing to contribute to work sessions and coming to work sessions unprepared. It is not clear from the data whether this individual was aware that he was violating a cultural value of the group. It is clear, however, that he was not aware of the degree of negative impact his failure to comply with cultural norms had on his partner, even if he were aware of the values themselves. As a result, he reported a perception of his feelings about the collaborative project as negative because of strong work preference. However, his partner reported negative feelings about the collaboration because of violations of the class culture.

The influence of work-style preference for these two participants was stronger than the influence of the class culture. This finding seems to reflect Carpenter (2003) who identified this work preference feature among undergraduate engineering students and suggested that this feature may influence team members' evaluations of the group projects in which they participated. Carpenter identified two types of students: those who preferred to work alone and those who preferred to work with others. In my study, it appears that both of these groups were represented among study participants. However, the majority of participants seemed to fall in the latter group, preferring to work with others. Furthermore, participants who fell into this category seemed to have, overall, perceived their feelings about the collaboration as more positive than did those with a strong preference for working alone.

One other group reported their perceptions of their feelings as being negative at points during the collaborative sessions because of failure to adhere to the cultural values of the class. In this case, it was clear that both group members were aware of the class culture. However, it was reported that one member of the group was, at times, unable to adhere to those values. For instance, at times he came to work sessions unprepared and did not contribute much to the collaboration. However, this case is different than the one described above in that the individual knew what the cultural expectations were, expressed concern at his own violations of those expectations, and changed his behavior to mirror better those expectations as the project progressed. Therefore, both members of this group reported perceiving their feelings about the project as positive overall, even though one member reported perceptions of his feelings as negative at points early in the project process when his partner violated the cultural expectations of the class culture.

These findings might suggest that the undergraduates participating in this program were at different places in their acculturation process into the profession as they began the progression from novices to experts in their field. Groups with members in this category reported experiencing negative feelings about the collaborative process and interactions during the work sessions corresponding to the partners' non-compliance with the cultural rules of the class. Those students who were most acculturated to the discipline of engineering may have been those

who were able to articulate the values of that culture most clearly and who reported having emotional responses when those values were, or were not, adhered to, by themselves or others, within the context of the collaborative project.

The conceptualization of culture with which I began the study, as country-of-origin, geographic region, language or ethnic group, was also represented in the study data although not in the manner anticipated. Reported emotions arising in response to individual cultural differences among group members most often centered on language. Interestingly, reported emotions related to participants' language skills were also most often related to aspects of the class culture. For example, when language skills prevented contributions to the collaborative session or created a misunderstanding that led to an inefficient use of time during a collaborative work session, participants reported feeling negative emotions. In fact, these were the only instances when language was reported to have an effect on participants' reported emotions in most instances. However, some non-native English speakers reported negative feelings as a result of language because of self-consciousness about their skills. In addition, one participant reported positive feelings because her partner's communication style and personality allowed her to feel less self-conscious about her English language skills. No non-native speakers were peripheralized in group work, as Leki (2001) reported of non-native speakers in her study of the experiences of speakers of English as a second

language in U.S. college group projects. The dominance of the class culture among the participants in my study may be one reason peripheralization reported by Leki in her study did not occur here.

Other cultural factors, like culturally appropriate informal conversational topics, were reported as giving rise to perceptions of negative feelings also, but to a much smaller degree than did the feature of language. This also reflects the dominance of the class culture. The factor of conversational topics did not result in reported intense negative emotion because it was not a factor that violated a value of the class culture. The values of the class culture were focused on the problem-solving feature of the project itself. Anything affecting the project was likely to be reported as producing an emotion in the participants. Other factors of culture, such as “chit-chat” topics, did evoke emotion, but not as frequently or as strongly.

Finally, additional features of the class culture that led to emotions on the part of participants were associated more with aspects of collaboration not related to specific participant behavior. These features include perception of other(s), clarity of assignment, shared goals, and familiarity with partner(s). These features are similar to those that have been identified in other studies of collaboration among engineers and scientists. For example, Carpenter (2003), in describing qualities of interactions between engineers, referred to establishing “shared

knowledge of the team's capacity to understand and solve the assigned problem" (p. 192).

A process of establishing the shared knowledge described by Carpenter may be instantiated in my data most clearly as *perception of other* and *familiarity with partner*, but also perhaps indirectly with *shared goals* and *clarity of assignment*. In my study, participants reported experiencing positive feelings when their perception of their partner and/or their familiarity with their partner created the impression on their part that the group would be successful in completing the project, the problem in this context. The first group meetings were often the occasion when this feature came into play. About these sessions, students indicated that they felt positive emotions when they knew that their partner, either personally or by reputation, would be a good person with whom to work. What qualities they felt led to this were partially indicated as the values of the class: for instance, contribution of ideas and coming to work sessions prepared. The features of *shared goals* and *clarity of assignment* emerged next as giving rise to reported emotions in the collaborative sessions. In discussion with a partner, if participants felt that their partner shared their goals and there was mutual understanding of the assignment and/or mutual desire to achieve that understanding, positive affect was reported.

In another study, Hara, Solomon, Kim, and Sonnenwald (2003) looked at how scientists perceived collaborative work. In their results, they identified

compatibility as a factor that the scientists they studied had mentioned as important to collaboration. This factor included work style, writing style, priority, and management style. In addition, they noted that “fully integrative collaboration appears to also require compatibility in approach to science and compatibility of personality, often including personal friendship and the trust that comes with friendship” (p. 959). The features identified by participants in my study, *perception of other, familiarity with partner, shared goals, and clarity of assignment*, seem similar to those identified by Hara and colleagues as features important to collaborative work. The features identified by the engineering students in the present study suggest issues of compatibility in both personality and work goals. When there seemed to be compatibility in these features, participants reported positive affect. When there did not seem to be compatibility, negative affect was reported.

For each individual, the features that were identified as leading to reported emotions passed through the filters of class culture, individual culture, and personal work style preference. The relative importance of each of these filters for each individual affected the individual’s appraisal of these features as positive, negative, or neutral at any given point during a collaborative session. Smith, Haynes, Lazarus, and Pope (1993) characterized appraisal as an evaluation of events and “their implications for personal well-being. Relevant issues include, Do I care about what is happening? Is it good or bad for me? Can I do anything

about it? Can I accept it? Will it get better or worse?" (p. 917). These types of questions were clearly on the minds of participants of the study as indicated in explanations for emotions they reported to have experienced during collaborative work sessions. The filters of class culture, individual culture, and personal work style preference influenced the answers to these types of questions for each individual. For instance, those participants who valued the class culture expressed concern about partners who did not contribute ideas because it negatively influenced search for a solution to the task in which they were engaged. This, in turn, was seen as affecting one's grade in some instances, which gave rise to additional negative appraisal of the collaboration.

Therefore, the results of this study seem to provide some empirical support for the theoretical concept in the emotion literature of appraisal and its connection to emotion. Furthermore, the study contributes to the body of knowledge on culture through the identification of a class culture that may suggest a process of acculturation into an academic and professional culture as students increase their knowledge of their field. In addition, the findings of this study contribute to the literature in the area of collaborative learning. Much has been written about cooperative learning (e.g. Gillies & Ashman, 1998; Warring, Johnson, Maruyama, & Johnson, 1985; Yager, Johnson & Johnson, 1985). However, the role of collaboration in the cooperative learning process has perhaps been less thoroughly studied. In addition, the role of culture and emotion in collaboration is a small

subset of the collaboration literature, particularly the emotions of individuals within teams. Fewer still have looked at the relationship between culture and emotion in the collaborative process. Finn and Chattopadhyay (2000) presented a model that looked at culture and emotion in a culturally diverse work team. However, this was in a business setting. In education, there have been a number of studies looking at collaboration and cooperative learning in the engineering field, for example, DiBiasio and Groccia (1995), Smith (1989), and Watson (1995). However, again, the role of culture and emotion in this context has been less well studied. In addition, as Do (2002) and Do and Schallert (2004) pointed out, there have been few studies looking at emotion in naturalistic contexts in educational settings. Therefore, this study is significant in that it fills a gap in the existing literature on emotion and culture in collaborative work groups in an educational setting.

Implications for Practice

This study has implications for practice in three areas: English as a Second Language, Engineering Education, and collaborative learning across the curriculum in higher education. The primary aspects of the study that suggest implications for practice in these areas are (1) the role of language in students' perceptions of experiences in collaborative work sessions, and (2) the dominance of the class culture in students reported feelings about collaborative work for this

project and descriptions of collaborative experiences that they reported as having been positive. The findings are particularly interesting because they reflect the perceptions of the students themselves and their perceived feelings about collaboration as a teaching and learning tool. Knowing students' perceived feelings about the collaborative process and the relationship between emotion and culture in culturally-diverse collaborative groups may help teachers to more effectively use this teaching tool in their classes.

Implications for Teaching English as a Second Language

Language was the feature of individual culture most cited by students as contributing to their perceived emotion in collaborative learning, and it was most often cited as a cause for their reports of negative emotions. Students reported being self-conscious about their English speaking skills, frustrated at not being able to express themselves completely or quickly, and concerned about how speaking skills would impact the oral presentation part of their grade for the project. Language became the cause of negative affect for native English-speaking students when they felt a partner's English skills negatively affected the efficiency of work session or progress on the project.

This finding has implications for instruction in English as a Second/Foreign Language, particularly in programs with an English for Academic

Purposes focus and those who are preparing students for coursework in an engineering program. As Freeman (2003) noted:

Since standardized tests, such as the Test of English as a Foreign Language (TOEFL), contain no speaking component, even students who pass the TOEFL with a good score often arrive at English-speaking universities without the oral/aural skills needed to thrive. Furthermore, many NNS come from school systems in which they attended large classes and learned English in silence through reading and writing....Such students may be unaccustomed to working in groups, asking questions of their professors, or giving presentations; they need time and help to adjust to the oral/aural demands of academic life in an English-speaking environment. p. 159-160.

As indicated by the values of the class culture, contributing ideas and clarity of communication were important factors that led to reports of perceived positive feelings for participants in the collaborative process. Inability or discomfort about one's ability to do so led to reports of perceived negative feelings. This finding indicates that it is important for students entering programs where collaborative learning is a component of the curriculum, as it is in engineering education, to be prepared to participate in the problem-solving types of discourse found in this context, including negotiation of meaning.

Being aware that having these skills will better enable students to participate in this type of learning environment, programs that prepare students for academic programs where collaborative learning is part of the curriculum might incorporate more collaborative-style activities into their English-language curricula. Along with the introduction of collaborative-style activities, explicit

instruction in language used for problem-solving discussions would be helpful to prepare students for collaborative learning contexts. Including more collaborative-style activities in the English classroom may, in fact, prove to be a difficult task, particularly in academic contexts where teacher-centered classrooms and a lecture-style delivery is the norm, as it may be perceived to call into question students' and faculties' beliefs about teaching and learning. In addition, as Shim (2003) noted, students do not always value the process of negotiating of meaning in language learning. Therefore, as she suggested, explicit instruction in why and how negotiation of meaning may be helpful to language learning may be required for students to be motivated to participate in such activities.

In terms of oral skills for presentations, English language programs might consider including explicit instruction in pronunciation in their curricula. This instruction may help to prepare students for class presentations and reduce concerns of comprehensibility in oral presentations affecting project and course grades. Integrating instruction in suprasegmentals, including stress and intonation, might also be particularly helpful to prepare students for academic programs in which presentations are routinely required as part of course work, as such features seem to improve comprehensibility (e.g., see Pickering, 2004, for a discussion of discourse intonation and the comprehensibility of international teaching assistants). Helping students improve their proficiency and confidence in collaborative activities and presentations would increase the likelihood of them

perceiving experiences in collaborative learning contexts such as those that may be required in engineering programs as positive.

Implications for Engineering Education

The majority of students in this study valued the collaborative learning process because it gave them experience in using skills that they would need in industry. The values that they expressed as part of the class culture were values that they stated were important not just to the project they were working on for this class, but for collaboration in general and within their profession in particular. However, there was some variation in how effectively the students were able to collaborate according to the values expressed by the class. Those who were able to collaborate effectively by adhering to the class values, and those who had partners who were able to do so, reported experiencing more positive emotions during collaborative sessions and reported having had more positive feelings about the collaborative project as a whole than did students who were less able or willing to collaborate according to those class values.

However, while most students felt that collaborative skills were important to their work as professional engineers and expressed values that reflected that belief, they also indicated that they had had very little opportunity to collaborate within the curriculum of their program. The students' perceptions of overall positive feelings about the collaborative work suggest that engineering programs

might consider using collaborative activities and projects early in the their curriculum. If, in fact, collaboration is a key skill needed by engineering professionals, the findings of this study suggest that not all students have those skills or necessarily desire to acquire them. Furthermore, the findings indicate that students who do not have collaborative skills may perceive the collaborative learning process as a more negative experience or might engender in their partners a perception of collaborative learning as a negative experience. Therefore, explicit instruction in collaborative skills may also be desirable early in the curriculum in order to produce graduates who can effectively collaborate in professional settings, even if they have a personal preference for working alone.

One concern that engineering faculty may have about including collaborative learning in the curriculum is that it takes time and will, therefore, take away time from subject-matter course content. However, DiBiasio and Groccia (1995) found no reduction of content in a chemical engineering course whose design incorporated a cooperative learning model. Therefore, it does not seem that collaborative learning scenarios necessarily reduce the amount of course content. In addition, the instructor for this course mentioned during the interview that the quality of the final product for this class was higher than any previous class, and he attributed this to the addition of a collaborative project early in the semester. He added that students who had participated in the collaborative project early in the semester produced a higher quality product than

those who had not. He indicated that students across classes consistently produced better quality products in collaboration than individually although, he added, the students did not necessarily realize that this was the case. In addition, the instructor mentioned that his student evaluations the semester this research was conducted were the highest he had ever had, and he attributed that to the collaborative project inserted early in the semester. He reported his perception that this enhanced the students' experience of the more elaborate group project that they had to complete later on in the semester. They were more confident and more effective in the larger project, having been exposed to collaboration in the earlier project.

If students indeed learn to produce better quality work in collaboration and come to value working in teams, then it seems appropriate to integrate more collaborative work in the engineering curriculum, particularly as these are skills they will need in the marketplace. However, if such collaborative work is integrated into the curriculum at lower levels, it would be beneficial to include some training in the process of group work because students at this level have not yet learned how to work effectively in groups and explicit instruction in these techniques would be valuable. This, in turn, may enhance students' enjoyment of collaborative activities.

In addition, engineering programs might consider how to support the language needs of non-native English speakers in their program. Perhaps English

as a Second Language professionals and Engineering faculty on campus could collaborate to ensure that international students have proficiency in English that enables them to perform well within the program. Such support may include classes in oral proficiency development. In addition, one non-native English speaking participant in the study stated that, based on his observations in the U.S., engineers without strong English skills were “the first to be laid off and the last to get promoted.” Therefore, English language support for students may be important not only to facilitate their progress through the academic program but also their careers.

Limitations and Future Research

There were a number of limitations to this study. One limitation was the length of time students had to complete their collaborative project. The time period from start to finish was very short, just two weeks. During this two-week period, the students, in their collaborative groups, had to select and read an article, write an executive summary of that article, complete and prepare a presentation, and give that presentation to the class. Because the total time that students spent completing their collaborative project was two weeks, this also meant that the total time for my data collection was two weeks. While it would have been possible to extend the time period for conducting interviews beyond this two-week period, it would not have been methodologically appropriate to do so as

interviews using stimulated recall procedure are best conducted as soon as possible after a recorded event to ensure a more accurate recall.

This short time period, in combination with the large number of participants, limited the opportunities students had to meet together and also the opportunities for collecting data through videotaping work sessions. This short time period also meant that I could not videotape every meeting; much of the work done by the groups was done off camera. Therefore, a great deal of group interaction was not available to me for analysis in the form of direct observation even though the students often discussed events that had occurred during their interviews with me. Videotaping of all work sessions and including those data in the analysis may have yielded additional insights into the relationships between emotion and culture and greater details on the values of the class culture.

The short time period available for collecting data also affected the interviews. The interviews with participants were necessarily truncated because of the time restrictions on the assignment and the large number of participants. At times I had back-to-back interviews, which sometimes did not permit me to explore some comments because of time restrictions. As a result, it is possible that I missed some important insights from participants.

In addition, although the number of participants was quite large in terms of collecting sufficient data in a short period of time, in terms of generalizing the findings across contexts, the number of participants is quite limited. However, as

the goal of qualitative research, in general, is particularization rather than generalization, the small sample size is not as great a limitation on the study as the limited time to collect data, which restricted the amount of data that could be collected. However, in terms of building a theory that reflects the relationship of culture in emotion in collaborative work, it is clear that the small sample size restricts the applicability of the findings to new contexts. Therefore, because the results of this research cannot be generalized to all contexts, other studies need to be conducted to see if the findings presented here obtain for other classes and other disciplines. Replication of this study in the same course and in different classes would be helpful in ascertaining whether the results of this study were particular to this class or could be applied across contexts.

Also, in a stimulated recall methodology, the interview should be conducted as soon as possible after the source session. The closer the interview is held to the videotaped session, the greater the chances of accurate and detailed recall. However, in some cases several days went by between the work session and the interview. In two instances, the time lapse was a week due to the participants' full schedules. This made participant memory of the work session limited. In addition, video clips from both video taped sessions were shown at the interviews. Therefore, the clips from the first video taped session were typically a week prior to the interview. This length of time most likely resulted in reduced recall for events in that first session in particular.

Another factor that may have influenced recall of specific work sessions was the quality of the videotape recordings from some of the work sessions. The recording site for the work sessions that were videotaped during the first week of data collection proved to be acoustically inadequate for the recording equipment to pick up the voices clearly: some sessions were more audible than others. Subsequent sessions were moved to different locations to resolve this problem. However, recall from the sessions taped in the first location may have been reduced because of the quality of the recordings for those sessions. In future studies, optimal timing for data collection and stimulated recall interviews should be considered, and collaborative projects that allow for more extensive data collection and more timely stimulated interviews should be selected if possible.

In addition, the participants themselves may have impacted the limited role of individual culture on emotion that was found in the study. Although the group as a whole was culturally and linguistically diverse, most of the international students had been in the United States for a number of years. None of the participants were newcomers to the United States. Therefore, all the international student participants had had time to adjust, at least to some extent, to U.S. culture. Different results may have been obtained with participants who had more recently arrived in the United States and had not had as much time to become familiar with and adjust to U.S. culture. Future research should consider this factor and its influence on the cultural expectations of participants. For

instance, a questionnaire measuring cultural beliefs on interpersonal interaction and beliefs about the appropriateness of the expression and experience of emotion in interpersonal interaction may help provide additional insight into these aspects of the collaborative sessions. In addition, another study working with groups whose members include international students who have not been in the United States several years might provide information about whether duration of stay in the United States has an effect on the degree to which individual cultural differences affect emotional responses in collaborative work groups.

If, in fact, knowledge of the culture of the class and the ability and willingness to follow the cultural values of that culture supercedes that of an individual's culture, then students with limited time in the United States and in a particular academic program would have a more difficult time working on these collaborative work projects. Consequently, their perception of the experience would be more negative because of their inability or unwillingness to act according to the values of the course culture. If this were the case, then the collaborative experiences would be more negative for the native speakers also because there would be more violations of these students' expectations for the participation of members in a collaborative work situation. The data in this study would suggest that this would be the result. However, additional studies should be done in order to test the hypothesis that emerged from the data discussed here.

In addition, this was an upper division engineering class: a class designed for juniors in the program. A number of students had already worked in industry, some as interns and some as permanent employees. Therefore, all students had several years of learning the culture of the engineering department, and some had had opportunities to learn the culture of professional engineers through industry experience. Thus, the limited role of individual cultural differences and personal work style preference differences found in this study may not hold true for students in lower-division engineering courses because they may not yet have become aware of the culture of engineers that was evident in data from this study. Studies with students in lower-division courses may reveal the extent to which acculturation into the engineering culture itself minimizes the effect of individual culture and/or personality influences on perceptions of emotional experience in collaborative work groups. Therefore, data from collaborative work sessions in lower-division courses may show a greater effect for individual culture on the emotions of the members of collaborative work groups.

In addition, data from this study were collected in a single class within an engineering department. The study should be replicated in the same class to test that the theoretical model developed from these data is valid across participant groups. This would indicate whether the conclusions about culture I am making based on this specific group of participants would be warranted for other groups

of students. Additionally, the extent to which other sub-disciplines of engineering would show similar views of collaborating should be investigated.

Furthermore, the small representation of participants for whom individual work was preferred over group work may be particular to this group and not representative of engineering students as a whole. If this is the case, then the dominance of the class culture may not be found in a class with a different personal work style preference distribution. Therefore, different effects of individual culture on emotion in collaborative settings may be seen with a different group of participants.

In addition, this study looked specifically at the role of emotion and culture in the collaboration of engineering students. As the students themselves mentioned, the focus of the interaction was finding the best solution to the problem. They frequently explained to me that this was what engineers do. As a result, the collaboration involved in this study was a problem-solving activity focused on external objects: an article, a paper, and a presentation. This object-oriented problem-solving focus of the collaboration may have influenced the relationship between culture and emotion and led to the dominance of the class culture. Therefore, reported emotions arose in relation to these external objects. In contrast, if the same participants were to collaborate in a different situation, perhaps one that focused more on relationship building, a different interplay between culture and emotions might have emerged. One indication that this might

be the case came from a participant, a non-native English speaker who suggested that talking with engineers was easy because it was about the engineering problem; however, communicating in social situations was much more difficult. He said that, at work, his fellow engineers made great efforts to ensure that he understood what was being said but that this was not the case in social situations. Therefore, it may be that collaboration in another field, one that might not be so oriented to problem solution, might exhibit a different relationship between emotion and culture.

In addition, the results suggest that, for some individuals, some personality features, like personal work style preference, may be even more important than individual culture and contextualized culture in accounting for an individual's perceived emotional experience. Specifically, personality features related to one's willingness to interact with others may, in fact, be a stronger predictor of affective experience than culture, at least in some contexts and for some individuals. If that is the case, it suggests that the role of personality should be taken into account when looking at the relationship between emotion and culture, as it may have a significant modifying influence in some cases. Therefore, in future studies, an instrument measuring personality features might be administered, which might add additional insight to the relationship of personality to culture and emotion in collaborative work groups. Thus, this apparent complexity and the interdependent role between culture, emotion, personality, and context suggest that complexity

theory may be a promising framework for theoretical models of the interactions between emotion and culture.

The results also suggest that the study of emotion in education settings should consider not just the intrapersonal experience of students, but the effects of different communicative contexts on emotion. This study looked at emotion in a collaborative learning context. Do (2002) examined the reported emotional experience of students in a class discussion context. Lee (2003) discussed students perceptions of their emotional experiences in face-to-face and on-line interactions in an English as a Second Language class. These studies found emotional experiences as reported by students in different classroom contexts to be quite complex. Therefore, the role of interactional context on emotions in classroom settings should be considered when conducting research on interaction within educational settings.

The next step in continuing to develop the theory presented here is to conduct similar studies in different disciplines, such as business or liberal arts programs. If, in fact, the culture of engineers supercedes individual cultures because of the nature of the discipline, the influence may not be seen as strongly or at all within other disciplines. It might also reveal a different set of values for those different disciplines. However, the question would be whether those values were so strong that they superceded individual cultures, as they were in this class.

Finally, it is important to note some limitations of the methodology used in this study. This study involved looking at participants' perceptions of emotion during collaborative work sessions and their perceptions of their feelings about collaborative work more generally. Therefore, the methodology selected for the study involved participants' reports of their perceptions of emotional experience. These perceptions were elicited through stimulated recall and narrative retelling. This involved participants reporting on perceptions of their emotional experiences through remembering the events rather than reporting them at the time of the actual experience. Thus, accuracy of the perceptions may have been compromised due to factors involved in remembering one's emotions from a past experience. For example, as mentioned above, time from event to recall may affect the ability of participants to recall accurately their emotions during the initial event. In addition, Levine (1997) suggested that the intensity of the emotion experienced in the initial event and changes in appraisals of the event from time of origin to time of recall may influence the accuracy of the recall of emotion. Furthermore, Thomas and Diener (1990) suggested in discussing the results of their study on accuracy in the recall of emotions that it was possible that "people could reconceptualize their emotional experience when the episode comes to an end; therefore, their recall is not of the on-line experience per se but of the way they currently conceptualize and chunk the experience" (p. 296).

In addition, it is, of course, possible that I in some way influenced participants' responses during the interview, for example, by the questions I asked or by verbal or non-verbal responses to participants' comments. Furthermore, a study by Porter, Spencer, and Birt (2003) looking at the effect of emotion on memory suggested the influence interviewers can have on responses of participants being asked to recall events. Thus, memory of the event itself as well as the memory of emotions experienced during that event seem to be subject to a variety of influences that may interfere with the accurate recollection of the event and the emotions experienced during the event.

Individual differences could also have influenced the reports of participants' emotions during the interview sessions. For instance, Barrett, Bliss-Moreau, Quigley, and Aronson (2004) suggested that the way in which individuals describe their emotions in reports of past events may vary according to their ability to detect their own physiological state, specifically, heart rate. Also, individual personalities and/or individual cultural beliefs about when, how and to whom to appropriately talk about one's feelings may have impacted participants' disclosure of their perceptions of their recalled emotional experiences. It is possible that individual culture played a greater role in individuals' emotional experiences than the data from this study suggest because of cultural prohibitions against the discussion of emotions or discussing certain types of emotions. Similarly, individual personality could have played a larger

role in emotional experiences than indicated from the data because of individual personality traits that restricted the amount or type of disclosure of perceived emotional experience. It is also possible that participants were simply not honest in their responses during the interviews because they did not want to discuss their feelings with someone they did not know or were not sufficiently motivated to share the information because it was not relevant to their personal goals for the project. In addition, some participants may have been reluctant to disclose fully their emotions because they were anxious about the interview process itself.

In addition, despite my efforts to ensure that participants were reporting their perceptions of what they were experiencing at the time of the event rather than at the time of recalling the event, it is possible that participants reported perceptions of emotions that they were feeling as they looked retrospectively at the event rather than what they were actually feeling during the event. No physiological data (e.g., pulse rate, galvanic skin response) were collected to measure physiological states during work sessions. Therefore, no comparison could be made between participants' reported emotion experiences and actual physiological responses that might indicate an emotion event. Such data, if collected, may have helped to determine the accuracy of the participants' perceptions of the emotion states of themselves and their partners. For example, McHugo, Lanzetta, Sullivan, Masters, and Englis (1985) used a combination of

self-report and physiological data (e.g., heart rate) in their study of emotional responses to video displays of emotion by politicians.

Roseman, Wiest, and Swartz (1994) noted that

Methodological arguments can also be made against data from retrospective accounts because recall and self-report are subject to bias. Of course, retrospective self-reports are commonly used in emotion research because they allow for gathering data on real and intense emotional experiences that cannot easily or ethically be studied in the laboratory or in the setting where they naturally occur and because there are few alternatives to self-report for assessing emotional feelings, thoughts, and goals (p. 218-219).

They recommended a variety of methods to investigate emotional phenomenon further. Thus, while self-report and recall data does seem open to bias from a number of sources, it can also be one valuable tool among many in the study of a phenomenon as complex as emotion.

Conclusion

While emotion in education has principally been considered an intrapersonal phenomenon, this study attempted to add to the research investigating emotion in educational contexts from the perspective of the types of interactions that occur in the classroom. In this case, the type of interaction was a collaborative learning context. If practitioners continue to incorporate collaborative activities into their course designs and do so in increasing numbers, then a better understanding of students' perceived emotional reactions in these situations may help educators to design these collaborative activities more

effectively to create an experience that is more consistently perceived as positive for all students.

In culturally and linguistically diverse classes, it is particularly important to understand the relationship between emotion and culture in collaborative learning environments. Knowledge of this relationship is critical in helping teams to collaborate effectively and to create an environment in which students can perceive collaboration to be a positive experience, thereby encouraging learning rather than detracting from it as can happen when students perceive collaboration to be a negative experience. Furthermore, because knowledge of the class culture seemed to supercede the influence of individual culture on participants' perceived emotions, establishing a set of class values for collaborative work may assist both students and teachers in creating collaborative learning teams that are effective and enjoyable for the participants.

Engineering students in particular might benefit from instruction not only in collaborative work processes but in cultural awareness. If, as several researchers have suggested, the field of engineering is becoming more internationalized (e.g., Granden & Dehmel, 1997), then cultural training and language training would be a positive addition to the engineering curriculum. In addition, because a large number of students in engineering programs in the United States are non-native speakers of English, it would be beneficial to provide

supplemental classes to assist ESL learners in acquiring the linguistic skills necessary for success in collaborative projects (Nord, 1988).

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Vita

Terri Lynn Wells was born September 3, 1964, in Dallas, Texas, the daughter of Jack Roger Wells of Colorado City, Texas, and Myrna Mozelle Musick Wells of Granbury, Texas. She graduated from J.J. Pierce High School in Richardson, Texas in 1983. She received a Bachelor of Arts degree in Literary Studies from the University of Texas at Dallas in 1987. She worked in both retail and insurance and volunteered as an English tutor with the Richardson Adult Literacy center until returning to school in 1993 to pursue a graduate degree. She received a Master of Arts degree in English with a specialization in Teaching English as a Second Language in 1996 from the University of North Texas. During her master's program, she taught English Composition as a Teaching Assistant at the University of North Texas and English as a Second Language at Richland College and Collin County Community College. In 1996, she entered the University of Texas at Austin to pursue a degree in Linguistics. The following year she changed her major to Foreign Language Education with a specialization in Applied Linguistics. During her doctoral studies, Ms. Wells worked as an instructor of English as a Second Language and as English Language Program Specialist for ESL Services at the International Office of the University of Texas at Austin. In addition, she was on the Advisory Board for Texas Papers in Foreign Language Education and served as Chief Officer for the Foreign Language

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