I, Andrea C Burrows, hereby submit this original work as part of the requirements for the degree of Doctor of Education in Curriculum & Instruction.

It is entitled:
Secondary Teacher and University Partnerships: Does Being in a Partnership Create Teacher Partners?

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Secondary Teacher and University Partnerships: Does Being in a Partnership Create Teacher Partners?

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Abstract
The purpose of this research was to understand how individuals, specifically secondary teachers and graduate engineering students, developed a working relationship in a grant funded project. I investigated three interrelated research questions about partnerships including: 1) What is the meaning of partnership to each individual? 2) How do the individuals negotiate the work in their partnership? and 3) Do the individual conceptions of partnership change as a result of their interactions?

I used a qualitative descriptive case study methodology. I conducted nine interviews, four focus groups, 33 classroom field note observations, and collected emails. I detailed each of the three cases, and I conducted a cross case analysis of the three schools. I compared the similarities and differences between the cases in order to understand the partnership themes that defined a specific case and those that were generalized to several cases.

Using grounded theory, my overall findings showed that each case generated six themes. These themes included product, perspective, expectations, decision making, relationships, and habit. I explored all six themes in current literature, and five of the six themes were prevalent there. In my study, habit was the core phenomenon but was not as common in the literature. It was related to the socio-cognitive theory of knowledge construction and Bourdieu’s habitus. Additionally, it was connected to the concept of change in partnerships.
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Chapter One: A Contextual Background

Coffee with questions… I looked forward to the coffee and to the questions both stated and left unasked. I was a volunteer that helped in science class. I spent one hour a week for one academic school year helping in my son’s fourth grade elementary science classroom. I asked to be a part of the classroom science program during the back to school night, and his teacher readily agreed. I went and helped regularly for the entire year. During the year his teacher and I wrote a few emails to each other regarding upcoming science topics. Most of the time I just showed up during my designated hour slot and “jumped into” the lab or activity set up for that day. Sometimes the teacher asked that I create, organize, and conduct the science experiment for the week. I was in charge of the labs about efficiency and electricity. I enjoyed my time in the classroom with my son and his classmates. The students seemed excited when I showed up with my “bag of lab fun.” The questions that they asked, and sometimes didn’t know how to ask, fed my desire to continue volunteering. Of course, it was not my classroom, and often, since I had once had my own classroom, I felt that I would handle science time (and other things) differently. These topics were never discussed between us. We did not have a relationship outside of the one hour a week. I did not take a lot of time to reflect on my role in the classroom or how I was impacting the class or the teacher. At the end of the year, my son’s teacher thanked me for being her “science teaching partner” and engaging in a school/parent partnership. My first thought, after “You are welcome, I really enjoyed it,” was had I really been part of a partnership with my son’s teacher? I wondered how partnerships really functioned in K-12 schools. So, I studied partnerships and their formation.
I asked myself if I was in a partnership with my son’s teacher. My answer was no. I worked with her, and I played with the students. I helped her with some lessons and some classroom management, but a partnership entailed more than just help from one of the individuals involved. For me a partnership needed two parties that interacted to create something together and maybe those interactions worked and maybe they failed. However, the pivotal point of a partnership for me was the interaction, or the relationship. It was dealing with successes and challenges together, meaning that communication was paramount. This type of system did not exist between the teacher and me in my son’s class. I assisted in the class, but I did not partner with his teacher to explore and improve either her class or my views on teaching science.

*What was GK-12 Project STEP?*

I thought about partnerships often. I was employed by a grant that had educational partnerships. Like my son’s teacher, I wondered if other teachers thought they too worked in partnerships. Did all of the individuals feel the same way? Luckily for me, I had the opportunity to explore these concepts. I worked in a grant funded by the National Science Foundation (NSF). The grant itself had no formal definition of partnership, so an explanation of the basic structure of the grant helped to place this partnership amongst others. The main goal of the grant was to increase the communication skills of engineering students to a non-technical audience (e.g. high school students). There were two other goals that involved increasing K-12 teacher and student learning and finally sustaining the grant after funding ended. There were a total of five graduate engineering students working for the grant, each working in one school with four teachers. One graduate engineering student was partnered with four secondary teachers in mathematics and science classes and was required to work at one school site with the four secondary teachers
(Figure I). At each school, one of the four teachers was designated as the school coordinator. In total there were 20 secondary teachers working, in the grant proclaimed partnership, with the five graduate engineering students. Of the 25 individuals in the grant for the 2009-2010 school year, nine of them were represented in this study as they created new partnerships.

Besides the engineering students, the university faculty and coordinators were the other main individual groups from the university. The faculty members, or primary investigators, were from the Colleges of Engineering and Education. Their main interactions were with the grant coordinator and the graduate engineering students. However the faculty members interacted with the secondary teachers during some grant meetings and events. In addition to the three faculty members there were three coordinators involved from the university.

The three coordinators were students at the university. I was the lead grant coordinator and the liaison between the secondary teachers, the graduate engineering students, and the university faculty members. I set up and conducted summer training and year-long practicum sessions for the graduate engineering students, meetings with the secondary school coordinators, meetings with the university faculty members, annual grant events, and the overall coordination between all individuals. My job of facilitating a smooth running grant partnership was made easier with the help of two other student coordinators. The technology coordinator worked with the website, newsletter, and other technological grant developments. The evaluation coordinator assisted in data collection for the outside evaluator to compile into annual reports on the grant. Both the technology and evaluation coordinators had little to no contact with the secondary teachers, graduate engineering students, and/or university faculty.
The responsibilities, as stated by the grant, were explicitly given to each member of the grant partnership (teachers, engineering students, faculty, etc…) before the beginning of the partnership. I gave the individuals the six page document (see Appendix A), that broke down the responsibilities of the grant by constituents. In a meeting in June of 2009, between a university faculty member, the four-person teacher team, the school principal, and me, we read and initialed each teacher responsibility. This meeting was formal in nature. The school’s principal applied for acceptance to work with the grant, and nominated the four-teacher team. However, this meeting was the first time that the group discussed the roles of the members. It was the first time that all of the individuals were together and talked about the grant work. The teacher responsibilities, or expectations as described by the grant, included commitment to attend events, involvement in meetings, participation in lesson development, leadership of lessons and activities; mentoring of the engineering students, access to the classroom and students, joint delivery of lessons as a team, completion of evaluations, dissemination of lessons developed and feedback to the engineering students about performance. The following month, in a meeting in July of 2009, the five engineering students and I read and initialed each engineering student responsibility. The engineering student meeting was less formal since the engineering students had gone through an extensive interview process that included a verbal agreement to the responsibilities. The engineering student responsibilities included completion of coursework, participation in events, attendance at meetings, cooperation with teacher to develop activities, development of lessons/activities, discussion of lesson with faculty, completion of evaluations and dissemination of project and lessons. The teachers and engineering students agreed upon the roles and responsibilities outlined for the grant before they worked together.
Since my interest was in partnership formation, I wondered what certain terms were found in the responsibility document that expressed the expectations of the grant. This document was the grantees’ first written exposure to the grant’s expectations. I examined the document and explored the language used to express the grant’s expectations of all members.

Below, I presented examples from the document to highlight the type of verbal communication used in explaining the grant’s expectations. In this roles and responsibility list, I looked for the terms, partnership, team, support, communication, lesson/activity, perspective, negotiation, and leadership. I found the term “partnership” only one time. The document explained, under the teacher section, that teachers should interact with the engineering students over the summer “to foster the partnership and plan for activities well in advance for the coming year.” There were no directions that explained how to accomplish the fostering of the partnership. In the responsibilities document, the term “team” showed up five times in the four pages. It appeared once in the teacher section as, “Work jointly with a [engineering student] to deliver instruction as a team.” The word team was found four times in the engineering student section. The first time it appeared in the engineering student section as, “Team-teach the ‘Teaching with Technology’ workshop.” Another time in the engineering student section it stated, “Work with teacher-faculty-grant coordinator team.” A third time it described, “Discuss the activity with the content provider Principal Investigators (PIs) in the project team.” The last time for engineering students it explained, “Work to relate to other teams.” The word “team” was used, but never explained. I found the term “support” three times, but only for the engineering students, not the teachers. Support is mentioned the first time for the engineering students, and it stated, “Acquire, complete, and turn in assessment instruments that support the grant goals.”
Under the section labeled “Do’s” it claimed that engineering students should “Support, respect, cooperate, rely on each other.” The document last mentioned support for the engineering students as “Follow guidelines set forth by [the grant] and support the goals of the grant.” I found the term “communication” or “communicate” four times. Once was in the engineering student section with the call for them to “communicate with other [engineering students] by sharing and exchanging information.” The other three statements were in the evaluation coordinator’s section and the grant coordinator’s section. The terms “lesson” and “activity/activities” were closely related, so I counted them in the same category and called them the grant’s product. The term “lesson” showed up 12 times, and the term “activity/activities” was found 28 times. So, the grant’s main product was mentioned 40 times in the four pages. I found the product terms 16 times (6 lessons, 10 activities) in the teacher section. For the teachers lessons were asked to be developed and implemented along with lesson plans. Teachers were to help create and implement activities as well. The engineering student section mentioned the product terms 17 times (four lessons, 13 activities). The engineering students were also asked to create and implement lessons and activities. The remaining seven terms were revealed in the technology coordinator, evaluation coordinator, university faculty, and research advisor sections. Although I worked with the engineering students on creating lessons and lesson plans this was not detailed in the responsibility list of the grant coordinator. The terms perspective, negotiation, and leadership were not found in the responsibilities document. Understanding the emphasis on the terms lesson/activity (product), team, and support, respectively by number of references in the document, I entered a study on partnerships with a clear vision of what was outlined for the
individuals before the school year began. Clearly, the main focus of the grant was on the lessons and activities of the engineering students and teachers.

With my background volunteering in my son’s class as a partner, and my exposure to grant partnerships, I wanted to understand how new partnerships evolved. The grant expectations, given to the participants before they began working together, might influence them. Their interactions might as well. I questioned how these factors played into the roles of the individuals in the partnership. My list of questions about what influenced partnerships expanded.

*My Partnership Study*

During the three years that I coordinated this grant prior to the study, I was not directly involved in the day to day classroom interactions in the partnerships. However, I had heard and seen many successes and challenges of the individuals involved over three years. My immersions, in these *new grant partnerships*, were a chance for me to explore both the familiar and the unfamiliar at the same time. I was fortunate to have some concept of what happened in the schools based on my interactions over the past years, but I was also careful to open my perceptions in order to embrace new concepts of partnership.

For my research study, I focused only on the *new partnerships* formed between the secondary teachers and the graduate engineering students. My sample was limited to the schools beginning with the grant for the 2009-2010 school year. Of the five schools chosen to participate in the grant for the 2009-2010 school year, two of the five were continuing from the previous school year, one had taken the previous year off (2008-2009) and was returning to the grant (Bush High School), one had worked with the grant in the grant’s first year (2001-2002 – Ford High School), and one had never previously worked with the grant (Carter High School). The
last three schools listed are the ones that formed new grant partnerships in the 2009-2010 school year. These three schools, with teams of four teachers and one engineering student each, were considered new to the grant in the 2009-2010 year.

Working with these teachers and engineering students allowed me to explore partnerships. My study begins to address the request of Clifford and Millar (2008) as they called for rigorous research of partnership definitions, formation, and function. Other authors expressed that the literature contained gaps revolving around the understanding of partnerships as well (Butcher, Bezzina, & Moran, 2011; Tuten & Urban 2001).

In order to understand these newly formed working relationships, which I called a partnership, my research was guided by the following questions:

- What is the meaning of partnership to each participant?
- How do the participants negotiate the work in their partnership?
- Do the individuals’ conceptions of partnership change as a result of their interactions?

These questions guided my investigation of what the partnership meant to each individual, how these individuals interacted, and how their thoughts on new partnerships changed over time. I explored the meaning of partnership, negotiations of those partnerships, and conceptualization of the partnership between these teachers and their paired graduate engineering student with this research. The purpose of this research was to understand how individuals new to a partnership, specifically secondary teachers and graduate engineering students, developed a working relationship in a grant-funded project.

To research these three questions on partnership meaning, negotiation, and conceptual change, I decided to use grounded theory. The individuals in the study expressed their thoughts
and I observed their actions in order to collect data that was as authentic as possible. With this authentic data, grounded theory allowed me to “step back and critically analyze situations, to recognize and avoid bias, to obtain valid and reliable data, and to think abstractly” (Strauss & Corbin, 1990, p 18). This is the basis of grounded theory, and the concept of beginning with questions and data collection and then moving to analysis and conclusions, or inductively processing, fit my need to experience the partnerships along with the engineering students and teachers. My research exposed partnership formation themes in the literature (see Chapter 2). In particular, what emerged from this study was the importance of relationships to the building of partnerships. These relationships were situated in the habits formed by the individuals involved. The individuals’ habits were both a product of and a producer of the grant structure. The concept of social reproduction is based on Bourdieu’s habitus (Chapter 2). It was the relational nature of the individuals that was key to the central phenomenon of habit that I discovered. Thus, the habits, rising from the individuals’ habitus, were obstacles to change in the partnerships. The lack of change fed into a reproduction of grant actions, or automation of the grant process. This insight gives professionals, such as science, technology, engineering, and mathematics (STEM) educators or university faculty, benefits for cultivating partnerships, and answers a need based on Clifford and Millar’s (2008) call for new partnership research.

Overview of Remaining Chapters

To conclude this introduction I have provided a brief description of the chapters in this dissertation. In Chapter 2, I explore the literature surrounding partnerships. The first section introduces business models of partnerships. The second section discusses educational partnerships. The final section explores the themes found in the partnership literature.
In Chapter 3, I explain my methodology and the tools that I used for data collection in this case study. I outlined my reasoning for using grounded theory, and I explain my coding process of analysis. Finally, I discuss the framework for the interpretation of the data.

Chapter 4 offers views of my findings for the three case studies that I researched. This chapter is divided into four main sections. Section One revolves around Bush High School and three individuals: Alex, Dakota and Emerson. Section Two highlights Carter High School and three individuals: Bailey, Hayden and Logan. Section Three showcases Ford High School and three individuals: Casey, Payton and Taylor. Lastly, Section Four offers a cross-case comparison of the three cases.

Chapter 5 presents the conclusions of my work. I offer my grounded theory findings based on the three cases. Returning to the literature, I found themes that fit inside my findings, and I incorporate these into my conclusions. I close with implications and areas in need of future research.
Figure I: New partnership case study individuals (in blue) and modified overall grant structure.
Chapter Two: Framing the Study in Literature

Just as a good cup of coffee helped to wake me up in the morning and focus on my day ahead, “drinking in” the background of partnerships enabled me to find common patterns and apply them to my study. Originally, I did a limited literature review in order to carry out my grounded theory study, with as little outside influence of themes as possible. Indeed, Strauss and Corbin (1990) indicated that beginning with a list of already identified categories would “get in the way of discovery” (p. 49). Therefore, I sought out business models of partnerships, ignoring other places, such as medicine, where I saw them used. I used the business models as a starting place without the influence of the educational models. I purposely distanced myself from the educational literature at the beginning of my study.

Although I was separated from the educational partnership literature as my study began, the theoretical framework that I used for understanding the participants’ knowledge construction of the partnerships was a socio-cultural approach. Vygotsky’s (1978) theories stress the role of social interaction in the creation of knowledge. He believed that the community of individuals played a key role in building understanding, and he emphasized culture and experience. According to him, thoughts and reasoning develop through social interactions. I embrace Vygotsky’s notion of the social construction of knowledge throughout my partnership study.

I believe the participants’ knowledge of partnership was constructed through their relationships in the partnership. So, for the individuals in the study, social interaction was the core component for creating partnership meaning. The concept of partnership is an abstract idea. A partnership is not tangible, and as such, it was an idea that the participants created. For me, at
the foundation, a partnership is a series of intangible acts, and is extremely complex. For the participants, the complexity of creating the partnership meaning was entrenched in the social aspect of their exchanges.

My study focused on new school-university partnerships. There was a call by Clifford and Millar (2008), where the authors advocate defining partnerships and finding out how the partnerships function. The authors advanced the notion of the socio-cultural theory by explicitly asking for context examination during new research studies. In their abstract the authors stated:

K-20 partnership literature lacks methodological rigor and scope, that partnership is almost always inadequately defined, and that the research about how K-20 partnerships form and function and what they achieve contains significant gaps. … [We] recommend that future research articles begin with a clear definition of the term partnership, build upon and extend available research through replication studies and diversification of samples, pay closer attention to the contexts in which K-20 partnerships operate, and include findings on how K-20 partnerships form and function. (para. 1)

In reviewing over 150 articles on partnerships between K-12 schools and universities, the authors clearly saw a need for rigorous research on partnerships, and offered that the term “partnership was under-defined or ill-defined in the majority of reviewed studies” (Clifford & Millar, 2008, p. 16). With my study I divulge partnership meanings, negotiations, and conceptual changes of cases to address the vague notion of partnership. After my analysis, with this gap in mind, I went back to the literature and reviewed business, educational, and other forms of partnerships to enrich my work. The following is the expanded literature review with all of the information melded together to form a cohesive unit.
Call for Partnerships

Globally, business, education, medicine, and non-governmental agencies continue to promote partnerships (Mullinix, 2001; NSF, 2002; Stevens, 1999). According to a foundational article on business partnership models, “the number of attempted partnerships has grown almost geometrically in recent years” (Mohr & Spekman, 1994, p. 135-136). This trend continues, and literature shows the push for partnerships. Recently “many articles, in both the academic and popular business press, have touted the importance and benefits of partnering” (Tuten & Urban, 2001, p. 150). One reason behind the focus on partnerships was the advantages that they could offer. The concept of partnership received increasing awareness in education and other arenas as the idea of the whole, or partnership itself, became greater than the individual (Butcher, Bezzina, & Moran, 2011, p. 30). Additionally, federal programs promoted partnerships between K-12 school districts and universities to foster greater alignment and cooperation among participants (Clifford & Millar, 2008). Thus, partnerships are now an expected and accepted part of the working environment in business, education, and elsewhere.

Additionally, the National Science Foundation (NSF), spurred by the No Child Left Behind (NCLB) Act of 2001 (2002), encouraged partnerships between K-12 schools and universities, as well as between universities, colleges within universities, and businesses, through grant awards. One such program is NSF’s Math and Science Partnership program. In archival research that I conducted, there were over 50 of these types of NSF grants available. The push was (and is) more than words on paper, as over 1 billion dollars was spent by NSF to promote STEM educational partnerships (NSF, 2002).
Business Models of Partnership

In order to understand the foundation for my educational study, I describe the underlying business model of partnerships. What do these business partnerships look like? Mohr and Spekman (1994) found variables that predicted success of partnerships. The success, measured by either sales or satisfaction, hinged on coordination, commitment, trust, communication quality, information sharing, participation, joint problem solving, and avoiding the use of “sugar coating” problems (p. 145). Seven years later the list had overlapping areas of similarity. Successful partnerships, according to Tuten and Urban (2001), included satisfactory performance indicators, improved communication, and characteristics such as trust, reliability, honesty, and fairness (p. 157). As the business models progressed through time, the direction of the interest began to focus on the relationship aspect of the partnership. It appears that the people became more important than the partnership itself. Humphries and Wilding (2004) explained that relationship quality (win/win), relationship reliability (trust), relationship creativity (performance), relationship stability (objectives), and relationship communication (sharing), were all in a loop, which circled around continuously (p. 15). The relationship was the center of the partnership.

Hence, approximately twenty years after Mohr and Spekman’s article, there was a noticeable shift from the success of what the partnership accomplished to the success of the process of partnership. Smedley (2001) supported this notion when he claimed, “Attention is turning from the structure of the partnership towards its enhancement” (p. 201). People made the enhancement through connections. This shift continued. “Co-development partnerships are an increasingly effective means of innovating the business model to improve innovation
effectiveness. These partnerships embody a mutual working relationship between two or more parties aimed at creating and delivering a new product, technology or service” (Chesbrough & Schwartz, 2007, p. 55). Palmatier, Dant, and Grewal (2007) declared “four theoretical perspectives currently dominate attempts to understand the drivers of successful inter-organizational relationship performance: 1) commitment-trust, 2) dependence, 3) transaction cost economics, and 4) relational norms” (p. 172). In all of these models, I noted communication, trust, and performance. Again, the focus pointed to the partners more than the final products, and this involved one of the main components, trust, as an issue.

I found that nurtured partnerships are more successful. Vangen and Huxham (2003) stated that “the typically ambiguous, complex, and dynamic structure of collaborations presents challenges that require practitioners to engage in a continuous process of nurturing” (p. 6). Vangen and Huxham continued this thought and showed the value of having enough trust to start the partnership, being vulnerable and taking a risk, forming expectations about the future collaboration, aiming for realistic but successful outcomes, reinforcing trusting attitudes, and then gaining underpinnings for more ambitious collaboration. As Killion (2011) declared, “Partnership requires trust and commitment” (p. 11). Nurturing relies on trust as a cornerstone of building partnerships.

Partnerships need trust to build relationships. In a social work study, for all three measures of perceived trustworthiness, expertise, interest, and values, a positive and significant relationship existed with trust (Lambright, 2009, p. 73). Indeed, literature across the fields of psychology, economics, sociology, and others focused on trust in collaboration (Vangen & Huxham, 2003, p. 6). Continuing along this open line of thought, Buse and Harmer (2007), from
their study of a global health partnership, suggested seven actions for partnerships that include: integrating efforts with humility, balancing representation of stakeholders, accepting both market and public sector ideas, setting up standard operating procedures, improving oversight, finding funding, and addressing demands on individuals (p. 269). Without this relationship-building the partnerships suffer.

In summary, to adequately explain the educational models of partnership, I started with the business model of partnership. Greene and Tichenor (1999), university educators, asked a basic question: “What do we need for effective partnerships?” and then replied simply: “Individuals must build mutual trust though clear articulation and follow-through of any stated objectives. They must share both time and space for the mutual benefit of all involved in a fair and reasonable manner” (p. 18). It was appropriate to use the business model to begin my grounded study on new partnerships, because it provided a base that I could use without educational partnership model influences. There were limitations to the business partnership model. One of the largest limitations was that the business model misguided the focus of my study to the products of meaning and negotiation instead of the building of participant relationships to create meaning and negotiations. I explored educational models of partnership using a business model as a base. Since “the advantages of partnering continues to mount” (Tuten & Urban, 2001, p. 163), I needed to explore partnerships. In my pursuit of understanding educational partnerships, I searched for articles that related directly to school and university partnerships as well as articles that offered models to follow.
Educational Models of Partnership

I found the term educational partnership used widely in school settings, yet a review of the literature showed that there was no “right” way to form or participate in a partnership. There were many different examples of partnerships in schools. Epanchin and Colucci (2002) defined a partnership as an arrangement linking personnel preparation and school practice between school districts and a university. Another view, held by Rahm, Naughton, and Moore (2008), focused on the scientific resources and tools that partnerships made available to students. A volunteer tutoring program (Moore-Hart & Karabenick, 2009) and understanding family settings (Eppler & Weir, 2009) were two other examples. There were many types of educational partnerships, and all of them attempted a definition of partnership. However, the definitions differed and were often vague. Clifford and Millar (2008) cited the same problem when they reviewed the literature.

Although I found few examples of the word partnership defined in educational literature, there were definite opinions on what created successful partnerships. Greene and Tichenor (1999) claimed that “a narrative tapestry of school and university partnerships has existed for over 100 years” (p. 13). Because of this long educational partnership history, which does not only involve school to university partnerships, I described some of the most recent models to show the overlap and the separation in them.

There are six models outlined here for comparison. I start with an often cited work and then describe five more recent partnership models. Goodlad (1991), in what has become a foundational article on educational partnerships, discussed four essential components that K-12 school and university partnerships should include. The four elements were concept, purpose,
agenda, and structure. He continued by saying that partnerships needed “whole-hearted participation by all those involved” (p. 13). Goodlad warns that “the partnership agenda should not grow out of preoccupation with sustaining partnership for its own sake” (p. 59). Based on Goodlad’s work, educational groups founded partner schools and centers of pedagogy to create successful partnerships. He urged close collaboration. Successful partnerships, according to Badiali, Flora, and Johnson (2000), depended on the following:

1) Having and articulating mutual interests that transcend self interest, 2) Creating and sustaining positive, trusting relationships that make it possible to pursue mutual interests, 3) Maintaining a web of such relationships that allow for equal participation (opportunities for leadership) and complete reciprocity, 4) Having a durable structure that can survive changes in individuals regardless of their leadership role, 5) Having adequate resources, human and material, 6) Having freedom to make decisions that work for each unique school setting, 7) Having advocates with energy, good ideas, and creative problem-solving capabilities, 8) Sharing on public demonstrations of accomplishments and on celebrations that acknowledge progress, and 9) Successful partnerships depend on collaboration, perhaps the single most important factor of all. (p. 160)

Grundy, Robison, and Tomazos (2001) noted that there were certain “conditions that need to be considered in order to build genuine partnerships and honest collaboration” (p. 204). Development of trust, communities of inquiry, commitment to democracy, recognition of distinctive interests, acknowledgement that partners should be different to accommodate change were all described on Grundy, Robison, and Tomazos’ list. Essex (2001) claimed that successful
partnerships needed a clearly defined purpose and direction, enthusiastically endorsed message by top level leaders in schools and colleges, certain amount of trust among partners, mutual respect among partners, tangible benefit(s) for all partners involved, and mechanisms to assess progress and measure outcomes. Dunbar and Monson (2011) stated that “in a nutshell” successful partnership relied on mutual interests, the right partners, gathering data, and measuring outcomes (p. 42). Peel, Peel, and Baker’s (2002, p. 322) list included effective strategies and ineffective strategies. The effective strategies included respect and trust between players, visionary leadership based on knowledge, deep commitment of interests, willingness to promote change, open communication, developing a climate for learning, and financial support. The ineffective strategies were unrealistic goals, lack of collaboration, lack of financial management, lack of continuity, negative perceptions, lack of honesty, lack of feedback, and lack of communication. Thus, there are similarities and differences in models of educational partnerships.

I compared these educational models. Four of the models explicitly used the word trust. This was a pivotal factor for most partnership studies. At least two of the models out of the six described above spoke of the importance of commitment, communication, measuring outcomes, mutual interest, definite purpose, a support structure, and leadership. Finally, there were several concepts that stood alone, such as a maintaining a climate for learning, providing financial support, recognition of distinctive interests, ensuring differences in partners, providing tangible benefits, identifying the “right” partners, gathering data, and advocating energy. With so many differences in educational model components, what should or should not be included in an educational study on partnerships?
**Bourdieu’s Habitus.**

Partnerships rely on the socio-cultural knowledge construction and on the values that each individual brings to the partnership (Vygotsky, 1978; Wertsch, 1998). Thus, extending the idea of an epistemological construction, Bourdieu’s (1977) concept of “habitus” is key. Generally speaking habitus is the baseline of thought for personal action. In other words, habitus is the underlying reasoning for decision making. According to Bourdieu (1990), the meaning of and the reason he used the term habitus is explained as he states:

The notion of habitus has been used innumerable times in the past, by authors as different as Hegel, Husserl, Weber, Durkheim, and (Marcel) Mauss, all of whom used it in a more or less methodical way. However, it seems to me that, in all cases, those who used the notion did so with the same theoretical intention in mind…. I wanted to insist on the generative capacities of dispositions, it being understood that these are acquired, socially constituted dispositions…. I wanted to emphasize that this “creative,” active, inventive capacity was not that of a transcendental subject in the idealist tradition, but that of an active agent…. I wanted to insist on the “primacy of practical reason” that Fichte spoke of, and to clarify the specific categories of this reason….” (p. 12-13)

Furthering the idea of habitus, Gopaul (2011) outlined that there are important aspects of habitus. He claims:

Early socialization is extremely important to the development of habitus, as external structures are internalized by individuals and shape action such that existing opportunity structures are perpetuated. There are two important dimensions to habitus that need delineating. First, habitus structures action by defining the limits of that action. Second,
habitus produces perceptions, beliefs, and practices that reinforce the early socialization of existing external structures, thereby reproducing stratification. The dispositions associated with habitus construct action to the extent that actors will engage in activities and practices that create success as defined by their resources and previous experiences (Bourdieu, 1977). Habitus operates as a constellation of perceptions and attitudes that frame particular actions as possible in different situations. So, habitus acts as both a generative and restrictive mechanism to action such that some actions are deemed more appropriate in certain contexts based on an individual’s class status and experiences. This then assists in determining what is valued and acceptable. (Gopaul, 2011, p. 14)

With the ideas of habitus as a baseline set of action responses, and having those responses limited by perception, habitus will affect individuals as they construct meanings of and engage in negotiations dealing with partnerships. What is valued and accepted plays a part in what individuals will do or not do according to habitus. The actions of individuals are often guided by habitus and relationships with other individuals (Ozbilgin & Tatli, 2005). Ozbilgin and Tatli explain that:

…Bourdieu’s works can potentially contribute to multilevel and relational research practice…. First, organizational studies may benefit from the insight brought in by Bourdieu at the level of critical engagement …. Second, utilization of Bourdieuan concepts may advance the ongoing discussions of relational methodologies and theory building in the field of organizational research through linking agency and structure by situating individuals within the context of the organization and in their relations to each
other, as well as by situating the organization and organizational culture within the context of society and history.” (p. 855-856)

Relationships with the university and to the other participants in this study were essential to construction of the habitus of partnership for each person. Consequently, relationships were central to my work with partnerships.

My Partnership Study

I started with the basics of the business model to set up my educational study. I asked questions of the individuals in my study that revolved around the concept of common goal, trust, decision making, clear focus, feasible agenda, personal commitment, leader commitment, financial support, and organizational commitment. All of these were outlined in the business models. Although the business partnership model was not totally applicable to an educational setting, the ideals, especially those that were people-dependent, which underlie the business model, provided a useful starting point. This was especially true since the same tenets, which I found later, were used in the educational studies described. I formulated three main research questions to ask of K-12 school to university partnerships. One question related to partnership meaning, one to partnership negotiations, and one to conceptual change in partnerships. Smedley (2001) emphasized the point of needing additional research on partnerships when he stated that “partnership remains in its infancy… [and] much is still to be tried and tested in this innovation” (p. 197). My study, based on a business model but conducted in an educational setting, provided additional partnership information.

I used grounded theory, described later in Chapter 3, which is framework of discovering theory from data (Glaser and Strauss, 1967). Because my study was framed with grounded
theory, I completed the thorough literature review after the data was collected. As I read the articles and books over time, overall themes in relation to the partnerships began to emerge. I grouped the themes as I identified the major aspect of each partnership described. I created these themes and the categories that went in them in the same way that I created the categories for the data analysis described later. The six themes that I identified were closely related to the topics discussed in the partnership literature of successful partnerships, and they built upon each other.

Six Partnership Themes

I describe the six themes that I identified in the literature, and I use these themes in the discussion of the findings (Chapter 4). While I use these themes to explain the data, I also refer to my research questions of partnership meaning and negotiations. Therefore, this section sets up the reflection of partnership themes in literature with the research questions.

The first theme I identified was perspective. Embedded in perspective were the sub-categories of communication, power, and democracy. Partnerships were susceptible, and often vulnerable, to each of these concepts. Rahm, Miller, Hartley, and Moore (2003) repeated that “any attempt to develop an authentic view must first be grounded in the individual” (p. 752). The partners in any given partnership exert a force over the development of that partnership. Thus, no two partnerships were identical because of the differences in partners. Smedley (2001) summarized this idea when he explained:

Many writers have stopped short of defining exactly how this communication is effected, how the necessary human relationships are created (Alexander, 1990, p. 61). When, how, why does liaison take place? What is the nature of the exchange? How do or might the institutions involved ensure interaction is facilitated? How is or can the enthusiasm and
goodwill of individuals be maintained despite the barriers already outlined? As Cornbleth and Ellsmore (1994) noted, more information on the actual rather than the intended needs to emerge. (p. 202)

Smedley focused on the interactions and my study focused on the actual partners during their authentic communication and in the school context. The individuals in the study showed their perspective through their communication with each other. This perspective was important, but came with a note of caution. My study encompassed half of an academic year (January through June 2010), and Meyer (2002) warned, “Two years is too short a time to restructure, implement, and bring about cultural changes” (p. 128). However, there might be room for me to view the beginnings of change in my study. As she continued, “In those two years, new trends were developing” (p. 128). To support the change needed in communication or with democratic issues, Mayers and Schnorr (2003) suggested “intentionally facilitating a diffusion of power throughout the partnership” (p. 109). Interestingly, just increasing “avenues for communication, appeared to disrupt some of the traditional vertical-power structure” (Meyer, 2002, p. 128) among partners. Thus, the communication is strongly linked to the perspective of the individual. The partners use the communication, power, and democracy as ways of expressing their perspective. Partnership literature describing the importance of the individual fell under this perspective theme.

The second theme was decision making, or negotiation. This theme was closely tied to both communication and culture. Radinsky, Bouillon, Lento, and Gomez (2001) offered that:

…a primary design concern should be putting an effective system for communication and negotiation in place early in the process. In addition to assigning a facilitator, it is also
necessary to create an expectation that partners will have to allow ample time for such communication, and to take the negotiation process seriously. (p. 427)

Most partnership studies did not mention the establishment of a negotiation system. Yet, many of the studies recounted partner dialogue exchanges. These exchanges could include negotiations. One decision making study conducted by Nelson (2005) called these exchanges “a key event [that] consisted of a dialogic exchange associated with classroom-based actions or an instructional decision where one or both partners’ ideas were called into question” (p. 386). I found that these exchanges or key events, regardless of their root cause, were seen as extremely important to researchers that wrote about decision making. Kezar (2011) outlined the seriousness of forgoing negotiations. He expanded by including culture within the decision making as he stated:

If these dissimilar assumptions are not identified and discussed openly, they often lead partners to believe that they have separate goals. Differences in values can emerge creating communication problems, different governance structures can develop distrust, and varying expectations of staff responsibilities can create inappropriate expectations. The awareness of difference makes the partners spend more time on partnership development, the creation of common language and communication, development of trust, and other practices that develop a shared culture. It may seem obvious that culture would have an impact on partnerships because as Bergquist (1992) notes “culture provides meaning and context for a specific group of people . . . and helps to define the nature of reality for those people” and affects their practice (p. 2). Although difference in
organizational cultures has been identified as impacting partnerships, this awareness is largely absent from the education literature focused on partnership. (p. 209-210)

Accordingly, assumptions led to problems, and often these decision making assumptions revolved around culture. Grundy, Robison, and Tomazos (2001), keeping with the notion of culture as a “place” to conduct negotiations, explained that “schools and universities have different working cultures and varying expectations of each other” (p. 207). The authors continued by describing the cultural differences between teachers and academic researchers. Cultural differences permeated decision making text. Kezar (2011) stated:

Cultural differences need to be recognized and can be navigated if organizations are aware of the ways that they are distinctive, are willing to examine and modify practices that may work against partnerships and low income student success, make compromises when needed, change and shape their language to be understood, and identify translators and intermediaries who can help to champion and foster IDAs [individual development account initiatives] by laying the groundwork so that others can understand and implement them. (p. 234)

In addition to the ideas of examining and modifying practice (Kezar, 2011), authors Vangen and Huxham (2003) offered a suggestion for bridging the cultural divide when they spoke of:

…the pragmatic solution to both reaching agreement on aims and identifying with whom to build trust is frequently to get started on some action with relevant partners without fully negotiating and agreeing on the aims and dealing with all other aspects of trust building. (p. 18-19)
Thus, the authors recommended three approaches for partners dealing with decision making. These included: to modify practice, change language, and start an action. Doing these actions, however, causes disruption(s) in the status quo. The interactions, surrounding communication and decision making, “often resulted in a change in how they were teaching or in the tools they were using” (Nelson, 2005, p. 389).

I found in the literature that different actions, like the ones used during decision making, caused breaks in communication. Grundy, Robison, and Tomazos (2001) cautioned that these interruptions were not negative. Actually, they maintained:

Indeed, what was perceived in many instances in the reports of experiences is that the interruptions created spaces in which new ways of working and new relationships could be explored and established. These relationships and processes had generative outcomes for the academic associates working with the teachers as well as for those in the participating schools. (p. 216)

I found that interruption could be beneficial in decision making. These pauses were important and led to relationship building.

The third theme revolved around relationships. Attitudes were a sub-category of this theme. Relationships ranked extremely high in partnership satisfaction, and maintaining the relationships required high amounts of energy and commitment (Badiali, Flora, Johnson, & Shiveley, 2000; Essex, 2001; Grundy, Robison, & Tomazos, 2001; Hake, 1993; Kagan, Freeman, Horton & Roundtree, 1993; Peel, Peel, & Baker, 2002; Smedley, 2001; Teitel, 1994). Killion (2011) wrote that “genuine partnerships are mutually beneficial experiences,” (p. 11) and later related that “when partners enter a relationship, they do so for one another’s mutual benefit to
accelerate the achievement of their individual and shared goals with a commitment to work collaboratively to strengthen their relationship” (p.12). Relationships according to Fullan (2001) were the most crucial piece of the relationship puzzle.

Some researchers called for evaluation of these relationships. Schools and collaborators “should periodically assess the quality of their collaboration to fine tune their relationships and procedures in order to achieve even greater program success and enhanced satisfaction” (Kirschenbaum & Reagan, 2001, p. 501) by the partners. The idea of assessment of relationships connected with Lefever-Davis, Johnson, and Pearman’s (2007) notion of partner equality. The authors wrote:

Effective partnerships honor the distinct characteristics of each while ensuring egalitarianism between the 2 partners. Mutually beneficial goals, valuing each party’s unique contributions, and receipt of benefits based on involvement are critical for the egalitarianism that is realized between the partners. Those ideas are achieved on the basis of relationships developed between the individuals. (p. 204)

In this quote, partners searched for differences and embraced equality of partnership relationships. In order to do this, partners needed a relationship framework.

Change was an important sub-category of relationships. This partnership framework was hard to change. Wei and Wang (2010) stated that, “a recurring behavior (i.e., a habit) that may occur despite a high level of… immediacy” (p. 475) was possible to change. Researchers are still investigating when change was needed and how change should occur. Parts that fit into that change were parts of the relationship whole. Collegiality and collaboration, pieces of relationship building, “are recognized by many authors as important components for sustaining partnerships,
however, there is little agreement on their definitions and more critically, methods for establishing and maintaining their conditions are not well described” (Marlow & Nass-Fukai, 2000, p. 188). Relationships, and changes to them and the thus the partnership, played a large role in the partnership literature.

The fourth theme was expectations. This theme was directly related to two previous themes of perspective and relationships in the partnership. To begin, there were many expectations of partnership development given by researchers (Grundy, Robison, & Tomazos, 2001; Kezar, 2011; Killion, 2011; Koch & Borg, 2011; Krasny, 2005; Peel, Peel, & Baker, 2002; Radinsky, Bouillion, Lento, & Gomez, 2001; Trubowitz, 1986; Vangen & Huxham, 2003). I explored some of these expectations here, and these expectations reflected the models of partnership described earlier. Twenty-five years ago those entering partnerships were told that “educators need energy, commitment, sensitivity, and good intentions to develop successful partnerships. But they also need to know what to expect in the course of developing a collaborative relationship” (Trubowitz, 1986, p. 19). More recently, but similarly, partnerships included “a process for negotiating collaborative work structures among individuals involving explicit communication about project goals, products and progress” (Radinsky, Bouillion, Lento, & Gomez, 2001, p. 417). Some researchers used a broad brush with expectations that included “establishing clear common goals, developing mutual trust and respect, open communication, and shared responsibility by all stakeholders” (Peel, Peel, & Baker, 2002, p. 321). Within the last few years, expectations were listed with more specificity. For example, Krasny (2005) explained:

    University faculty or other program designers can use the model to reflect on the factors they can control (their own commitment and skills, the innovation being introduced,
dissemination strategy, and goals for dissemination) and those over which they have relatively little control (educators and their context). They also can collect information about the educators and their context, so that they can design innovations and dissemination strategies that are aligned with educators’ interests, skills, and organizations. (p. 358)

Some expectations were specific, but unusual. Marlow, Kyed, and Connors (2005) used “kuleana” and explained that it was a feeling “of caring and a sense of advocacy. It emphasizes relationships between individuals… and demands consideration of the needs and feelings of all partners. Without this component, collegiality and collaboration ring hollow. Kuleana is the… glue that solidifies… effective relationships” (p. 192). Current expectations were more specific in the literature. However, I also found sweeping notions of grand expectations that still exist. Koch and Borg (2011) gave general expectations of partnerships when they declared, “As the saying goes, the work is first planned and the plan is then worked. A shared vision, flexible approach, and frequent and ongoing communication form the cornerstones of a successful partnership” (p. 29). Likewise, Killion (2011) claimed, “It is particularly important to ensure that the partners share common values and assumptions about education, have intersecting goals, and are committed to advancing one another’s goals” (p. 15). Expectations, although clearer than in the past, for the most part still needed refinement and explanation to be useful.

The fifth theme identified in the literature regarded the products made through the partnering relationships. Products were much more prevalent in the business models of partnership. Yet, educational models referred to products as well. When partners created or invented something Bouillion and Gomez (2001) “believe the choice of problem and partnership
needs to emerge from and reflect the values, goals, and resources of the local context. The complexity and visibility of the real-world problem are also anticipated to be variable” (p. 895). The partners benefited from work that was crafted for them. There were other considerations. Radinsky, Bouillon, Lento, and Gomez (2001) emphasized the differences in products in partnerships. They proposed:

It may be worthwhile to work with teachers and partners to make the distinction between primary and secondary products clear at the outset of a partnership. By doing this, all individuals can have explicit discussions about the primary and secondary products they believe are possible in the arrangement, and seek to design activity and forms of participation that can optimize value for students, teachers and partners. (p. 421)

I did not explore the types of partner products in my study; however, I did consider the products made as part of the context and bigger picture of the partnership.

The sixth and last partnership theme was leadership, and change was a large sub-category of this theme. Leaders needed to recognize the importance of “nurturing relationships” in order to enact change (Peel, Peel, & Baker, 2002, p. 321). Indeed Fullan (2001) explained that relationship building is one key to successful change in partnerships. In order to become acquainted with the relationships, the job leaders needed to “utilize every opportunity to know the people, to know the culture and to encourage interactions and relationship building which lead to a positive learning environment” (Tobergte & Curtis, 2002, p. 772). To perform this job of understanding relationships, leadership had to build trust. Butcher, Bezzina, and Moran (2011) explained:
Collaborative leadership is built upon genuine trust among those involved. Strong relationships and the development of trust are priorities in an engaged, transformational partnership. Honesty, reciprocity, and mutual respect are the building blocks that are created through the involvement of people across the partnership and its projects. (p. 39)

These transformational partnerships were “better” than the simpler transactional partnerships also described by the authors. Part of achieving the transformational partnership depended on leadership. Change was a part of that leadership, both at the leadership level, with the other partners, and within the individual. When groups worked together, changes, and thus flexibility, were factored in to successful partnerships. Trubowitz (1986) stated:

> We know now that when a public school and college work together, the process is one of constant change. Some teachers return or go on sabbatical, others transfer into the school, curriculum mandates are hurled at the school from state and city agencies, and budget support varies with a fluctuating economy. The attempt to control every detail of the project is like trying to bottle a cloud on a windy day. (p. 21)

Like the groups, and still a part of partnerships, individuals also struggled with change. Attard (2007) expressed this notion when he stated:

> Learning should be *directly relevant* to teachers’ needs if it is to promote change to professional practice. If new learning seems relevant to my needs—for example, if it is linked to a problem I perceive—I already feel the need to change. However, when learning does not appear to be immediately relevant, is highly abstract, or is perceived as being far away from the realities I face as a teacher, it is either ignored or just
accommodated within my comfort zone and it rarely challenges habitual routines. Thus, such new learning will rarely result in change of practice. (p. 154)

Change required leadership either individually or within a group. Change, as evidenced above was difficult, and mirrored the change sub-category found in the relationship theme. I found some evidence of change in all of the other five themes including: perspective, negotiations, relationships, expectations, and products. Leadership factored into partnership successes and relied upon perspective, negotiations, relationships, and expectations.

*Partnership Stages*

As I conclude this literature review, it is important to explain Mullinix’s (2001) partnership development continuum. Although Mullinix, along with others with whom she worked, created the three partnership descriptions (pre-partnership, partnership, and Partnership) for a non-governmental organization, I used her nine dimensions (Appendix B) to identify where each of my cases fell into the partnership descriptions (Chapter 4). She included the following dimensions as important for partnership development: 1) focus of interaction, 2) activities/projects/programs, 3) time and orientation, 4) benefit, 5) trust and respect, 6) organizational structures, 7) organizational strategies and information access, 8) locus of influence, and 9) written agreements or contracts. I used these dimensions and described each case as a pre-partnership, partnership, or Partnership for my study.

*Literature Summary*

In conclusion, the push from NSF and other agencies to promote partnerships drove the need for research in this area. Although the research described here was specific to partnerships in general, it was not specific to new partnership formation which was where my study was
situated. The business model of partnership provided a vehicle to begin investigating educational partnerships. The business models included communication, trust, and performance or creation of product as the mainstays of partnerships. Other factors such as commitment, representation, and funding were also included in some models. Educational partnerships shared many aspects of the business model, except for the emphasis on the product and profit. The main characteristic of the educational models was trust. However, communication, leadership, commitment, and mutual interest were also frequently mentioned.

After the initial brief literature review, before I began collecting data, I utilized agendas, decision making, trust, goal setting, clear focus, personal commitment, leader commitment, financial support, and long-term organizational commitment as the building blocks to conduct my study. After my study, and after a more extensive literature review, I identified six themes in the partnership literature. The themes included: perspective, negotiations, relationships, expectations, products, and leadership. I used the concept of habitus as the baseline for participants’ actions. Their actions were often set in routine and formed the central phenomenon of habit. Change was an important idea throughout these themes. These themes impacted the grounded theory of habit that I created, and suggested ways to interpret certain events that were witnessed several times as I collected data. As Dhillon (2009) expressed so well, “Partnership is a dominant theme in education policy and practice in England and in other western countries but remains relatively under-researched, especially with respect to what sustains a partnership” (p. 687).
Chapter Three: Methodology

A good friend once told me that watching his daughter put a leash on her cat put several things into perspective. He said that for years he told her not to do it, and then would say, “I told you so,” when the cat scratched her. One day, when he felt particularly unable to control to what was happening in the world around him, he said he finally understood his daughter’s obsession with leashing the cat. From her point of view she was bringing order to her unordered world, even if it didn’t work, just like he wanted to do but was incapable of doing. This story is not unlike the research situations that I have been in. I have tried to arrange information carefully and understand the conditions, or in other words, bring order to what I saw, heard, and experienced in an unordered world. In this partnership research I did the same, using qualitative methodology. I endeavored to organize my findings; however, I also tried to recognize the perspective of all the individuals, like the father, daughter, and cat, knowing that there were others that I did not even realize existed. The design of this study was conceptualized with “the multiple nature of reality, the close relationship of the researcher to that being researched, the value-laden aspect of inquiry, the personal approach to the writing narrative, and the emerging inductive methodology of the process of research” (Creswell, 1998, p. 73).

In this research I am interested in understanding how new partnerships function and mature through the exploration of the definitions, negotiations, and changes over time employed by the individuals. I am not interested in evaluating the partnerships or judging the effectiveness or efficiency of the grant duties performed or not performed by the individuals. Therefore, I interacted with nine individuals in three new partnerships. At each of these sites the partnership was comprised of two teachers and the one engineering student. Although this unit was the
defined partnership, most often the engineering student worked with one teacher at a time. Therefore the majority of the interactions took place in one or the other teacher’s classroom. However, there were times, such as lunch or in meetings, when all three individuals were together.

The remainder of this chapter includes my study methodology, research context, role of the researcher, description of the case sites, description of the individuals, research tools, analysis process, validity and bias. In order to understand these sections more fully, my research was guided by the following questions:

- What is the meaning of partnership to each participant?
- How do the participants negotiate the work in their partnership?
- Do the individuals’ conceptions of partnership change as a result of their interactions?

My overall purpose was to delve into partnerships, looking specifically at the individuals’ meanings, negotiations, and conceptual changes. In order to do this, I needed to explore the world of partnerships without preconceived notions. I wanted to experience new partnerships through the eyes of the individuals in the study.

**Methodology**

I used grounded theory as a theoretical framework for the study. For my study, grounded theory had clear advantages over traditional methodological frameworks. First, grounded theory is used by researchers already immersed in a profession that “are trained to want it [theory], to look for it, and to generate it” (Glaser & Strauss, 1967, p. 7). As I am an immersed professional in both science education and in school to university partnerships, and I am able to gather data,
analyze, and create grounded theory regarding these new partnerships. Other researchers, although trained to use the same tools, do not have the background to truly “see” the message encoded in the new developing partnerships. Second, grounded theory seeks to develop a core concept, and the “adequacy of a theory… cannot be divorced from the process by which it is generated” (p. 5). Thus the concepts established based on the theory are an integral part of the analysis process. My research was based on partnership meanings and negotiations for each case, and the concepts produced cannot be separated from the context and procedures that shaped them. For example, how can an interaction between a teacher and engineering student, about supplies used in a classroom, be disconnected from the supplies that are available, the grant requirement to create STEM lessons, and the teacher’s willingness to share them (to name only a few considerations)? Lastly, grounded theory allows for “what is relevant to that area [of study]… to emerge” (Strauss & Corbin, 1990, p. 23). In my study, authentic categories materialized for each of my cases. Had I used an already established traditional theory, these categories, and the final core phenomenon of habit, would not have been as evident.

Since little empirical research has been devoted to the arena of new partnership development, I used a grounded theory framework to discover a core phenomenon regarding partnerships. My research serves a foundation for future research studies of university and K-12 school partnerships so that a keen understanding of aspects of partnerships will be available for future use. Additionally, as a baseline study, other studies can use my analysis and theory in questioning and answering future questions. Clifford and Millar (2008) recommend the development of such a “partnership database, to enable better sampling techniques and studies with larger samples” (p. 16). My research begins to fill this need.
My data collection included focus groups, field notes, emails, and interviews. I collected field notes and emails throughout the duration of the study. I conducted focus groups and interviews at the beginning and ending of the study. This data collection was not totally independent of the analysis and the iterative process that accompanied the creation of the central phenomenon of partnerships. There was overlap in data collection, questioning of that data, and explorations of ideas and emerging categories. At the end of the study, after the formation of the core phenomenon using grounded theory, four “central criteria for judging the applicability of theory to a phenomenon” were explored: fit, understanding, generality, and control (Strauss & Corbin, 1990, p. 23).

To investigate these new partnerships, I used a case study which is a tradition of inquiry in qualitative research. Case study was the obvious choice as it “offers a means of investigating complex social units consisting of multiple variables of potential importance in understanding the phenomenon” (Merriam, 1998, p. 41) at hand. Creswell (1998) calls a case study “an exploration of a ‘bounded system’ or a case (or multiple cases) over time through detailed, in-depth data collection involving multiple sources of information rich in context” (p. 61). With Merriam’s idea of variables in complex social units, and Creswell’s concept of rich context in the bounded system, I embraced the case study as a method of investigating new partnerships. Thus, to study the new grant partnerships among the secondary teachers and the engineering students I used descriptive case study methodology. Stake (1994) explains that there are “major conceptual responsibilities of the qualitative case” (p. 244) study. I highlighted two of these conceptual responsibilities. I made a “detailed account of the phenomenon under study” (Merriam, p. 38) which was the inquiry of new partnerships, focusing on definitions, negotiations, and conceptual
changes, and by using distinct bounded cases. The three cases consisted of a newly funded grant partnership between an engineering student and two teachers at one secondary school.

The advantages of this case study were clear. First, a partnership was a complex social unit where many variables enhanced or constrained the partnership from developing a coherent working meaning, which happens through negotiations, and results in conceptual changes. The holistic partnership experience in these cases needed to be examined in depth, and case study allowed for this scrutiny. The individuals involved in the study sites needed to adjust the multiple variables of the context, including, but not limited to: grant requests, personal attitudes, school schedules, student motivation, and university support. Second, the context was important to the understanding of the phenomenon of the new partnership. In order for me to understand the individuals’ formation of partnership meaning, negotiations, and conceptual change, I had to literally hear, see, and touch the context of new partnerships. Although these cases could be studied using numerical surveys or by quantifying individual actions or taking written statements from individuals (to name just a few), these tools would not allow me to understand how the individuals interpret their own experiences as members of the partnership.

Case study methodology required me to collect data that was rich in content and context, which provided me with the opportunity to learn about the conceptualization of the partnerships through the participating individuals’ own words and actions. In order to accomplish this, data was collected through multiple methods, over time, with great attention to detail and context. Importantly, as grant coordinator, I had access to these partnerships cases. According to Strauss and Corbin (1990) “professional experience is another source of sensitivity, if a researcher is fortunate enough to have had this experience” (p. 42). My somewhat limited, but still
professional insights into these grant partnerships as the coordinator were valuable to the
collection and analysis of the data for this new partnership study framed through grounded
theory.

Research Context and the Role of the Researcher

In order to understand who I am as a researcher and how I fit into this partnership study, I
offer my background. I was a previous middle and high school science teacher for 12 years, then
a university course instructor for three years. I became the grant coordinator in the summer of
2007. As the grant coordinator, my assigned duties included: teaching courses, making
placements of engineering students into high school sites, monitoring the work completed by the
engineering students, and serving as a general K-12 school/university liaison. In my time in this
role as the grant coordinator as well as with outside volunteering, I observed and began to
question why some partnerships were more effective than others.

These observations and questions piqued my interests and led me to study what happens
when individuals are linked together for working purposes in a partnership. Many questions
needed to be answered. How does the partnership form? Does it always form? What do the
individuals consider a partnership to be? What types of negotiations happen in that partnership?
Are partnership meanings and negotiations the same for the sites as they are for the individuals
involved? Do individuals have any conceptual change in understanding over time about
partnerships? These types of questions shaped my study. I settled on three main questions that
included: 1) What is the meaning of partnership to each participant? 2) How do the participants
negotiate the work in their partnership? and 3) Do the individuals’ conceptions of partnership
change as a result of their interactions?
Description of Case Sites and Individuals

The three study sites are described in detail in Chapter 4. In this chapter, I summarize the selection process and demographics of each partnership. Each partnership was comprised of two high school teachers (either science or mathematics) and a graduate doctoral student in engineering. I selected three partnerships from the pool of the five funded by the grant for the 2009-2010 academic year. Only schools that had not participated in the grant the previous year were considered to be new partnership sites and therefore eligible for the study. From the pool of eligible partnership sites, 12 teachers and three engineering students were solicited to participate in the study. I selected the six teachers that would create the most diverse pool of individuals. The three engineering students placed in the partnerships with these teachers completed the participant pool. Figure II shows these demographics by individual and site.

In the following paragraphs, I briefly describe the three study partnerships. The participants and the sites are described extensively in Chapter 4. The descriptions here establish a context for understanding the methods and data gathered.

Bush High School is located in Cincinnati in an urban setting with neighborhoods adjacent to two sides of the property. The houses are multiple occupancy homes with a high transient rate and nearby college population. The approximately 300 students at Bush High School were almost exclusively black. The building was recently renovated, and the curriculum was being revised with a focus on STEM. The teacher participants at Bush High School were Dakota, a physical science teacher, and Emerson, a STEM technology teacher. Dakota was a black female, and Emerson was a white female. Dakota and Emerson had a good 12 and 18 years of teaching experience respectively. Dakota and Emerson worked with engineering student,
Alex, in their 9th grade classes. Alex was a white male, who spoke with a slight accent and was not from the United States. Alex had worked as a construction project engineer in Europe before beginning his Ph.D. work in civil engineering. There was a nine-year age difference between Alex, the youngest, who was 32, and Emerson, the oldest, at 41.

Carter High School was also located in urban Cincinnati, but as a private all girls’ high school, served a much less diverse population of around 500 students. The school building was approximately 80 years old, but had an updated, modern feel. The hallways were wide and there was a lot of natural light throughout the building. Work that students had done was hung on the hallway walls. Both teachers, Hayden and Logan, were white females, and the student population was primarily white. Hayden had taught for 18 years and Logan for 28 years. Hayden taught physics and Logan taught calculus. Bailey, the graduate engineering student working with the two teachers, was a white female pursuing her Ph.D. in aerospace engineering. Her engineering experiences revolved around college cooperative education rather than industry positions. There was a 25-year age difference between the youngest, Bailey, who was 25 years old, and the oldest teacher, Logan, who was 50.

Ford High School was located in suburban Cincinnati with houses literally surrounding the school campus. The school campus included a ranch-style high school and middle school located on the same property. The school building was 40 years old, and had the largest student population, with 1,300 students. Eighteen percent of those students were economically disadvantaged and 95% of the population was white. There was a lot of light in the hallways and student work lined the walls. Both teachers, Payton and Taylor, were white males. Taylor’s background was as a freshwater research scientist, but he had been a chemistry teacher for 12
years. Payton had taught biology for 20 years. Casey was the engineering student that worked with these teachers. He was a white male pursuing his Ph.D. in aerospace engineering. He had worked as a computer software engineer and received his MBA before entering his doctoral program. Casey was the youngest at 30, while Taylor was the oldest at 52.
<table>
<thead>
<tr>
<th>Name</th>
<th>Identity &amp; School Affiliation</th>
<th>Gender</th>
<th>Age</th>
<th>Race</th>
<th>Teaching Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alex</td>
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<td>Male</td>
<td>32</td>
<td>White</td>
<td>Graduate Assistant</td>
</tr>
<tr>
<td>Dakota</td>
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<td>Female</td>
<td>39</td>
<td>Black</td>
<td>12 years</td>
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<td>Female</td>
<td>41</td>
<td>White</td>
<td>18 years</td>
</tr>
<tr>
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</tr>
<tr>
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<td>46</td>
<td>White</td>
<td>18 years</td>
</tr>
<tr>
<td>Logan</td>
<td>Mathematics Teacher Carter High School</td>
<td>Female</td>
<td>50</td>
<td>White</td>
<td>28 years</td>
</tr>
<tr>
<td>Casey</td>
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<td>30</td>
<td>White</td>
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</tr>
<tr>
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<td>48</td>
<td>White</td>
<td>20 years</td>
</tr>
<tr>
<td>Taylor</td>
<td>Science Teacher Ford High School</td>
<td>Male</td>
<td>52</td>
<td>White</td>
<td>12 years</td>
</tr>
</tbody>
</table>

Figure II. Summary of participant demographics.
Research Tools

As is typical of qualitative case study, I used a variety of research tools to gather data. I performed individual focus groups, interviews, artifact collection, and field note observations to ensure a rich data source for triangulation. These tools were developed to understand the process of partnership conceptualization and negotiations. Each of the data collection tools allowed for an emphasis on the culture and experience of a secondary school partnership setting. Methods of data collection and subsequent analysis are shown in Figure III.

Individual Focus Groups

Focus groups were important for data collection at the beginning and end of my study. There was an initial focus group for the teachers and one for the engineering students. This same setup was repeated at the ending of the study. Focus groups can also be called group interviews. Originally focus groups were used in “marketing research… where the purpose [was] to gather consumer opinions on product characteristics, advertising themes, and/or service delivery” (Fontana & Frey, 2005, p. 703). Now these group interviews “are essentially a qualitative data-gathering technique that relies on the systematic questioning of several individuals simultaneously in a formal or informal setting” (Fontana & Frey, 2005, p. 703). Denzin and Lincoln clarified that “focus groups reduce the distance between the researcher and the researched. The mulivocality of the individuals limits the control of the researcher over the research process” (2005, p. 648). I wanted to become closer to the individuals and lose control as the researcher. I used the focus group as a semi-structured environment where respondents could explore topics.
The purpose of my focus groups, as opposed to other tools such as semi-structured interviews, was to allow the individuals to respond to statements made by colleagues about partnerships. Focus groups were used because the interaction of the individuals can spark dialog that would otherwise go unheard. I used questions about partnerships to spark discussion among the individuals. The questions were based on the business model of successful partnerships. I wrote the preliminary questions for the ending focus groups before the study began. However, these questions were modified based on data analysis that occurred as the study progressed.

I did not want to control the conversation. I wanted to listen for baseline beliefs about partnerships from each group (engineering students and teachers). I anticipated hearing the individuals’ meanings and understandings of partnerships. I would also be able to hear the range of ideas regarding partnership meanings and their negotiations based on the individual responses.

All engineering students participated in the focus group at the beginning and then again at the end of the study. All but Hayden participated in the initial focus group, and all six teachers participated in the final focus group. Appendix C outlines the initial focus group questions, and Appendix D shows the questions asked of the individuals during the final focus group sessions.

The initial focus groups were conducted in February for the engineering students and the teachers. The initial engineering student focus group was held on two separate days due to scheduling. The final focus groups for the engineering students and teachers were held in May and early June. The same procedures used in the initial focus groups were used in the final focus group sessions. All of the focus groups were held in the same university conference room so that there was an air of comfort for, and collegiality between, the individuals. Both focus groups lasted a little over an hour. I transcribed all of the digital recorded focus group sessions and took
notes to supplement the digital recordings. When individuals used the white board I took pictures of the images and words which were created by the group. The transcripts, notes, and images became the full data set from the focus groups.

*Individual Interviews*

Individual interviews were also used to explore each individual’s beliefs about partnerships. The interview is not a neutral tool. The interviewer and the interviewee become a team of sorts. It was shown that the “interviewer becomes an advocate and partner in the study…” (Fontana & Frey, 2005, p. 696). When the interviewer and interviewee become partners the roles become complex. Supporting this notion that interviews are complex stories woven by both the interviewee and the interviewer, Fontana & Frey (2005) explained that the interview is a “mutually accomplished story that is reached through collaboration between the researcher and the respondent” (p. 714). My study concentrated on the development of new partnerships. The interview data allowed me to hear the partnership story of each individual in his/her own words. The questions (Appendix E) revolved around the meaning, the working relationship and changes, and the conceptualizations or negotiations of partnership. I gently probed the individuals for explanations of terms and ideas (e.g. is a collaboration the same as a partnership?) as the interviews progressed, and this interview collaboration allowed for further understanding of the partnership stories.

I conducted individual formal interviews with each of the six teachers and three engineering students near the end of the data collection period. I interviewed the six teachers individually during May. I interviewed the three engineering students individually in between April and June. The interview sessions were digitally recorded. I transcribed each of these
interviews. Each interview lasted approximately an hour. For each teacher, the interview was held in his/her classroom, and for the engineering students they were held in a university conference room. In all of these formal interviews, regardless of the location, I wrote notes. After each interview I took at least five minutes to review my reaction to the interview and write my observations.

Researcher Field Notes/Observations

I engaged in observations in order to record what happened and in what context. Miller and Crabtree explained that “observational field notes… [can] provide rich descriptions of the variables under study” (2005, p. 624). I made observations in the teachers’ classrooms and other school settings such as lunch or meetings, while the teacher and engineering student were present. These observations allowed me to actually watch as the individuals interacted, worked together, and negotiated which leads to partnership development. Field notes were the vehicle for me to secure this information for later use.

I made 38 observations. No standard protocol for recording the observations in my field notes was used. During observations, I made a running commentary focused on the teachers and engineering student, with less attention given to the high school students, unless they were interacting with one of the study participants. At Bush, 12 separate observations were completed. I observed Alex and Dakota six times and Alex and Emerson six times. At Carter High School I made 11 separate observations, and one of those observations was a meeting with all three individuals. I observed Bailey and Hayden five times. I observed Bailey and Logan five times. At Ford, 15 separate observations were made. There were six observations of Casey and Payton, six observations of Casey and Taylor, and three group session days on an extended field trip.
During the observations, I often sat in an open seat in the back of the classroom. I observed whole class periods 25 times and partial class periods six times. Other observations were during meetings and lunchtime. While observing I answered specific questions (Appendix F) in my field note journal, noted additional items of interest, and drew pictures of classroom arrangements. I observed not just what the teacher and engineering student were doing, but also how, in what context, and why that was important. I informally discussed the events that took place with the teacher and engineering student after each observation either in the classroom or in the hallway after the observation and before leaving the school. These meetings were very short, typically about five minutes or less. After I left the school I made notes of the main points of these conversations. I used the field notes to help guide me in what to look for and what to ask during the few minutes with the individuals at the end of my observations as well as during the next observation.

*Individual Artifacts*

The artifacts I collected were personal emails between the individuals. Finley claims that there are “varied ways in which the world can be known and that broadening the range of perspectives available for constructing knowledge increases the informative value of research” (Finley, 2005, p. 685). Emails provided another method for me to understand partnerships. These emails provided unmediated partnership interactions regarding questions, definitions, conceptualizations, and negotiations because they were participant-initiated rather than initiated by the study questions.

I collected the emails at each visit from the individuals between January and June. I collected 13 emails from Bush High School, 95 from Carter High School, and 109 from Ford
High School. From Bush High School, Alex provided eight emails, Dakota provided two emails, and Emerson gave me three emails. From Carter High School Bailey provided 38 emails, Hayden provided 20 emails, and Logan gave me 37 emails. From Ford High School Casey provided 62 emails, Payton gave me 43 emails, and Taylor gave me four emails.

I requested, and received, email correspondence between each of the six teachers and the three engineering students. Each of the nine individuals provided email correspondence with one or two other individual(s). During the week when I visited the school sites, I asked that the teachers print any emails that had been exchanged with the engineering students since my last visit, and I asked the same of the engineering students. However, there were many weeks when I did not receive any emails, not because they were not written and sent, but because the teachers or engineering students could not access the emails at that particular time and promised to provide them at a later time. I was not allowed by the IRB to ask for these emails electronically for security purposes, so requesting the hard copies was more secure, but also more difficult to obtain. I kept the many email printouts that I received in a notebook as I got them, filed by the month of the email exchange under each teacher and engineering student’s pseudonym. These email artifacts, because of their unmediated nature, gave added perspective, as close to unbiased as possible, to the definitions, negotiations and changes that may or may not have occurred in the partnership. These data collection tools are summarized in Figure III. Additionally the subcategories (what, how, where, etc…) are briefly shown along with the analysis method and research questions addressed.
<table>
<thead>
<tr>
<th>Data Collection Tool</th>
<th>Subcategory of Tool</th>
<th>Analysis Method and Research Question(s) Addressed</th>
</tr>
</thead>
</table>
| **Interviews**       | 1. Initial Focus Group  
                     A. Teachers (5 of 6)  
                     B. Engineering students (3 of 3)  
                     2. Final Focus Group  
                     A. Teachers (6 of 6)  
                     B. Engineering students (3 of 3)  
                     3. Final interview  
                     All 9 individuals   | Coded data  
                     1. Partnership definitions  
                     2. Partnership negotiations  
                     3. Partnership changes |
| Jan. – June 2010     |                     |                                                   |
| **Field Notes**      | Classroom observations | Coded data  
                     1. Partnership definitions  
                     2. Partnership negotiations  
                     3. Partnership changes |
| Jan. – May 2010      |                     |                                                   |
| **Artifacts**        | Email correspondence | Coded data  
                     1. Partnership definitions  
                     2. Partnership negotiations  
                     3. Partnership changes |
| Jan. – June 2010     |                     |                                                   |

Figure III. Summary of Methods.
In summary, I gathered data using focus groups, interviews, field notes, and emails. I had a unique position in the grant to study these partnerships. In the analysis and subsequent writing, attention was given to expressing the voice of every individual from this data. With this baseline data I generated grounded theory and a core phenomenon regarding partnerships.

Analysis Process

The analytical framework of grounded theory is the conditional matrix (Strauss & Corbin, 1990). The conditional matrix, as represented by Strauss and Corbin, looked like a bull’s eye target. They explained this target as

…a set of circles, one inside the other, each (level) corresponding to different aspects of the world around us. In the outer rings stand those conditional features most distant to action/interaction; while the inner rings pertain to those conditional features bearing most closely upon an action/interaction sequence. (p. 161)

Therefore, once the data sets were coded (open, axial, and selective), and grounded theory had been presented, I took the core phenomenon and compared it to the conditional matrix, or wide range of conditions and consequences that must be considered (Strauss & Corbin, p. 158). Lastly, and just as importantly, I looked through all four data sets (focus groups, interviews, field notes, and emails) for evidence that would disprove my notions of how the cases were functioning and carrying out the definition of, negotiations in, and changes with the partnership. After completing this step, I developed some themes for new grant partnerships. I also asked questions for further research studies involving new partnerships.

Overall, I tried to view partnerships from the perspective of the individuals. I began with general questions in teacher and engineering student focus groups, moved into field note
observations, sought individual insight from the personal interviews with the teachers and engineering students, and then reviewed unmediated email communication during the whole data collection period (January through June 2010). I used the focus groups, field notes, interviews, and email data from all nine individuals to conduct case studies. Then I compared the cases. By viewing each site (two teachers and one engineering student) for what was believed (focus groups and interviews), what actually happened (field notes and emails), how it happened (field notes and emails), and why it happened (focus groups, interviews, field notes, and emails) in that particular location, I compared what was similar or dissimilar in each of the three bounded cases in relation to definitions, negotiations, and changes.

In review, my data collection and analysis involved qualitative focus groups, interviews, field notes, and emails. Throughout the semi-structured focus groups, formal interviews, artifact collection, and field note collection, I searched for teacher and engineering student meanings of partnership, negotiations in the work of the partnership, and any changes in the negotiations, conceptualizations, and/or interactions of partnership in all forms. I mapped the processes uncovered during analysis, and I used coding techniques to discover meanings, patterns, and gaps in the data for my three main research questions. Below I outline the coding process that I used.

Open, Axial, and Selective Coding

Coding the data sets was an iterative process where open, axial, and selective coding were used to focus on a core phenomenon based on grounded theory. The explanations for these coding techniques follow However, Strauss and Corbin (1990) state that “the lines between each type of coding [is] artificial. The different types do not necessarily take place in stages” (p. 58).
Comparing data and making connections often comes and goes as data is revisited. Additionally, Strauss and Corbin also state that “the data collection and data analysis [are] tightly interwoven processes, and must occur alternately because the analysis directs the sampling of data” (p. 59). So, although the data presented throughout this study is shown as open coding comparisons, axial coding connections, or selective coding verifications, note that these coding processes were often parallel interpretations instead of isolated incidences.

Open coding was a way to place “conceptual labels on discrete happenings, events, and other instances of phenomena” (Strauss & Corbin, 1990, p. 61). It was a way to classify what was happening and how it was happening. “This classification is discovered when concepts are compared one against another and appear to pertain to a similar phenomenon. Thus the concepts are grouped together under a higher order, more abstract concept called a category” (Strauss & Corbin, p. 61). After these categories of comparison were established, I used axial coding. Axial coding put data back together in new ways after it was separated by classifying “by making connections between categories” (Strauss & Corbin, p. 96). Attention was focused on several aspects during axial coding including “conditions, context, action/interactional strategies, and consequences” (Strauss & Corbin, p. 96). This technique allowed for me to make connections in my data. Finally, after the comparing of data and connecting of data, I used selective coding. Selective coding was the “descriptive narrative about the central phenomenon of the study” (Strauss & Corbin, p. 116). This was where the central concept was found. It validated the relationship of the categories in the data. All of the categories were shown in the selective coding.
**Data Set Coding**

I coded the initial focus groups first. I used the same basic coding technique described in the previous section. First, I searched for key words and phrases, explicit or implied, which revolved around expectations, agendas, goals, working with partners, decisions, communication patterns, and definitions. This was the open coding stage. I paid special attention to expectations, agendas, and goals based on the business model of partnerships discussed in Chapter 2. I charted these categories for all individuals and created categories. The axial coding stage involved regrouping, asking questions, and creating connections. I charted these connections for all the individuals. Lastly, I searched for the core phenomenon of selective coding. Throughout this coding, I focused on all three research questions in relation to definitions, negations, and changes in meanings and conceptualization of partnership for each of the nine individuals.

From these initial focus groups, taking Bush High School for example, the open coding produced simple comparisons of expectations, goals, and agendas for partnership meaning. Alex and Emerson brought up creating lessons required by the grant as a goal and part of their agenda. Dakota did not agree. She said her agenda was set by classroom priorities, not grant lessons. Moving from these simple comparisons to the axial coding showed the connections between the categories. To begin these connections, the causal condition must be identified. “The events that lead to the occurrence or development of a phenomenon” must be recognized (Strauss & Corbin, 1990, p. 100). I acknowledged this causal condition as the interaction between the teacher and the engineering student regarding mutual duties in the classroom. I labeled the phenomenon that occurred consistently. The properties of the condition included grant duties and classroom duties and the intersection of the two. Finally, selective coding was used to give a “descriptive narrative
about the central phenomenon” (Strauss & Corbin, 1990, p. 116). Thus, as the teachers and engineering students spoke during the focus groups about expectations, goals, and agendas, they showed a high level of consistency or habit with their answers. It appeared that the answers had been rehearsed. The same phrasing was noted. This was just one coding example from the focus group data that I used for partnership meaning. This same process was repeated for each data set and each case.

I coded the final interviews near the end of the data collection, and in coding the interviews, I again focused on key words and/or phrases, expectations, agendas, goals, descriptions, and topics relating to definitions of partnership given or implied, and experiences of the individuals. I chose to use the interviews for a continued springboard into the data analysis about the individuals’ perceptions of what happened, what worked, what didn’t work, why, and what could be improved in the partnerships. Words that I focused on, either explicit or implied, that became themes in this data set, were expectations, agendas, goals, grant duties, communication, engineering, idea generation, teacher improves skill, secondary student learning, teacher receives service, engineering student improves skill, and university support. The nine individuals were also asked if collaboration and partnership had the same meaning. The past experiences of individuals, brought up in the interviews, were of interest, as those experiences allowed me to see how the individual negotiated other working relationships. I charted all of these findings while trying to keep the descriptions as rich as possible. The interviews allowed me to focus on all three research questions in relation to definitions, negations, and changes in meanings and conceptualization of partnership for each of the nine individuals.
At this point, I hypothesized about the means by which the teachers and engineering students created definitions and worked through negotiations in partnerships. With this hypothesis in place I proceeded to investigate the partnership conceptualizations from the field notes and in the email artifacts. I asked questions, created from the coded data sets, and used those questions in the other data sets as an ongoing comparison, connection, and validation sequence. I used an iterative process of analysis.

Using this iterative process, my questions of the field notes included: 1) How are the goals of the partnership expressed? 2) How is respect shown or not shown in the partnership? 3) How are decisions made and by who? 4) What is the priority of the work in the partnership? 5) What is the commitment to the partnership? and 6) How is the flow of information used? The field notes allowed me to understand how the individuals enacted their partnership and working relationships.

With the email artifacts, I coded the words, phrases, descriptions, and iterative topics and/or writing pattern used by the individuals. However, I paid special attention to the conceptualization and negotiations of definitions, working relationships, and changes over time with my coding. These emails were individual-driven in the sense that the individual was the originator and provider of this partnership data, and coding from such an unmediated source added a dimension that I did not capture in my interviews, focus groups, or field notes. The emails were generated by the individuals and were analyzed as they were collected and then reanalyzed at the end of the study. Although the email artifacts were purposefully selected for the genuine nature of the communication, the richness of this data set was not realized until the analysis was complete at the end of the study. Specific quotes from the nine individuals were
noted and then used to showcase the definitions, negotiations, and changes in the conceptualization of partnerships.

As a form of member checking all the teachers and engineering students had a chance to review the data collection and descriptions for additional input. This member check ensured that the descriptions given were as accurate as possible for each individual and for the cross case study. Misinterpretations were corrected before the final presentation of data analysis.

*Dealing with Validity and Bias*

In pursuing the design and subsequent data collection and analysis of partnerships, validity of the study was carefully considered. According to Guba and Lincoln (2005) there are two aspects of ensuring validity. The first “argues for rigor in the application of method whereas the second argues for both a community consent and a form of rigor… in ascribing salience to one interpretation over another and for framing and bounding an interpretive study itself” (p. 205). With this statement the authors claim that the interpretations, not just the methods, be rigorous and thorough.

According to Guba and Lincoln (2005) the interpretations of the data analysis should include fairness, ontological authenticity, educative authenticity, catalytic authenticity, and tactical authenticity for validity. These are the core concepts that drive analysis. The interpretations of my data promoted these core ideals including: expressing the voice of the individuals, raising the level of awareness, prompting action from the individuals, and ensuring the soundness of the study. These concepts were taken into account during my study. For example, the individual quotes from both focus groups and interviews were used with as much surrounding context as possible to provide rich individual descriptions. The individuals
experienced increased awareness regarding partnerships based on their feedback after our interactions and their reading of these chapters. Actions, such as meetings to explore expectations were a direct consequence for the individuals, because of this study. Finally, my bias as the researcher and the validity of the study were scrutinized using the tenets of those established in qualitative research.

My research meets both rigor of methods and interpretation criteria in the following ways. The central focus of the cases was the understanding of new partnership growth and development in regards to definitions, negotiations, and changes. In relation to position of the researcher, I was both an outside and inside researcher. As the coordinator I was responsible for implementing the specifics of the grant, but I did not perform regular observations, interviews, or other similar interactions with individuals as part of my duties. Although I understood the basic functioning of the teacher and engineering student partners, I had never observed the grant individuals for any length of time before this study. The outsider position provided a unique opportunity for me to gain more insights into the development of each working partnership. The insider position as the liaison between the university and the teachers, however, gave me access to information and ways of personally interacting with individuals that would have been outside normal interactions for parties that did not know one another.

For the sake of validity, diversity was important to the sample chosen. In relation to purposeful sampling, I used maximum variation sampling where I included as much diversity as possible with the individuals and with the sites. Glaser and Strauss explain that choosing different individuals/sites forces the researcher “to understand the differences between the various slices of data, in terms of the different conditions under which they were collected”
(1967, p. 66). After data analysis, the site diversity, or the differences between the schools, played the largest role in the grounded theory formation. Figure 1 graphically represents the three cases (three secondary schools, six teachers, three engineering students, three university faculty, and three university coordinators) that worked and interacted in these new grant partnerships. These cases were shown as a means of situating the study in the context of the grant.

In all of the data collection and especially in the analysis I ensured the soundness of the study for validity purposes. Multiple data sets were gathered on each site to ensure triangulation. Triangulation is basically considered “a process of using multiple perceptions to clarify meaning, verifying the repeatability of an observation or interpretation” (Stake, 2005, p. 454). According to Stake, gathering multiple means of perception or reality through different data collection allows for the identification of various interpretations of the phenomenon. The coding process for this data included open, axial, and selective coding in order for the emergence of the central phenomenon (Strauss and Corbin, 1990). Open coding allowed for comparisons in the data, axial coding permitted connections within the data, and selective coding verified these connections. The central phenomenon of the study was based on the story that the data told. I had to begin before the data analysis, or coding.

As with any study, this study had limitations. Obviously, my own bias, although taken into account, was the largest limitation. Another limitation was the time of the year of the study. These were new partnerships that began in August, but I did not begin my data collection until January. The third limitation was the school schedule. Because of the limited amount of time between classes and “free time” during class, I was unable to ask many questions that I
formulated during my observations. The number of individuals in the study was relatively small. Three cases (nine individuals) was a good baseline study, but many more studies need to be added for strength through results. Another limitation was that all of the schools were located in Cincinnati. Although the schools were different, this was limiting in scope of geographic inclusion. The perspective of the teachers and engineering students involved was limiting. Each person in the study volunteered to interact with the grant and this study. These were willing participants and may not represent those that were unwilling to be involved outside of “regular class duties.” Lastly, I missed an opportunity to view organic partnerships, which spring naturally from individual interactions, versus institutional partnerships, which are created and regulated. All of my new partnerships were institutional creations, but the grant construct created organic partnerships as well. However, my study was not set up to capture this comparison.

Summary

In summary, the perspective used in interpreting data was extremely important. The methodology that I used was the case study, as it provided me a means to interpret the data with the individuals as the central focus of the research. Because new partnerships have not been researched well, grounded theory was used to build the core phenomenon of these partnerships. I focused on partnership meanings, negotiations, and conceptual change as my research questions. The data that I collected through focus groups, interviews, field notes, and email artifacts were analyzed using the strategies of grounded theory. With each data set, and always searching for evidence to support the research questions, I used open, axial, and selective coding in finding the core phenomenon. As a former teacher and grant coordinator I have extensive experience working with teachers and others that help teachers in their classrooms. This expertise gave me
an advantage during the coding analysis. With this professionalism, however, I was careful of bias and I took several steps to ensure a valid study. So, just like the girl with the cat on the leash being viewed by an outsider, at first the data did not make sense. Yet, after viewing the data through multiple means and with multiple perspectives a core phenomenon of habit came into view.
Chapter Four: Three High School Cases and a Cross Case Comparison

Do you remember the story of the cat and the little girl from Chapter 3, the one where she tried to control the cat and continued to get scratched and the father didn’t understand her logic? One day his perspective changed and he was finally able to understand what the girl was trying to do. With this findings chapter, I begin by offering another view of that same incident. Imagine if the expectations, goals, and priorities of the girl and the father could be compared. Think about watching them for months and recording how the girl and the father interacted with and around the cat. Consider getting to read the journals of both the girl and the father to see what they said to and about the cat. It would be interesting, wouldn’t it, to be able to spend time not just trying to see from another’s perspective but to actually collect items to support those views would support arguments about what was happening. This look inside of three different triads was the basic structure of my partnership study.

I heard in the focus groups and interviews about the expectations, goals, and priorities of the individuals at the beginning and ending of the study. The field observations allowed me to gain an inside view of the classroom interactions of these individuals. The emails that the individuals exchanged were not forced, but unmediated, and reflected the thoughts and actions of the happenings in the classroom that were on the individuals’ minds. These emails were a more genuine reflection of participant interactions than my focus groups, interviews, or observations. My guiding questions were the meaning of partnership, the negotiations of it, and the conceptual change through it.

So, what is a partnership to these individuals? To answer that question, I explored the question. According to Webster’s dictionary, a partnership by definition must involve a joint
interest of at least two people (Guralnik, 1976), and thus it is the interaction between the individuals in the cases that elucidates the concept of partnership to them. The relationships amongst the participants were essential to the partnership development. As I describe the schools, I refer to the partnership themes located in the literature (Chapter 2) as well as the research questions that form the base of my study.

Bush High School

During the year of the study, Bush High School was a public school that served only the 9th grade in an urban area in Cincinnati, Ohio. It was a school in a redesign process that was phasing in new curriculum while phasing out parts of the older curriculum. There were approximately 300 9th grade students in the school. Ninety percent were minorities, and 84% of them qualified for free or reduced-cost lunch. There were approximately 25 students in each of the teachers’ classes. The school itself was old, but had recently undergone exterior renovation and thus the outside, hallway paint, floors, and huge windows were new. Walking up to the school was impressive. It was a historic red and yellow building with charm of details like gargoyles and intricate carvings. Once inside the hallways stayed large and open and classrooms spread out to the left, right, and up the stairs two other floors. Inside, the classrooms were large and the ceilings were high, but the space was used and not newly renovated. The desks, tables, and chairs were worn, and the carpet had small torn areas and some stains. The two classrooms that I observed were located on different floors on the same side of the same building, and had different general furniture arrangements and classroom atmospheres.

Dakota, one of the teachers, was energetic and had a winning smile. She spoke loudly, crisply, and definitively, with an air of authority. She spoke to the students with respect.
Dakota’s physical science classroom was big and had a slightly non-traditional feel. It had 12 large windows, 14 tables, 30 chairs, four bulletin boards, four white boards, one large wood storage cabinet and approximately 15 posters lining the walls. The posters included inspirational sayings such as “Let the choices you make today be choices you can live with tomorrow,” science content, famous people like Einstein, and teacher reminders like Bloom’s revised taxonomy. There was a definite front to the classroom with a teacher’s desk and a pull down screen. However, the chairs at the tables did not all face the front or the same direction. The room was comfortably messy, with some glassware on the back counter and stacks of papers and books in various locations. Each student had access to a movable cabinet full of laptop computers, and the students used these computers during my observations. Dakota was at either her desk or walking around tables and helping students in her room.

Emerson, a teacher at Bush High School, was often smiling. She engaged students in light banter about happenings outside of the classroom, but she expected the students in her classes to work for the entire class period. Emerson’s STEM technology classroom was slightly smaller than Dakota’s classroom and had a more traditional set up. The teacher’s desk was at the designated front of the room along with a pull down screen. All of the student chairs, situated behind two person tables, faced the front of the room. Her room had 12 large windows, five whiteboards, one bulletin board, 12 student tables, and 10 desktop computers lining the two walls opposite the door. Her room, like Dakota’s, had a movable cabinet filled with laptop computers. There was an air conditioner in one window, brown and pink carpet on the floor, and green paint and posters adorned the walls. The posters were varied and included motivational sayings such as “Make an effort: Not an excuse,” classroom rules, science content like energy
and simple machines, and Bush High School ideals for student achievement. Emerson was at either her desk or walking around tables and helping students, and her classroom had the more traditional feel of a teacher-centered curriculum.

In both classes, the students were very social with each other, and they interacted constantly. They smiled a lot, and asked many questions. The questions that they asked were often not of the science content, but of the circumstances in the room (new person, temperature, etc…). Especially at the beginning of class, both teachers encouraged the students to stay on task, stop talking, sit down, and put away distractions like mirrors and notes. Once the students were working, they often stayed on task with just a few interruptions of talking with friends. Class ended with a rush of cleanup of materials and students settling down for dismissal.

A typical day for students, based on my 12 observations of Dakota and Emerson, included a teacher greeting to the class, such as, “Okay, hi, let’s get started.” Usually, both teachers wrote class objectives and an agenda for the students on the board. The students worked on a warm up question first. The students spent approximately 15 minutes on the warm up question before moving on to the project of the day. For example, I saw one 10-minute lecture in Dakota’s class. The lecture focused on students in Ethiopia and the comparisons between high school in Ethiopia and at Bush High School, and Dakota was pairing her students with pen pals from Ethiopia. The teachers spent the majority of class time for both classes with students working independently, or in small groups, on an existing project. For example, one project that students worked on with Emerson involved 3-D Google Sketch Up and Floor Plan Measurements. Class ended in a rush with the cleanup of laptops and other items. I never saw or
heard about any homework assignments. The teachers gave the students a verbal goodbye to signal the end of class. Then the students would leave the room after the goodbye.

Alex was the engineering student that worked with Dakota and Emerson. Alex had a diverse background. He came to the United States after growing up in Egypt and receiving his master’s degree in Germany. He had worked for industry outside of the United States as a project construction engineer. He was in his third year of graduate school to obtain his Ph.D. in civil engineering. His only previous teaching experience was working as a graduate assistant with his advisor, and he seemed interested in bringing his engineering skills to students.

A typical day for the teacher and engineering student included each individual smiling when the other entered the classroom, and “Hi” was the usual greeting amongst them. After these initial greetings and the beginning of class (described earlier), the teacher and engineering student circulated from table to table. In the classrooms, the individuals had little interaction with the others during the majority of the class time. Both teachers focused on the project at hand, and did not look at or talk to Alex during the student work time. For both teachers, once Alex started helping students, there was little regard to him being in the room. In general, Alex, without direction from either teacher, went around the room from student to student answering questions. Overall, Alex, Dakota, and Emerson had a relaxed and isolated working relationship. Alex, the engineering student, and Dakota and Emerson the teachers, were working with students during class time, but not with any other adult. There was little interaction between the two teachers and Alex during class.

During these typical class days, the teachers did not formally integrate Alex into the class work or procedures for the class. Although they were in the same room, Alex never worked as a
co-teacher with either Dakota or Emerson. The teachers expected Alex to help students, and if he was not in the classroom then the students had one less resource for their project. For example, on January 19th from 11:15 am until 12:00 pm, while the students worked in groups at tables on an engineering applications packet, Alex and Emerson were never at the same table of students at the same time. During this same class period, Emerson took the lead as the disciplinarian by constantly reminding students to stay on task with their work packets. The only interaction between the engineering student and teacher was at noon when Alex asked what the students needed to do. Emerson answered that the students needed to write questions and answers before they moved to any computer work (Field Notes – January 19, 2010). After this brief exchange, Alex and Emerson continued helping students at different tables until Emerson dismissed the class. On March 2, as class started at 12:55 pm, Dakota asked Alex to help a student with a worksheet on atoms. She said, “Can you help me?” Alex replied with a “Yes” and then Dakota explained about the student and the worksheet. After that brief five-minute interaction until the class ended at 2:00 pm, neither of the two individuals communicated verbally or non-verbally (Field Notes – March 2, 2010). Alex, Emerson, and Dakota shared these limited classroom interactions. Despite this lack of classroom communication between the engineering student and the teachers, there were areas of overlap in relation to partnerships. As I explored these areas, the individuals presented glimpses into their outlook on partnership meanings, negotiations, and conceptual changes.

The obvious big question then, was do these three individuals believe that they were in a partnership? Alex stated, “I would say it was a partnership, yeah. Even if the partnership was sometimes just –uh – of shorter frame or sometimes just for this [class] we are partners. I’m
doing this and you’re doing this” (Alex’s Final Interview, June 1, 2010, Lines 722-724). Dakota agreed when she claimed, “I’ve enjoyed the partnership, and I think that the students truly benefit from that” (Dakota’s Final Interview, May 17, 2010, Lines 424-425). When asked if her relationship with Alex was a partnership or collaboration, Emerson said:

It was collaboration. I think it was both at different times. I think it was a collaboration in that we worked together … equally to give something to that partnership but there were times that he had more to give than I did and there were times that I had more to give him than he did (Emerson’s Final Interview, May 28, 2010, Lines 323-327).

Thus, all three Bush High School individuals agreed that their time together was spent in a partnership. Additionally, the three individuals valued each other as well as the partnership. Alex asserted:

I respect the, the way she [Emerson] treated me and teaches her class. Actually the way she managed her class…. Each one has a different way to manage and teach the class, but I was impressed actually with both of them [Emerson and Dakota] and how much control they have over their students…. That is something worthy of respect” (Alex’s Final Interview, June 1, 2010, Lines 543-559).

Dakota stated that Alex “is an educator while he is in my classroom. So I have to respect him for that. Um – also he works extremely hard…” (Dakota’s Final Interview, May 17, 2010, Lines, 308-309). Emerson echoed her sentiments when she said:

I think Alex has a huge amount of knowledge. He has a very unique perspective. He was good with the students. Um – He could talk to them and explain things in a way that I
necessarily couldn’t because of not having the engineering background. Um – and he was a huge resource in the class” (Final Interview, May 28, 2010, Lines 246-249).

Alex respected the teachers for their management skills while Dakota respected Alex for his hard work, and Emerson respected him for bringing engineering into the classroom. These individuals needed respect, a foundation of relationships in both business and educational partnership models (see Chapter 2), for future partnership growth. All three individuals had respect, albeit for different reasons, for each other. Accordingly, the individuals respected each other both inside and outside of class in all of their interactions, and they verbalized that they were in a partnership.

**Partnership meaning**

So if, according to the individuals, they were in a partnership, and they respected each other, how did the Bush High School individuals construct meaning for their partnership? To answer my first research question regarding the meaning of partnership, I looked for partnership meanings that the individuals identified and exemplified through interactions. Based on the business model of partnership discussed in Chapter 2, I considered the person’s expectations, goals, and agenda regarding the grant. These three areas were pieces of a successful business partnership model. Based on these parts, in this section I show how several areas of commonality existed in the meaning of partnership for Alex, Dakota, and Emerson. Four actions defined partnership for the Bush High School individuals.

Lesson creation and communication emerged as the first two important aspects of partnership meaning. In Chapter 2, I linked the product theme with lesson creation and the relationship theme with the relationship theme. Alex and Emerson each referenced lesson
creation in the focus groups and interviews. One difference though, was that Emerson linked communication to lesson creation, unlike the other two individuals, in both the field notes and final interview. Her comments supported the meaning of partnership. In the initial engineering student focus group, Alex was optimistic about upcoming lessons. For example, in relation to how he helped Emerson, he stated, “It could be like for a lesson, or during the class and stuff” (Initial Graduate Focus Group Part 2, February 22, 2010, Line 87). In the initial teacher focus group, Emerson highlighted the lesson interaction when she said, “When we were leading up to our major [lesson] we were spending three to five hours for a couple weeks, before that we decided on where and how it was going to be done and what we were going to do” (Initial Teacher Focus Group Part 1, February 12, 2010, Lines 142-144). Emerson, during her final interview, was pleased with Alex’s lessons and at the communication between the teachers and engineering student on lessons and even claimed that they “spent a lot of time emailing back and forth on lessons that he [Alex] was doing…. He was very good about updating me on what his lessons were and this is what I’m doing in class…. He did a really good job when he did his lessons” (Emerson’s Final Interview, May 28, 2010, Lines 209-212 & 228-229). Dakota mentioned lessons only during her final interview; however, she talked about the process quite extensively when she explained:

…in our interactions he [Alex] talked about the lessons that were upcoming or the content that I was planning on covering, and I would leave it open for him to suggest ways to - um – to enrich those, those topics. Other times we would kind of sit there and pick each other’s brains. What can we do for this? Or what can we do for this? Or how can we infuse construction engineer or – I’m sorry – construction science or civil
engineer topics into this lesson? (Dakota’s Final Interview, May 17, 2010, Lines 249-253).

These sentiments were in line with Alex’s comments about interactions. When speaking about lessons in Dakota’s class Alex states, “with Dakota, every time I go to the class and she has something new, I have a goal for the lesson. If I have any input she is really flexible in incorporating this new idea in her lesson” (Initial Graduate Focus Group Part 1, February 8, 2010, Lines 51-53). In the final interview, Alex expressed concern over the communication feedback from his two teachers. Alex’s concern was one instance of dissatisfaction in the partnership. He stated, “This, this [corrections] didn’t happen this year… I always had the feeling, OK, that they glanced through it or flipped through the lesson plan, but they didn’t really go into detail. So, they didn’t take the time to go through the lesson plans” (Alex’s Final Interview, June 1, 2010, Lines 572-575). Dakota also felt that something was missing during the year. She explained:

So, no I don’t feel like most of the decisions that we made were necessarily shared decisions, even when it came down to the major [lesson] that he was going to do – um – it’s not like, you know, he gave a choice of three and we made a decision to chose on the same one, it was kind of like he came up with it, we thought it was great, - um – but, you know, those decisions weren’t necessarily shared between him and his advisor, so I can’t really support that shared decisions was a big factor in our rela…., in our partnership (Ending Teacher Focus Group, May 26, 2010, Lines 488-493).

Thus, lesson creation and communication, even if it was not good communication, played a large role in how Bush High School individuals identified meaning of their partnership. Even when
they spoke of other subject matter, the individuals repeatedly returned to the topics of lesson creation and communication that were expectations of the grant.

The third and forth aspect of partnership meaning was incorporating engineering content into the classrooms and increasing student learning. I linked the expectation theme of partnerships from Chapter 2 to both incorporating engineering and increasing student learning. For these individuals they expected to follow the grant guidelines that included engineering content and increased student learning. I found that the individuals brought engineering content into their lessons, as well as honed in on student learning, as a foundation of their partnership meaning. As mentioned by Dakota earlier, the individuals discussed how engineering concepts played a part in the lessons. Alex, Dakota, and Emerson incorporated engineering into the classroom with secondary student learning and this continued to define partnerships. Alex spoke of bringing engineering into the classroom in the focus groups, field notes, interviews, and email exchanges. In the focus group, Alex spoke of prioritizing work based on the lesson needs (Initial Graduate Focus Group Part 2, February 22, 2010, Line 57). Emerson had a similar outlook when she claimed, “I think my expectation was just to have the graduate Fellow [Alex] come into class and then show the students what engineering is. So I think just bringing in those people to get a wider feel for what that is actually about, and where they think of when they are interested.” (Initial Teacher Focus Group Part 2, February 12, 2010, Lines 91-93). Alex brought up another engineering concept during my field observation when he interjected during Dakota’s class that sand is a cleaning agent and has a lot of surface area (Field Notes, May 26, 2010). Alex brought his engineering background into the content of the class discussion. However, based on field notes, this was not a frequent occurrence. Yet, he emphasized his engineering background in his
interview, “I was more focused on bringing like engineering reality into the classroom” (Alex’s Final Interview, June 1, 2010, Line 410). Dakota agreed, “I expected Alex to bring in some fresh ideas and also ideas based on current technology and current scientific discoveries. I … expected an outside resource for science and technology or new type of activities that can help to enrich the students’ learning” (Dakota’s Final Interview, May 17, 2010, Lines 213–216). In one email to Dakota regarding an upcoming engineering lesson on concrete deterioration, Alex described that “we will just use coke instead of HCl which should work out and at least change the pH of the concrete cubes. Coke has a pH of 2.5 which should be enough” (Email correspondence from Alex to Dakota, February 22, 2010). Here, Alex’s knowledge of concrete and its weakening after construction helped to situate the specifics of the lesson. Dakota did not respond back to Alex in an email, and therefore I do not know what her thoughts were on his suggestion. Similarly, Emerson mentioned incorporating engineering ideas frequently during her interview. She stated that:

Alex is at the university. I think he has more knowledge about how engineers use the information that we are teaching them on a lower level but use that information to further their careers. And I think he gave a very unique perspective of what is out there for our students, when they don’t normally get that from just the teachers at the high school level (Emerson’s Final Interview, May 28, 2010, Lines 187-191).

In relation to the expectations of knowledge, the teachers valued Alex’s knowledge contribution, but Alex never mentioned valuing the teachers’ knowledge. Instead, he only mentioned respecting them for their classroom management skills. The expectations of Alex, Dakota, and Emerson reflected the need for bringing engineering into the classroom that was a general goal
of the grant. The partnership fulfilled the needs of the grant and the teachers maintained respect for Alex’s knowledge. Emerson continued:

I think Alex has a huge amount of knowledge. He has a very unique perspective. He was good with the students. Um - He could talk to them and explain things in a way that I necessarily couldn’t because of not having the engineering background. Um – and he was a huge resource in the class (Emerson’s Final Interview, May 28, 2010, Lines 246-249).

Here she echoed the statements of Dakota regarding the benefit of Alex’s engineering background with classroom content and student learning.

In summary, lesson creation itself defined the meaning of partnership for this group. The individuals repeatedly highlighted the grant’s requirement of creating five lessons. These lessons were the main deliverable of the grant. There was very little focus on the classroom assessments resulting from the five engineering student created lessons or any teacher lessons. Even when the individuals spoke of the other three actions that defined partnerships (communication, incorporating engineering ideas, and increasing secondary student learning), these were in relation to the grant lessons. The teachers mentioned classroom assessments, like student projects, twice, and Alex did not mention them. Further, for Emerson, she linked communication to the lesson creation. Alex talked about incorporating engineering ideas. Alex and Dakota shared an email that referenced an engineering concept and lesson change. I observed Alex incorporating engineering ideas into the classroom. Alex and Emerson displayed increasing secondary student learning and linked it to incorporating engineering ideas in the classroom.

Also interesting is that many of these partnership meanings were related to processes of interaction to create the lessons. I looked for expectations, goals, and agendas, and these were
assessment oriented, but I did not hear from the individuals about the process to create these assessments. For example, bringing in engineering ideas, increasing student learning, and increasing communication were processes that may not have tangible assessments, but I did not see or hear about the processes that ignited the ideas. All three individuals seemed to value the grant assessments, like the five grant lessons, over processes like clarifying and negotiating partnership meaning.

According to the individuals at Bush, partnership meanings fell into partnership themes (see Chapter 2) of products, relationships, and expectations. I did not hear or observe leadership as shaping partnership meaning by any individual, although Emerson was the leader of the grant team at Bush. Thus, Bush individuals used three of the six themes identified in Chapter 2 to construct partnership meaning.

Processes in the six identified themes of partnership, it would seem, should be the backbone of any partnership. A true interaction of ideas, and thus improved assessments for the grant and the teacher, could show a more dynamic partnership. Using the partnership meanings as a backbone for the function of the partnership, I now explore the concept of the partnership negotiations of the individuals at Bush High School.

Partnership negotiations

If partnership meanings form around creating lessons, incorporating engineering ideas in the classroom, increasing communication, and increasing secondary student learning, then what do partnership negotiations look like? I defined negotiations as a back and forth dialogue, between at least two individuals, to reach an agreement over a certain matter or topic. After analyzing the data, I found very few true negotiations. However, what I established was that
these dialogues were often truncated, and thus the negotiations at best were emerging and only scratched the surface of negotiation. Nonetheless, I described these abbreviated negotiations here using the terminology of negotiation(s). Additionally, I expected to find examples of the negotiation theme found in the partnership literature (Chapter 2).

Mostly, grant lessons played a central role in showcasing negotiations as did time and supply use. I saw the two themes of product and negotiations/decision making. Compromises were an important feature in these negotiations. Dakota stated:

So if the situation changes, then you know some aspects should also change. And you know, at the beginning, you don’t always know what’s needed from the beginning to the end. So when you find out what’s needed then of course you’ve got to change some of your expectations some of your characteristics, and compromise (Dakota’s Final Interview, May 17, 2010, Lines 83-86).

Alex, Dakota, and Emerson all mentioned grant lesson creation while explaining negotiations. For Alex, he felt that grant lessons helped to increase the negotiations between the teachers and himself. In the initial engineering student focus group Alex said, “Obviously, if you have like, if you have – um - a major [lesson] coming up then you talk about the major and the goals of this major and when and how you will do it” (Initial Graduate Focus Group Part 1, February 8, 2010, Lines 34-35). This idea of interaction to improve lessons and overall teaching, in a give and take fashion, was still strong at the final interview when Alex stated:

I was expecting from them to give me feedback, maybe on a weekly basis, just so I can improve myself in the way I work with them, lessons, and the students, and at the same time my duty or my responsibility was if I saw something wrong in the way they dealt
with students or if they made a mistake in whatever subject/content they were teaching to
the, in a respectful way to, um, highlight it or to like approach them and tell them about it
(Alex’s Final Interview, June 1, 2010, Lines 370-375).

Later during the same interview Alex talked about the negotiations between himself and the
teachers he referred to his lessons again. Alex claimed:

We always make them together. Like we talk about if someone has an idea – um – if it
was like one of my projects, activities, then we would talk about it. I would share my
ideas. I would always expect them to give me feedback or input and – um – if I say, if I
see an okay from their side and not a lot of rejection then we would just go ahead and do
it (Alex’s Final Interview, June 1, 2010, Lines 563–566).

He continued to explain about the grant lessons and negotiations when he stated:

Maybe – um – in some of the activities that I had maybe like a different idea or about a
piece in, in the lesson plan and – uh – the teacher has a different idea, and I think at the
end we just talked about it and we agreed on either a combination or one of them (Final
Graduate Focus Group, June 8, 2010, Lines 231-233).

The teachers also shared Alex’s focus on grant lessons during the negotiations in the classroom.

For example, Dakota affirmed:

I also feel like at the beginning of the year we did some negotiation as to what majors he
[Alex] thought he was going to do and when, based on our pacing guides and our
individual core classes, you know like, if we were doing something in physical science
we would negotiate and make this better for him to do the physical science topic but in
the STEM education class after you guys are finished we can reconnect, you know, just
negotiations about when would be the best time for him to do his majors [lessons], and with that I think he was going to do his first major with, with me first, and then because of that negotiation he did it with Emerson in STEM ed. class. So we had to negotiate – um – lesson topic structures (Final Teacher Focus Group, May 26, 2010, Lines 314-321).

When discussing the decision making process Dakota said, “I’d like to say both of us” (Dakota’s Final Interview, May 17, 2010, Line 313). Emerson claimed, “I think we mainly shared decisions. It was…a collaborative kind of sharing of decision making. …We would work together on… lessons and things that went on in the classroom. …Talk about them and kind of come to a shared agreement” (Emerson’s Final Interview, May 28, 2010, Lines 259-261). Unlike Alex, Emerson seemed satisfied with the process and partnership. This case of individuals negotiated lesson ideas and shaped their partnership meaning in the process. Alex sounded dissatisfied with the kind of support he got during the partnership, but I never saw or heard a negotiation regarding dissatisfaction.

I believe negotiating challenges and clarifying expectations should play a prominent role in partnerships. Yet, between Alex and the teachers, negotiations only extended to lesson interactions, or the product theme. Although expectations, duties, feedback, and dissatisfaction were mentioned during some focus group and interview sessions, I did not see evidence of full negotiations during observations or in email exchanges.

Once again, as seen with the partnership meanings, there was a breakdown, not just in the number of interactions, but also in the levels of interactions. Thus, the relationship, a theme identified in Chapter 2 was a barrier to negotiation. This barrier appeared to interfere with the negotiations that centered on the creation of the lessons. For example, Dakota, during her final
interview, explained that the lesson ideas “were all fine and we all contributed, we all received, but then he [Alex] had to go to someone over all of us [at the university]…to get that lesson approved and to get feedback on how effective that lesson would be” (Dakota’s Final Interview, May 17, 2010, Lines 368-370). This sounded like a place of interference, and a place where negotiation should happen. Here the issue was not on the lesson itself, but where trust in the partnership actually exists. This apparent irritation about the process does not appear in other places. For instance, an email exchange between Alex and Dakota described that she “made a few minor changes” to his lesson (Email exchange between Dakota and Alex, February 22, 2010). Here Dakota gave some suggestions for Alex’s lesson, but based on her earlier statements she felt that the university had the final decision. It appeared that she saw no reason to engage in negotiations over the lessons. Thus, her comments on lessons, and other items, might have been lessened due to their lack of perceived importance. The theme of perspective and power was only shown here with Dakota’s remarks about the lesson approval process.

There was once more an overwhelming focus on the grant lessons in the negotiations between the individuals. The individuals mentioned two other processes, which sparked negotiations. Dakota and Emerson discussed time schedules, the challenges associated with these schedules, and the use of time during their final interviews. These concepts fit most closely with the expectations theme of partnerships from Chapter 2. Emerson explained:

Usually Alex was in twice a week. He would come in anywhere from one to two of my classes. Um – on the weeks that he wasn’t doing his [lesson] he would come in and assist the students in whatever we were doing, answer questions, bring some of his own experience in, talk to the students, he always added information to the class. Um – on the
weeks where he was doing his [lesson] obviously we met quite a bit more often than that. Um - both on the weeks where he was and the weeks where he wasn’t doing his [lesson] we would sit down and discuss – you know – how things went in the classroom, what we saw, um, ways he could get more involved in the classroom although sometimes that was a little hard to get him to do when I was teaching and he wasn’t doing a [lesson]

(Emerson’s Final Interview, May 28, 2010, Lines 201-209).

In regards to time, Dakota stated, “So, a lot of our time was spent kind of like brainstorming and trying to figure out where he would be best used and where his activities would be most beneficial (Final Interview, May 17, 2010, Lines 253-255). Thus, negotiating time schedules was a topic raised only by used by the teachers. The individuals were not engaged in clarifying expectations, refining processes, or other such tasks, but negotiations to all three individuals involved compromise. Alex used the term compromise during his final interview while Dakota and Emerson used the term “mutual compromise” during their final interviews.

Using supplies, or actually using the physical classroom equipment, was another vehicle for negotiations for the individuals. Alex referenced the use of supplies one time as a means for negotiation, and Dakota did twice. In her final interview, Dakota explained a change in the supplies used when:

[Alex] made that decision….. Uh – in the actual lesson plan…we were going to use, we were going to use nitric acid. And I was like, ‘You know, we don’t really have a hood.’ And so, you’re going to, you know, address the issue of not having a hood. So I mean, we ultimately came to the decision together that - that may not be the best thing to do

(Dakota’s Final Interview, May 17, 2010, Lines 320-325).
Supplies also caused problems that called for clarification of expectations, and the beginning of negotiations. During a field observation, Alex approached Dakota in the front of the class, and a conversation ensued. Dakota talked to Alex about waiting to the last minute to get items, like probes and copies, and Alex apologized and explained his reasoning for the late requests. A few more exchanges provided a confirmation of what should have happened. This confirmation was that requests should be made at least two days in advance via email or in person before any materials should be expected. (Field Notes, May 24, 2010). Later the same day, Dakota told me that although this was frustrating it was “not a huge problem” with Alex (Personal Communication, May 24, 2010).

Thus, Alex, Dakota, and Emerson centered negotiations on lessons created for the grant, time management, and use of supplies. The individuals had interactions that reflected the perspective/power, decision making, expectations, and product themes shown in Chapter 2. The individuals did not engage in true negotiations where there was a series of back and forth interactions. The individuals rarely negotiated, and when they did, it was more a clarification of expectations than a true negotiation. Typically, the teachers clarified for Alex what they thought he should do. Alex was frustrated because there was no clarification of his expectations of the teachers. He expected them to provide support and feedback, but he did not receive this, and he never sought to clarify these expectations with the teachers. Leadership/change and promoting relationships (see Chapter 2) were not themes exhibited during the Bush negotiations.

Bush High School partnership summary

For Alex, Dakota, and Emerson, partnership meanings revolved around the grant products of lesson creation, incorporating engineering ideas in the classroom, increasing
communication, and increasing secondary student learning. These actions of the individuals showed their view of the partnership, and what it meant to them. In creating partnership meanings, the individuals showed three themes of partnerships from Chapter 2 (relationships, expectations, and products). Partnership negotiations revolved around lessons created for the grant, time management, and use of supplies. The individuals demonstrated four themes (Chapter 2) of perspective/power, decision making, expectations, and products. Most partnership meanings and negotiations centered on the grant lesson content, and assessments, instead of the underlying processes that shaped the partnership. There were limited interactions on the relationship process. The leadership theme was not a factor for Bush.

My third research question revolved around the conceptual change of partnership of the individuals. In regards to partnership change, the observations, spoken statements, and emails all revealed a constant pattern without change of conceptual framework. The individuals showed this constant pattern in their actions and interactions with each other during the whole study. What I heard, observed, and read during January and February mirrored what I heard, observed, and read during May and June. The idea of change did not happen either in the conceptual framework of the individuals or in their stated or observed actions.

Revisiting that big question, do these individuals have a partnership? My answer was yes, but it was a pre-partnership (Mullinix, 2001). This group of individuals had limited, specifically defined relationships, was beginning to build trust and earning respect, worked autonomously, and used separate strategies. All of these dimensions were characteristic of the pre-partnership category (Appendix B). Yet, they also exhibited some partnership (with a little p) dimensions. For example, the participants worked towards a mutually valued objective, had specified/longer-
term objectives, increased capacity to access resources, and signed a written agreement focusing on roles. They believed that they were in a partnership, but they were responding to the requirements of the grant. This was not a negative reflection on any of the individuals. They were given a document (Appendix A) that outlined duties and their focus was on those duties, mainly the lessons. Alex, Dakota, and Emerson worked together. They interacted because they needed to interact, and their relations were superficial. They had created a meaning of partnership based on the necessities of the grant, but they had not built a relationship that would encourage and require negotiations. Therefore, these individuals lacked the depth of relationship, or partnership, to truly engage each other to better themselves, each other, and the students with whom they worked. In order to do this the individuals would need more time. The teachers were busy, and asking for a true partnership with negotiations would require more of a time investment than the grant provided.

Importantly, an emerging or established relationship was not one of my criteria for this partnership study. To create the partnership meanings I looked at the expectations, goals, and agendas of each individual. The negotiations were those back and forth interactions over one topic engaging at least two individuals, but these were shortened versions of what could have been. I expected these interactions to included tackled challenges, improved successes, explained misunderstandings, and/or expanded compromises. Yet, all of the individuals focused on the requirements of the grant. Therefore, even though the individuals did have similar expectations, goals, and agendas, they engaged in a pre-partnership. They were connected through parallel play, but they were occupied at the grant tasks they were given.
Carter High School

Carter High School was a private school for girls that served the 9th through 12th grades in the greater Cincinnati area. Hayden and Logan were the teachers and Bailey was the engineering student. There were approximately 530 students in the school. Six percent were minorities, and 16% of them qualified for free or reduced-cost lunch. I noticed that the school buildings looked nice and clean, as did the grounds. There were flowers in the spring that led up to the double-door main entrance.

At Carter High School, I entered the main doors and noticed that there were many student work samples lining the walls of the buildings. The walls and stairways were bright and freshly painted. There were many pictures of students involved in activities, such as the school play and softball games, hanging in glass cases in the hallways. Logan’s classroom was on the second floor and Hayden’s classroom was on the third floor. All of the classrooms were a nice size. Logan and Hayden had approximately 20 students in each class. Each classroom had space for the students to move easily around the tables.

Hayden was the short, petite, physics teacher. She was full of life and smiled a lot. Her voice was light and uplifting, and she was serious about student work during class. Hayden’s physical classroom was large and well equipped. In this science room, there were 24 chair desks facing the front of the room and the teacher’s desk, six large square tables with stools behind those chair desks, counter tops and cabinets around the back walls behind the tables, one large white board, one pull-down screen, six sinks, one clock, and one smart board. In this setting, Hayden’s class had a structured time line of activities for the students on any given day.

Hayden’s teaching style was traditional, and she directed the class. For example, on January 22,
Hayden led the class through physics problems while Bailey watched from the back of the room. Near the end of class, Hayden asked Bailey to talk about engineering for five minutes. Hayden kept a schedule on April 8 despite many interruptions. Alumni were touring the school and kept coming in the room, but Bailey, who had prepared to teach a problem to the class that day, was asked to continue with her lesson. During these types of lessons, Hayden and Bailey used the white board to show physics problems and math solutions.

Logan taught calculus. She was tall and thin, and her mannerisms were graceful. Her tone in the classroom was soothing. She both sparked and invited discussion in her classes. Logan’s classroom was not as large as Hayden’s room. The room had one white board, a pull down screen, eight round tables, 32 chairs, two bulletin boards, one tall cabinet, a few posters, many student work samples, a clock, and a podium. There was not a specific order for the activities that took place in her mathematics classroom. Logan was soft spoken and allowed her students to interact with her, each other, and the engineering student at any time. Her classroom tone was one of helpfulness. The girls commented on all of the ideas of their peers, and the group decided what happened to the content presented. Logan’s method of teaching was more open than Hayden’s and she was not the director of the room. She was the facilitator of the day’s lesson, but she was not the one in charge. For example, on March 19, class began and the students already were working on showing yesterday’s homework. Logan got up from the back of the room and approached Bailey. She asked Bailey to explain a networking project to the class and asked the class to figure out the parts for the project. Then, Logan sat back down and started talking to two tables of girls while Bailey talked to the other tables. In this instance, like the other
classes I observed, the students understood, based on their interactions with each other, that they guided the lessons from topic to topic and stopped to ask for help and guidance when needed.

The students with whom these individuals interacted were well-behaved. They dressed in uniforms, and followed all of the traditional school rules. I rarely heard a teacher correct a student for behavior, and when I did hear a correction, it regarded talking in class. The students appeared relaxed in both classrooms and asked questions frequently. They were polite to each other in the classrooms. Only in the hallways did I hear louder voices and small shouts calling out names or the like. The culture of the student body was one of high involvement and high academic expectations. Carter High School was the epitome of the classic female “All American High School.” Although she did not fit the traditional model at Carter High School because of a face piercing and modest tattoos, Bailey, the engineering student, fit in well with the girls. She was a second year Ph.D. student in aerospace engineering and believed that outside experiences guided her to engineering. She wanted to share this passion with other girls and was enthusiastic in doing so.

The interactions of the three individuals at Carter High School were dynamic. There was a lot going on in the classroom and with the individuals. The teachers were interested in talking with the engineering student and each other. When Bailey entered the room Hayden said “Hello,” and so did Bailey. The same was true for Bailey and Logan. The same was true for goodbye at the end of every class session. During the class, the teachers involved Bailey in what was happening by giving her specific directions on what each expected her to do during class. Bailey was most often involved in laboratory experiences, general classroom help, projects, and direct instruction. She easily moved around the classrooms and interacted with the students
frequently. Bailey, Hayden, and Logan were always cheerful when I was around. They all interacted, but in different ways. Most of Hayden’s interactions with Bailey occurred at the beginning or ending of class while Logan’s interactions with Bailey occurred throughout the entire class time.

There was a difference in Bailey’s behavior between Hayden and Logan’s rooms, and the individuals perceived it. Bailey guarded what she said and how she said it in Hayden’s room. Hayden even stated that the “interactions during class was sometimes hard during class because if she [Bailey] wasn’t working on a major [lesson] I needed to be attentive to my students and their questions and their needs” (Hayden’s Final Interview, May 10, 2010, Lines 306-307). In Logan’s class, Bailey acted freely to say and do what she wanted when she wanted. Bailey explained the reason for this difference during her interview when she said:

Like with Hayden, I feel like she has more of a strict schedule and she needs to follow her plan, and for her I only get to fit in if she thinks, for her, like, she wants, she likes the idea of me piping in and fitting in but it doesn’t fit as well in her mind unless she incorporates it in and organizes it together. She kind of thinks of it that way. Now Logan it’s a little more relaxed, she has more of a classroom that is more of an ongoing discussion I feel like, so adding another person, in my role, is different, because I feel like it flows a little bit better. Now you know, if I’m to pipe up and say something throughout class and it fits in perfectly and I mean if I have something to say and Logan always, you know, welcomes the… So, it’s different with the different environments (Bailey’s Final Interview, April 27, 2010, Lines 357-365).
Pointed out early in the data collection, during the first teacher focus group, Logan had some initial concerns that she had to overcome in order to include Bailey in her classroom. She recalled:

I have a graduate degree in math education, but I have no engineering background. So, when Bailey came in I have to admit that I was a little intimidated at first. She has a really strong personality …to take charge. Those are all things that I admire. I had to get used to that. I thought that…, it wouldn’t be so quick for her to do it, but she just jumped in (Initial Teacher Focus Group Part 1, February 12, 2010, Lines 210-213).

Despite her concerns, Logan conveyed a warm and welcoming atmosphere for Bailey by inviting her to help with engineering clubs as well as the classroom content.

The classrooms of both teachers were full of energy and activities, and Bailey jumped in during both classes. However, her level of engagement was different in both classes because of her perceptions of the teachers’ needs as well as the teachers’ reactions to her help during the class sessions. Some of these perceptions were rooted in respect. Bailey clearly had a strong stand on why she respected both of her teachers and stated:

I would say, Logan yes, I would say she respects me and I respect her and she often comes to me, you know, stuck on something and she’s like, “Oh, I had this idea I wanted to run this by you” or – um – like she sent me a text when she was at a conference it’s like, “Oh, I just sat through this whole talk on networks and you’d find it really interesting.” So I mean, I don’t know it’s cool because she definitely comes to me as somebody that thinks that I can help her in her class. So, that’s definitely me a sign of respect and that she respects why I’m there and my part of the partnership. And I
definitely respect her, I think she – um – is a really good teacher and teaches for the right reasons and thinks about her students and I definitely respect her. Um – I respect Hayden for different reasons. I think Hayden is [pause] a good person and she really tries – and she struggles with some of the material and she struggles with how to really teach it really well so that the students understand but she really wants to do a, good, job, and she wants to – um – she wants, she wants me there for the right reasons. So that’s, I mean, I know she respects me and she wants to incorporate me so that she can do a better job. Now she thinks of that in different aspects like with me helping talk through examples or giving examples about applications in class and stuff like that, so a little bit differently but yeah (Bailey Final Interview, April 27, 2010, Lines 405-420).

Bailey respected both teachers, but for different strengths, and this played into her perceptions of the partnership with each.

Again, the question became, did these individuals believe that they were in a partnership? In this traditional setting, what were the individual views on being in a partnership? During the first focus group, Logan spoke of Bailey and their relationship in the classroom. Logan stated, “Right when we first started I wasn’t sure how it was going to work” (Initial Teacher Focus Group Part 1, February 12, 2010, Line 244). This uncertainly sums up the yet uncreated partnership for Logan. By the final interview however, I asked Logan to tell me of a time that she was in a partnership. This was her answer:

Well, I considered [the grant] to be a partnership. Yes, because I felt like there was several different – um – people or groups of people that I could communicate back and forth with, mainly it was between Bailey, the Fellow, and me. But there was also, I got to
work with the science teachers in the school, this opened up communications between the science teachers and math teachers. And then I felt like it opened up communication between the teachers and the board at Carter High School and the administration at Carter High School. There was also a connection with [the university] with the staff at [the university]. So there was lots of different avenues, means to communicate and gather information and learn things (Logan’s Final Interview, May 5, 2010, Lines 154-163).

Hayden clearly thought she was in a partnership with Bailey when she explained that it was a: …partnership [Pause], but then I don’t know if I’d call it an equal partnership because one has just a little more pull…, but there’s still that equal exchange of ideas, but there’s till that equal exchange of ideas, but I see the teachers making the final decision (Hayden Final Interview, May 10, 2010, Lines 393-395).

Although there were some questions at the beginning of the interactions amongst individuals, both participants felt that they were in a partnership with Bailey by the final interviews.

*Partnership meanings*

The meaning of partnership was very similar for all three individuals at Carter High School. For Bailey, Hayden, and Logan partnership meanings fell into three common areas. Throughout these three areas, explored in this section, I saw examples of the individuals’ expectations, goals, and agenda. I found that partnership meaning built around the grant.

For Bailey, Hayden, and Logan focusing on the lessons that fulfilled the grant requirements was a central theme of partnership meaning. Once again, I found the theme of products, here the lessons, from Chapter 2. Bailey and Logan highlighted the lesson creation. During the initial focus group, Bailey stated that she prioritized by “majors [lessons] first, I’ll say
that” (Initial Graduate Focus Group Part 2, February 22, 2010, Line 44). Logan then continued the focus on lessons in her focus group when she explained that “Bailey comes in with the intention of developing a really good lesson that the students will learn from” (Initial Teacher Focus Group Part 1, February 12, 2010, Lines 176-177). During her final interview, Bailey said it was important “to incorporate the lesson plans within their curriculum and test them out on them…. I gave them the lesson plans and activities and stuff” (Final Interview, April 27, 2010, Lines 341-348). Hayden supported this creation when she explained, “I knew what academic conduct, content standards needed to be addressed, but yet Bailey had the freedom to develop the lesson” (Final Interview, May 10, 2010, Lines 334-335). Additionally, Logan emphatically implied that the lessons were the driving force behind the partnership when she claimed:

Yeah, I think the goals were really driven by the program, and the goal was for her [Bailey] to have, uh – to teach a major [lesson] in the class, and along the way supplement that with some other things, so I think she was always looking for a major and I was always looking for areas in which the timing would be right for her to do the major and also – uh – a place in the curriculum that, that the students would know enough that the major would have a lot of meaning to them (Final Interview, May 5, 2010, Lines 217-221).

Logan explained how the impetus for the partnership was clearly set around lessons. Hayden even went as far to say, “I felt like sometimes we focused a little too much on developing her lesson[s]” (Final Interview, May 10, 2010, Lines 358-359). These statements clarified the partnership, and thus the meaning, to the individuals.
There were also discussions on lessons between Bailey and Logan during my observations. There was discussion about a networking lesson on March 19. This lesson, inspired by Logan while at a conference, became the center of the talk during class while the engineering student, teacher, and students tried to figure out the parts of making a network graph. On April 8, Bailey and Logan discussed an upcoming section of an earthquake and damping lesson. This was one of the grant-required lessons prepared mostly by Bailey. Bailey filled the whole class, from beginning to end, with questions, comments, suggestions, and problems regarding her impending lesson.

There were also many examples in the email artifacts about lessons and activities for both Hayden and Logan. Most of the 95 email exchanges dealt with events for the classroom. For example on January 21, Hayden wrote, “Just a heads up to let you know I changed my lesson plans for tomorrow so I could keep up with topics from Wednesday” (Email from Hayden to Bailey, January 21, 2010). She continues by describing the next several days of class. Similarly, Logan wrote to Bailey about her plans for the class the week of January 25. She ends the email stating, “So you want to talk about the major [lesson] for honors pre-calculus on Friday” (Email from Logan to Bailey, January 25, 2010)? Bailey expressed to Logan that she wanted five minutes of class “to discuss with each group tomorrow,” and then went on and said she had “a good idea of the plan for my lesson with you. Can we take like 20 minutes tomorrow during one of your free periods… and discuss this further so I can start writing it up” (Email from Bailey to Logan, February 4, 2010)? These are three early examples of email exchanges involving lesson topics, one from each individual, and this trend continued throughout the five-month study period. I found that the grant lessons were the root of partnership meaning for each individual.
Thus, the individuals defined partnership meaning by the creation of the lessons, or grant assessments, by all three individuals at Carter High School. Each data set clearly offered examples with a focus on lesson creation. The individuals used assessments and their implementation as a bridge for the second area that defined the meaning of partnership.

Incorporating engineering content into the classroom was the second piece of partnership meaning for these individuals. The expectations, goals, and agendas of the individuals included incorporating engineering into the classrooms. This fit into the partnership expectation them from Chapter 2. Bailey, Hayden, and Logan brought attention to engineering concepts and incorporating engineering into the classroom. During the initial engineering student focus group, Bailey agreed with the other engineering students and stated, “Um – Bringing engineering into the classroom. OK. I feel like that’s the goal, right? I feel like everybody kind of said that, but I’ll repeat it. [Laughter]. But I do feel like that’s a goal” (Initial Graduate Focus Group Part 1, February 8, 2010, Lines 43-44). Bailey continued by saying that the “big goal is to bring engineering into the classroom and the smaller goal is like do it on a daily basis” (Initial Graduate Focus Group Part 1, February 8, 2010, Lines 54-55). All three individuals included incorporating engineering into their final interviews. Bailey during her interview spoke explicitly about her expectations regarding engineering in the classroom when she declared:

Of this partnership I guess, I expected to incorporate, you know, what my knowledge of, one, engineering is and incorporate that, incorporate that and teach the students and try to get them to realize that an engineer isn’t always what their stereotypical view is. Two, try to incorporate daily, not necessarily daily, because like I said it’s kind of impossible to be involved in every class every day, but that try to incorporate different engineering
activities relating to daily quote unquote material in the classroom (Bailey’s Final Interview, April 27, 2010, Lines 336-341).

Hayden and Logan also believed that incorporating engineering was important to the partnership as well. Logan sheepishly explained:

So I was looking for somebody to help me to learn some engineering ideas to use in my classroom because again I felt in return the students are going to benefit from it. I also was hoping that it would encourage some of the students to consider engineering for a career because I feel it is very important for us to try to encourage students that are talented to go into engineering for the sake of our country (Logan’s Final Interview, May 5, 2010, Lines 180-184).

Hayden had comparable ideas about incorporating engineering and said that “we worked on developing lessons for the students to apply engineering ideas” (Hayden’s Final Interview, May 10, 2010, Line 314). These types of statements were prevalent throughout the focus groups and interviews.

During my observations, I also witnessed all of the individuals incorporating engineering into the classrooms. Hayden asked Bailey about incorporating engineering during several of my observations. For example, on January 22 with about 10 minutes remaining in class Hayden approached Bailey and asked her to talk to the class about her research or engineering. Bailey replied that she “is a planner” (Field Notes, January 22, 2010) and did not have anything ready. With some prompting from Hayden, Logan did speak to the class for about five minutes. She gave an overview of what the students needed to take in high school order to get into an engineering college, and talked about perceptions of engineers. Hayden, from the back of the
room, suggested she talk about different kinds of engineers. Bailey did this for about one minute and then the bell rang and Hayden dismissed the students.

The emails between the participants highlighted the incorporation of engineering, but usually through the interactions about the upcoming lessons. For example, Bailey wrote:

I think it would be fun to break them into groups, give them a 50 lb bag of sand (or something equally heavy), some tools (gears, pulleys, inclined planes, levers, etc), and see which group can come up with the “best” design to get the bag on the lab bench. It’s a perfect example of how engineers go about solving problems, and simple machines are used all the time in engineering…. (Email from Bailey to Hayden, February 11, 2010).

Hayden gave Bailey feedback on this topic as well. After Bailey sent Hayden a PowerPoint to review, Hayden exclaimed, “Excellent overview! I particularly like the side that outlines process of project design by engineers” (Email from Hayden to Bailey, February 11, 2010). Through interactions like these, the individuals at Carter High School used lessons and activities as a vehicle to incorporate engineering. Incorporating engineering was a large part of the partnership meaning for the group.

Bailey, Hayden, and Logan were all concerned about incorporating engineering into the classroom content. Although mentioned in the expectations of the grant, these individuals honed in on this concept and it became a central piece of the partnership meaning to them. In addition to the lesson creation and incorporating engineering, one other area was a vital piece of the partnership meaning as well.

The last piece of partnership meaning for these individuals was a spotlight on secondary student learning. Again, this was an example of the expectations theme of partnerships (see
Chapter 2). Bailey referred to secondary student learning, or “teach[ing] the students,” which also defined partnerships to the Carter High School individuals. Bailey and Logan referred to secondary student learning throughout the data collection. Hayden spoke of increasing secondary student learning as a part of the partnership only during her final interview. I heard an example when she said:

I think for Bailey to be able to share with me as a teacher and also my students…. Um – well, also there are ideas that I can say, “Well this is how we use them in everyday life” but then for Bailey able to take them and make them relevant for the students to actually participate on that with hands on (Final Interview, May 10, 2010, Lines 275-280).

Like Hayden, during Logan’ final interview, she spoke about her expectations revolving around student learning. She asserted, “I guess it was a selfish expectation, but I wanted to become a better teacher and I wanted the students to learn more because I was a better teacher” (Final Interview, May 5, 2010, Lines 179-180). Logan goes on to explain that student learning was a vital part to what she expected Bailey to do for her classroom. She stressed:

There’s another person in there that the students can listen to and talk to and another person that generates ideas that I may not come up with, and it also, sometimes the ideas – um – I don’t know if I’m using that word right, reinforces what I say because Bailey said basically the same thing in different words. So it definitely opened up the students’ perspective, they learned new things that I wouldn’t have been able to teach them, and then they had another role model in the classroom that they could look up to and see that someone that was a female could be successful, and that they could do the same thing too (Final Interview, May 5, 2010, Lines 189-195).
Both teachers voiced the importance of secondary student learning when they spoke about the partnership.

Although less frequently than in focus groups and interviews, the individuals at Carter High School also spoke about secondary student learning during my observations. On March 12 during a bi-monthly meeting with all of the individuals in the study and some others present as well, Bailey said she wanted to stay involved with the teachers even after school was out because she had “formed relationships with the girls.” Hayden responded back to her saying, “You’ve been a good addition! The girls have really learned a lot from you.” Later during this same meeting, Hayden asked the group to think about Bailey’s lessons. She asked the group to think about what had worked and not worked. Hayden stated, “I thought it was cool you went to plan B since the formula didn’t work yesterday.” Bailey replied, “Yeah, I wrote the formulas wrong and the girls questioned me and I was mad at myself. I confused them but they called me out on it.” Hayden responded, “But they got something out of it. They’ll remember it” (Field Notes, March 12, 2010). This is one example where secondary student learning was important and valued as part of the partnership.

There was one email exchange that showed focus on secondary student learning. In an email from Logan to Bailey, she explained that they were beginning the Maclaurin series in calculus. She continued:

I am trying to get them [the students] to use the series as much as possible so that they can better understand the theorems. I found in the past that the more they crunch numbers, the better they understand the meaning of the series (Email from Logan to Bailey, February 16, 2010).
The emails usually spoke to upcoming lessons and activities. While using lesson creation, incorporating engineering, and secondary student learning, the concept of communication was a way to give the partnership meaning as well. Logan only mentioned communication during the initial teacher focus group where she described how she “tells her [Bailey] the plans… ahead of time…. So, that starts the communication” (Initial Teacher Focus Group Part 1, February 12, 2010, Lines 269-270). However, communication was important for Hayden in relation to synthesizing the meaning of partnership. She spoke of communication frequently. Hayden combined all of her goals and referred to creating lessons, incorporating engineering, secondary student learning, and communication when she described:

We worked on developing lessons…. That was one goal. Um – another goal, we also had was to help provide Bailey with teaching methods. [Pause] Um – that I think the, that the students could adapt to and I think also they thought Bailey could help to develop a good – um – academic lesson. And I think also to, just be able to, I think develop that level of communication where we were comfortable looking at each other as equal colleagues? Equal partners? Because, once again, we’re working towards common goal which is the development of the student (Hayden’s Final Interview, May 10, 2010, Lines 314-320).

In these excerpts and others, communication played a role in understanding what the partnership involved and what the individual needed to continue it. Communication, used this way, describes relationship building which was another theme of partnerships (see Chapter 2). During her final interview, Hayden stated:

Let’s see, the perfect partnership I think would be, the open communication, and where each is free to – uh – be able to promote ideas for example the teacher is unclear about,
how, how can I teach electrostatics? And I think for the graduate student, student just to be able to say, “OK, these are some ideas that I have, let’s see what can work out.” Um – I think also for the teacher to be able to suggest ideas on improvement of teaching methods, maybe presentation, maybe discipline, uh – and then I think also for the graduate student to be able to incorporate those ideas. But I also see with the graduate student in developing the lesson – um – also teaching the teacher to be more comfortable in that topic (Hayden’s Final Interview, May 10, 2010, Lines 246-253).

She also explained that people have diverse means of interactions when she stated, “Because with people being different, some people approach ideas differently, they have different methods of communication, and I think it’s a matter of being aware of those methods and then knowing how to adjust to those different means of communication.” (Hayden’s Final Interview, May 10, 2010, Lines 263-265). Additionally, Hayden often referred to communication in her emails, but not as extensively. For example, she ended several exchanges with quotes such as, “Let me know what your thoughts are” (Email from Hayden to Bailey, March 1, 2010). Thus, Hayden had a communication framework.

In summary, creating lessons, incorporating engineering, and increasing secondary student learning all merged to create a meaning of partnership for the Carter High School case. Communication also was important for the two teachers. These actions were included in the relationship, expectation, and product themes identified in the partnership literature (see Chapter 2). These three individuals were deeply involved in bringing these concepts into the partnership. Bailey, Hayden, and Logan shared these ideas of the partnership, which created a strong, supportive working dynamic.
Partnership negotiations

Partnership negotiations were important to Bailey, Hayden, and Logan. The individuals did not fully develop the negotiations, as explained earlier, but these negotiations were the most expanded of the three cases. The culture of the school played a part in these negotiations. The decision-making theme, found in Chapter 2, explained the importance of culture in negotiations. The culture at Carter High School was one where all three individuals showed extensive evidence of offering opinions, making changes, and listening to others. In general, Bailey claimed, “everybody is pretty open” (Initial Graduate Focus Group Part 2, February 22, 2010, Line 122). This alluded to the power differential, or lack thereof, between the individuals.

Bailey talked about decision-making during the focus group and said that she had the final say on lesson plans that she created, but Hayden decided on group decisions. Bailey claimed:

Hayden needs to feel like [pause], with Logan it’s more like we talk it out and then decisions are made by a compromise, you know, well and not even a compromise because generally like nobody needs to compromise, but we talk about it then a mutual decision is made. I feel like Hayden there is a little… she feels a little bit more authority in her role and needs to really feel like she’s in control and organized of her class so it’s more of, like, and I understand that about her and I respect that about her. So, she needs to feel like…, which is fine, because it never really…, a big deal, but – uh – she is more of a decision maker, more influences the decisions than I do unless for some reason it’s a conflict and then, I mean, which it hardly ever is… (Bailey’s Final Interview, April 27, 2010, Lines 422-430).
Hayden claimed that the decisions were made with an equal voice, and Logan talked of compromise as well. The overall focus of these negotiations was on lessons, as shown in earlier in the partnership meaning section. Again, the product theme from Chapter 2 was evident. In every observation, there was some back and forth dialogue regarding a lesson or activity. Sometimes this talk was about the current lesson or activity and sometimes it was about an upcoming lesson or activity.

Early on, regarding these lessons and activities, there was a sense of compromise with Hayden and Bailey. In January when Hayden asked Bailey to talk to the class about engineering, and she initially refused, there was an exchange after class that captured the prevailing actions of each individual. Hayden explained to Bailey, “I hope that I didn’t put you on the spot.” Bailey replied that she did and she was not comfortable without planning. Then Hayden said, “You do a better job of thinking outside of the box.” Bailey stated, “Well, I’ll have to figure something out.” Finally Hayden said, “Let’s think about it and get together again to talk” (Field Notes, January 22, 2010). Although Bailey was reluctant to “jump into” class for Hayden, she did not hold back in Logan’s class. On the same day, during the next class period, Logan was explaining a mathematics calculus problem (“$27.5 e^{-0.44t} \times 2$” is “$55e^{-0.044t}$”) and Bailey said, “It’s all one term.” Logan continued explaining and Bailey said, “Did you just do that in your head?” Logan laughed and then asked Bailey to graph a problem with a TI-Nspire calculator, but Bailey had problems with the calculator. Logan grabbed another calculator and showed the class how to do the problem. After a few other exchanges Logan said, “It [TI-Nspire] is hard to learn but it’ll come” (Field Notes, January 22, 2010). This back and forth during class did not show a true negotiation, but it did show Bailey’s willingness to engage in class discussion with Logan.
Another interaction between Bailey and Logan occurred a few months later during a planning period while they were actively moving around the room. Bailey showed Logan how to use the shake table that she created for a lesson. The following interaction was long, but showcased the authentic mutual decisions from both individuals.

Logan: Let’s see if it does what we want. How do you get it to start?

Bailey: Auto scale it.[Pause]

(Logan and Bailey then go through examples together of the shake table, motion detector, and PASCO Xplorer GLX.)

Logan: Tomorrow I’ll let them collect data and μ, when you aren’t here.

Bailey: Let’s talk more tomorrow.

Logan: Maybe half the class we’ll collect data and half the class we’ll talk about it.

Bailey: After the addition and damping take new data, solve, and relate the two terms natural frequency and damping coefficient.

Logan: There is power in them seeing it.

Bailey: Yes, maybe we can put it on the same graph.

Logan: I don’t think the distance away matters.

Bailey: That’s what I was saying. What are these numbers on the GLX: periods and peaks?

Logan: I think we’re rushing. Monday we should do the math stuff.

Bailey: Tuesday we should do it again, no Wednesday, yes Thursday. I really want them to bring in something to test. I feel Tuesday we’ll have extra time.
Logan: Okay. Let’s see how it goes. I’m still kind of confused. Will they use KNEX or something from home?

Bailey: I want to talk about them bringing something in to take some data on Tuesday. Is that okay?

Logan: Yes

Bailey: Perfect

Logan: They need time.

Bailey: I’ll try to demo it for them.

Logan: Okay.

Bailey: I don’t think it does anything, but that’s the point.

Logan: Okay, I got that down.

Bailey: Do you have a clear idea of what I’m looking for from them?

Logan: Yes. (Then she types on the computer what should happen over the next few days.) What else am I doing Monday then?

Bailey: Maybe normal math stuff?

Logan: Maybe I should do an example?

Bailey: We’ll talk about damping coefficient and natural frequency.

Logan: I don’t know what natural frequency is.

Bailey: Basically vibrations decrease. …I’ll do an example.

Logan: (General talk about what will happen the following week.)

Bailey: Make sure you call it damper. They need to find an equation.

Logan: How do you compare it?
Bailey: That’s what I said, we’ll find damping and natural frequency of the house, and they’ll find the new damping coefficient of the house. I think the timing is planned out great.

Logan: I’ve got to get my thoughts together on this.

Logan and Bailey were working together. Logan ran some of the days and Bailey ran others. However, these two individuals worked together to begin negotiations, or elucidate expectations, of what would happen on any particular day during the lesson. There were clearly gaps in understanding by both individuals that needed clarifying. Although there were gaps, these compromises showed relationship building. Creating relationships was important to these individuals. They would often eat lunch together at a nearby fast food restaurant, and they discussed happenings like the ones described above.

Emails showed the beginning of negotiations, especially for Logan and Bailey. In one example, from February, Logan stated, “If there is a time, we will talk about radioactive decay? Do you have any input on it for an introduction? I like to talk about… the clean-up…” (Email from Logan to Bailey, February 21, 2010). Bailey replied, “Actually, I have a GREAT application of exponential decay! I won’t have it ready for tomorrow, but can I do it for Wednesday? We can discuss it tomorrow” (Email from Bailey to Logan, February 21, 2010).

Another similar situation happened on April 8. Logan stated, “I made the TI-Nspire document for the honors pre-calculus to work on Monday. …Check the last page and see if I used the correct terms” (Email from Logan to Bailey, April 8, 2010). Bailey responded:

Yes, for the most part you used the right terms. However, omega is generally called just the angular frequency not the angular natural frequency. The natural frequency is the
angular frequency / 2*pi. Also – they don’t know how to find ro (the damping coefficient) or omega (the angular natural frequency) yet… and I thought we were going to discuss that tomorrow yet? I thought we were going to wait until Tuesday?

Thus, these email exchanges highlighted the beginning of negotiations, but not true back and forth dialogue to complete a lesson, or some other activity.

Carter High School partnership summary

For the individuals at Carter High School, partnership meaning centered on lesson creation, incorporating engineering into the classroom and secondary student learning. Communication was a theme for Hayden throughout these meanings. I found the partnership themes of expectations, relationships, and products in the individuals’ meanings (see Chapter 2). The participants’ focused negotiations on lessons and their dialogue resembled emerging negotiations instead of true double participant dialogue. I found the partnership themes of perspective/power, decision making, relationships, and products in the negotiations between the individuals.

If negotiations need relationship building, there was some evidence of the relationship in the email exchanges of the individuals at Carter High School. There were friendly email exchanges embedded in the work exchanges. For example, Hayden wrote to Bailey, “Look forward to hearing about your presentation in Florida” (Email from Hayden to Bailey, January 4, 2010) after an email about what was happening in class. Hayden also invited Bailey to an event when she said, “Hi Bailey, Hope all is well with end of the quarter week! Wanted to let you know I will be having the mousetrap race on Friday… so you can see the girls’ engineering skills! See you Friday! Hayden” (Email from Hayden to Bailey, March 17, 2010). Logan wrote
the same type of email pleasantries. For example, Logan expressed to Bailey, “I was thinking about you several times…, wondering how your drive was to Maine for Christmas with all the snow, wondering how your presentation went in Florida. You’ll have to tell me about it when I see you…” (Email from Logan to Bailey, January 13, 2010). There was an email from Bailey to Logan, which began with condolences about a death in Logan’s family. These type of exchanges highlighted relationship building amongst the individuals.

I did not directly mention the third research question about conceptual change since the individuals did not show any changes. The notions of, and actions with, their partnership at the beginning of the study were repeated at the end of the study. Additionally, the meanings and negotiations did not change.

I believed that the individuals at Carter High School were a partnership (with a little p) as defined by Mullinix (2001). There was only one dimension, organizational strategies, where this group fell into the pre-partnership category because of the lack of proprietary information and shared. In six categories the participants were in a partnership (with a little p) where the group was opportunistic and worked together because of a good match, worked on longer-term objectives, increased capacity doing more and accessing resources, exhibiting trust and respect, showing separate but coordinated team work, and having written agreements focusing on roles in the grant. In two cases the individuals demonstrated Partnership (with a big P) dimensions of developing and implementing programs together and acknowledgement of expertise and capacity (Appendix B). The expectations of the lessons seemed to be the backbone of this materializing partnership. As with the first high school, this was not the fault of any of the individuals since they were given documents that highlighted the lessons as the most important aspect of the grant.
These individuals focused more on process, but grant lessons were still all encompassing of the individuals’ partnership actions. These individuals, given more time, seemed to be on a track of relationship building and true negotiations. All of the individuals respected each other. They had promising relationship building, and clarified expectations, agendas, and goals. These clarifications centered on lesson creation, incorporating engineering, and secondary student learning, and again this was a parallel play situation in a new partnership.

Ford High School

Ford High School was public and served the 9th through 12th grades in the greater Cincinnati area. To get to the school I literally drove through neighborhoods. Upon entering the campus, I noticed a middle school, a lake, and a high school, all on the same property. The buildings looked well kept, and there was a fountain in the lake between the two schools. I walked carefully up to the covered walkways because of the duck droppings that were present. I approached the school on wide, concrete walkways and looked at the three sets of double doors nestled into the red brick. Light came in the school through many windows and the hallways were wide, but not large. Student work lined the hallways in glass cases and on bulletin boards. There were posters in the hallway about the yearbook, prom, and other school activities and events. There were approximately 1500 students in the school. Five percent were minorities, and 15% of them qualified for free or reduced-cost lunch. The average class size was 25 students.

Payton was the biology teacher. He was jovial and laughed a lot. His classes were often work sessions on individual projects where he would help students as needed. He was the team coordinator for the grant. Payton’s medium science classroom had four small windows, two white boards, one large mountain panorama, three small cabinets, one wall with counter tops,
one permanent desk in the front of the room, a computer, a clock, a mounted TV, and an off-white tile floor.

Taylor was tall and thin and moved quickly. He smiled and interacted with students in a friendly manner. His voice was soft and melodic. His chemistry classroom was large with a permanent desk at the designated front of the room. There were two large white boards, five computers in the back of the room, 15 tables, 30 chairs, a document camera, one pull down screen, a mounted TV, counter tops lining two walls, two hanging cabinets, drawers/shelves along one wall to the floor, two large free-standing cabinets, one recycling bin, one large periodic table, a hanging globe, an Earth flag, a world map, 18 lights, two small windows, and an off-white tile floor.

Casey was the engineering student at Ford High School, and he was in his second year of Ph.D. work in aerospace engineering. He was tall and soft-spoken, and he asked for many clarifications of his grant duties. He wore a tie when he taught and he followed a traditional teacher model. Taylor arranged movable walls in his room to make a workspace for Casey to use during his year at Ford High School.

A typical day for Payton included a greeting of “Hello” for Casey followed by a quick rundown of the class events. The first few classes that I observed were about amps and volts, series and parallel circuits, and a biology lesson on genetics. The students had an extended experiment project to work on the last few times I observed. The students entered the class and began working after some prompting by Payton, and they worked on their activities or experiments and data analysis for the entire class period. At times Casey helped the students with questions. However, most of the time he worked at a side computer to aid Payton with an
extended experiment on turtle locations. Lunch occurred in the middle of this class, and the students left and then returned and continued working. During lunch, Payton, Taylor, and Casey ate with other members of the science department in Taylor’s classroom. I often joined them for lunch and listened to the conversation. The class would end with a quick clean up and “Goodbye” release from Payton.

A typical day for Taylor began with a “Hello” from each individual and then a warm-up led by either Taylor or Casey. After the warm-up, the students completed an activity such as making a 3-D model of atoms or conducting a calcium carbide and water lab. The end of class was set aside for cleaning up the activity or lab. The class ended calmly, without fuss. Taylor dismissed the class with a “That’s all, folks!” or “Don’t forget your test/homework” (Field Notes, May 3, 2010) when it was time for the students to leave.

The students in both Payton and Taylor’s classes ranged from the typical good academic student to the typical poor academic student. There was a large range of student dress, attitude, and conduct. Most of the students wore jeans and t-shirts, some with holes, some too tight, and some written on or with chains. The students were talkative as a group and the teachers reminded them to quiet down and get to work many times. For example, on May 3, Payton sternly told the class to get to work or they would lose privileges.

Casey, Payton, and Taylor had a relaxed relationship. It was apparent that there was a large amount of flexibility in the schedules and the expectations of the individuals. For example, on January 28 after Casey explains a F=ma equation regarding the space shuttle, Taylor walked to the front of the class, but then instead of stepping back, Casey stayed in the front of the room and continued to expand on what Taylor said. I asked after class if he planned the activity, and
Casey replied, “No, it was just what felt right” (Field Notes, January 28, 2010). Another example from the same day came from Payton. When Casey walked in the room, he said, “If I do anything wrong let me know” (Field Notes, January 28, 2010). About two minutes later Casey approached Payton and discussed the difference in amps and volts. Then in a loud voice Payton said to the class, “Casey just shared with me an example of voltage in a hose as how many are ready, and amps is a measure of how many electrons are flowing, and to figure out how much is being used, we use watts to do that” (Field Notes, January 28, 2010). Again, Casey did not plan this, and it was a spontaneous addition to the class content. Examples such as these happened in both classrooms frequently. The teachers were willing and eager to bring Casey’s knowledge into the classroom discussions, activities, and lessons, and they did this in front of the students.

In addition to the regular observations, I accompanied Casey, Payton, Taylor, 10 chaperones, and 40 students to Tremont, Tennessee for three days in April 2010. It took approximately six hours on a bus to get there on Friday and return on Sunday. During this time on the bus and at the Great Smoky Mountains Institute at Tremont, I observed interactions between the three individuals, which supported my analysis of the other data sets (focus groups, interviews, field notes, and artifact emails). I treated each day of the trip as one observation.

The individuals spent a lot of time together in and out of the school setting, and this influenced their respect of each other. Casey respected both Payton and Taylor. He stressed:

I think they do fantastic work. Uh – and Payton always said that you are not a true student until you care more about learning than you do your grade. Based on my observation during the year I came up with my own conclusion that you’re not a true teacher until you care more about the students’ education and well being than your
paycheck, and I can see that in both Payton and Taylor. I truly think that they are there for the right reasons of educating our youth and getting them excited about different subjects and their own learning and education. They’re there for the right reasons and they do the best that they can do and I respect that (Casey’s Final Interview, May 28, 2010, Lines 502-508).

Casey respected the teachers because they cared about their students. Payton respected Casey for a different reason. He said:

He [Casey] always wanted to know how we felt about how something would work in the classroom. His goal coming in here was to work with students and to work in our classrooms, which for teachers is sometimes a hard thing to let happen…, to let someone else have control of your classroom, but he never stepped in thinking that he knew all or was the end all be all. He always sought our advice about how to make things work, how to fit them into the room, how to tie them together. He never, ever gave me the impression, even though he is 10 times smarter than I am, that he knew what he was doing and, and whatever I had to say wasn’t important (Payton’s Final Interview, May 21, 2010, Lines 366-373).

Payton felt heard and respected by Casey and in turn respected Casey. Taylor respected Casey for another reason when he exclaimed:

…because we can sit down and look at a problem and bring to the table our, our sometimes mutually exclusive knowledge sets. Of – and – uh – our love of science and problem solving I think also strips away inequalities in those types of things. We’re both very interested in finding the answer. I think that, that elevates it. And you know it’s
always Casey in the classroom I think that’s very important. Uh – he’s very knowledgeable in areas that, that I have no knowledge at all. So, his ability to take something that we’ve done, question of the day or something like that, and then explain an aerospace engineering application of it is really good (Taylor’s Final Interview, May 21, 2010, Lines 379-386).

Taylor felt that Casey’s knowledge was worthy of respect. All of the individuals at Ford High School respected each other, but for different reasons.

Respect, according to the business model of partnerships was important. Did these individuals believe that they were in a partnership? Taylor recounted that in the beginning of the year, before his respect for Casey was established, he was not sure about his dedication towards working with Casey. Taylor stated:

I would say initially my commitment was – um – somewhat tempered by a wait and see attitude….And so my initial lens was somewhat – uh – smoked by that, and - um – as I learned Casey’s commitment, enthusiasm, and capabilities – um – largely – uh – my commitment grew and so I was more than willing to put in extra time and think after school, whatever, whatever it took, to make it work (Taylor’s Final Interview, May 21, 2010, Lines 432-438).

However, Casey, after he established his respect for the teachers, affirmed:

I would say “yes” to the work with Payton and Taylor, I would call that a partnership. Obviously our common goal would be to bring engineering education, the math, the science, to the students to get them excited in that field. And we both, that was our goal, but we both brought things to the table but each of us couldn’t do it alone. I had the
engineering side of it but I needed to get the information to the kids. He had the relationship with the kids but he might not have had the extensive knowledge of the real world applications of the engineering side of it. The two of us together as partners can exchange information in both ways – bring that into the classroom and get the students excited and interested in engineering type education (Casey’s Final Interview, May 28, 2010, Lines 227-236).

Payton echoed Casey’s remarks about being in a partnership, and he claimed, “Partnerships are about both parties gaining, which is interesting both, both parties contributing and gaining…. And so when you throw that dynamic into the partnership… between Casey and I, it sometimes adds a weird dynamic that you have to play with” (Payton’s Final Interview, May 21, 2010, Lines 468-473). Therefore, according to their statements, these individuals considered themselves in a partnership.

**Partnership meanings**

This group of individuals created meaning for partnerships from five main areas. The teachers and engineering student worked together in places besides the classroom and partnership meaning was created in all the locations. There was a large amount of agreement between individual partnership meanings.

The first mode of partnership meaning for these individuals revolved around lessons. I found this partnership product theme (see Chapter 2) in what the individuals said and did. In the first focus group Casey was already centered on lessons as the defining factor for the partnership. He stated:
So you have your majors [lessons], those are your top priority and how it fits into your – uh – basically your STEP work. Then you do your side projects, you know, you fit those in around your major, then you talk to a student on the side. So you try to make sure you get the big ones out of the way and what we can fit in around it that would supplement it (Initial Graduate Focus Group Part 2, February 22, 2010, Lines 48-51).

Casey expressed some urgency, over his upcoming lessons, in his email to Payton when he explained, “I’m coming mainly for the biweekly meeting to discuss my next majors [lessons]. I really need to talk about the next majors to move forward and I do not want to waste any more time” (Email from Casey to Payton, March 1, 2010). This is one of many email communications between the individuals. During an observation, I witnessed Casey and Taylor discussing a small lesson that Casey taught. Casey explained what he did and why he did it and Taylor said it was good. Casey continued by asking if what he brought up was “okay,” and Taylor said, “Yes, it’s a common misconception.” Casey explained that he thought it worked well, and Taylor agreed saying, “that’s what it takes, and your expertise helped too” (Field Notes, January 28, 2010). On the bus ride to Tremont, Tennessee Payton and Casey discussed how to get the students to create a study about land use and the number of hawks sighted. Payton said, “I want the students to compare land use with hawk sightings, and I want the students to create the structure, but Casey and I will be here to answer questions if needed” (Field Notes, April 22, 2010). Again, although on a field trip, the individuals were engaged in lesson discussions. During the final interview, Payton explained, “I would say the number one factor that plays out… is what has to be done for the terms of the grant. Making sure we have major lessons done on time” (Payton’s Final Interview May 21, 2010, Lines 408-409). Taylor agreed with the importance of the lessons and
declared, “Well, the priorities went to his major lessons. I mean, those became the priorities when we talked about things, was that how do we address those? So that became important” (Taylor’s Final Interview, May 21, 2010, Lines 408-409). By the end of the study Casey said, “Sometimes we would really get into school stuff; talk about school in general… we’d get into actual lessons that we [Pause], I taught either in his [Taylor’s] classroom or other classrooms, the pros and cons of what had happened” (Casey’s Final Interview, May 28, 2010, Lines 355-358). Evidently, the individuals at Ford High School focused on the grant lessons to create meaning for their partnership.

By incorporating engineering into the classroom content, the individuals’ showed another aspect of partnership meaning. Trying to integrate grant duties was central for these individuals, and I found the expectations theme (see Chapter 2) of partnerships here. During the initial focus group Casey said, “They [teachers] see the benefit of bringing in engineering education, bringing in someone with a little more experience - um - college experience that these kids don’t have” (Initial Graduate Focus Group, February 22, 2010, Lines 78-79). The individuals wrote many emails about incorporating engineering into lessons and activities. However, there was one email in particular that described Casey’s background in engineering and its importance to a lesson with Payton’s Biology class. This email was long but nicely portrayed Casey’s contribution of incorporating engineering into the classroom. Casey wrote:

I modified the MatLab code to compute the relative frequency of the up-right-down-left (or north-east-south-west) gene direction. Currently, the code uses the following notation to build its chromosome: 1 = left (west) direction, 2 = down (south) direction, 3 = right (east) direction, 4 = up (north) direction. Therefore, a chromosome looks like this in the
code: 41221313421 and so forth, meaning, go north-west-south-south-etc…. I ran the code for a robot for 99 generations in a 15 x 15 room with 20% obstacles in the room with an initial chromosome population of 300 robots. I attached the map of the room with the best (elite) robot and the output of the code. The map shows that a solution has been found but it’s obvious that it’s not the optimal path at that time (given enough time though, the optimal path would be found). The most interesting part is the output of the code in the attached excel file: Column 1: Generation, Column 2: Elite Chromosome – this shows the position of the elite chromosome at that generation. If there is a 1, this means that no chromosome was able to improve upon the last generation elite chromosome. This information is not necessary for the data collection, just used as an indicator of how the robot is improving. Column 3: Fitness value or cost of elite chromosome – cost of the elite chromosome, should go down over time Columns 4-7: Relative frequency of each directional gene. The robot is trying to get from the upper left to the bottom right of the maze. The first generation shows a roughly equal distribution of all directions. The environmental pressure to solve the maze should increase the relative frequency of the east and south directions while decreasing the relative frequency of the north and west directions. The Excel shows this over time thus proving our case. I have ran the code multiple times and got the expected trends in relative frequencies as expected. Just thought you would be interested in seeing some results (Email from Casey to Payton, February 12, 2010).

During my observation when Casey implemented this lesson on chromosomes and genes, he also used his engineering background when teaching the students new concepts. He explained that
there was a “traveling salesman problem.” So, he expanded, there were 15 destinations for the salesman to visit and they are scattered around. What order should he make his rounds? Casey clarified that in order to find the most efficient method computer programs can analyze the best routes. He connected this concept to chromosomes, genes, and DNA (Field Notes, February 24, 2010). During Casey’s final interview he talked about the time it took to incorporate the engineering into the classroom. He stated, “I’d have to spend time prepping myself for QOD’s [Questions of the Day] so I would spend a few hours find a good QOD and somehow put an engineering twist on that” (Casey’s Final Interview, May 28, 2010, Lines 362-263). Taylor also claimed, “He [Casey] would help us with – um – exposing our students to engineering” (Taylor’s Final Interview, May 21, 2010, Lines 271-271). All of these examples showcase the importance of incorporating engineering into the classroom for the individuals and creating meaning for the partnership.

The third means of creating partnership meaning for these individuals came from increased secondary student learning. Again, this fell into the expectations theme of partnership as defined in Chapter 2. In the initial focus group Taylor explained:

I think one of my expectations is just for him [Casey] to interact with students. For them to see someone at the graduate level and know our Fellow [Casey] and interact and ask him those questions like, what is graduate school, is it tough, and those kind of things. (Initial Teacher Focus Group Part 1, February 12, 2010, Lines 68-71)

Taylor continued getting Casey involved with student learning. In an email Taylor asked Casey, “One of our seniors is considering going into aerospace engineering. Would you be willing to talk with him during lunch on Tuesday” (Email from Taylor to Casey, January 29, 2010). Casey
responded, “I would be more than happy to talk with him” (Email from Casey to Taylor, January 29, 2010). Much later in May, during one of my observations, Casey left the teachers’ lunch crowd and went to another table and talked with a student about engineering. After lunch Casey told me that it was important to him to share information with students about engineering so that they had a “connection with what they need to do to succeed” (Field Notes, May 18, 2010). During Casey’s final interview, remembering these student interactions, he stated, “I had a couple kids that are now interested in engineering and sat down with me a few times and got more information on engineering which I don’t think they would have done it if I wasn’t there” (Casey’s Final Interview, May 28, 2010, Lines 314-316). Casey was concerned about science content knowledge as well. Casey worked with another student to find patterns in her research project data. He said, “I’m trying to help her see the patterns and the bigger picture of what she’s doing now and what it could lead to later on” (Field Notes, May 3, 2010). For these individuals the lessons, incorporating engineering in the content, and student learning were vital. Casey summed this up when he exclaimed:

I would get into it [lesson] and use that time to bring that engineering side into the classroom and it just seemed like we both realized that this is what is working out for us. This is what we are supposed to be doing, getting kids excited about engineering, and getting them excited about what’s out there, and how we’re using what they are learning in the classroom in real day problems. (Casey’s Final Interview, May 28, 2010, Lines 451-455)

Payton was quick to point out his focus when he stated, “Whenever there is something going on in my classroom, my focus is on that, on the fact that it is my classroom, and the kids have to get
something out of it. That, that always frames whatever I’m doing” (Payton’s Final Interview, May 21, 2010, Lines 353-355). The individuals at Ford High School constantly referred to student learning in relation to their lessons and bringing in engineering content.

The fourth means of defining partnerships for Ford High School was through communication. I found communication strongly in the relationship theme of partnerships (see Chapter 2). The authentic email communication gave some insight into this area. In all the emails there was a definite point to the email that usually revolved around a lesson or activity for the classroom. Yet, at the end of some emails there was a question to get more information. For example, Casey wrote, “Hey Payton, You wanted me to send you an email about the progress on the Philippines map with gridlines. Just curious how that is going” (Email from Casey to Payton, April 8, 2010). Casey asked for more information in the previous example and when he asked, “If I’m forgetting anything, please let me know” (Email from Casey to Payton, May 5, 2010). Casey requested more information, or communication, and he also spoke about it directly.

During his final interview, Casey stated:

Based on communications with them, we would be talking about ideas… you listen to them even though if you think they are wrong. You listen to what they have to say before you say something, you turn them down, you say okay this is how I feel about it and you work together and figure out what is the best way of going about things. (Casey’s Final Interview, May 28, 2010, Lines 479-483)

Casey emphasized the importance of listening in regard to communication. Payton expressed that the university played a role in the communication as well. He explained:
Well, because there was a fair amount of communication between the University people and Casey that would be communicated through Casey to us or through me to the rest of the team. So, there was lots of communication that involved Casey and I that didn’t always just involve Casey and I. (Payton’s Final Interview, May 21, 2010, Lines 439-442)

From these and other verbatim expressions by teachers and graduates, it is clear that communication was an important component of partnership meaning to these individuals.

Classroom projects were the fifth and final means that individuals at Ford High School used to make meaning of their partnership. I identified projects as part of the partnership product theme from Chapter 2. My three observations in May between Casey and Payton involved a classroom project on turtles as well as individual student research projects. Payton asked, “Is there any way to do this [turtle data base study using computer software]?” Casey responded, “What? Convert the data?” Payton said, “Yes, that’s what I’d like to do. Next time you’re here let’s talk about it” (Field Notes, May 3, 2010). In another class session, Payton exclaimed, “Here’s what I need from you.” Some papers were exchanged. Then Casey countered, “You don’t want to get rid of it [raw turtle data].” Payton said, “Let’s trouble shoot and talk about what permanent changes to make for this project” (Field Notes, May 11, 2010). Finally, on another day, Payton questioned, “Is it possible that it [computer program] is drawing them [data sets] twice?” A conversation followed where Casey and Payton described the challenges of the turtle project, and it ended with a short recount of the successes. Payton smiled and said, “You know, this project is for the students. They do all the work and I want it to work for them” (Field Notes,
May 18, 2010). Payton highlighted this Biology classroom project early on and in many emails over the course of the study. In one email, Payton wrote:

Casey, here is the data base for the turtles project. I created it in M.S. Access 2003. The table with the important data in it is the turtle tracking table. The types of vegetation temp and other data is contained in the table along with the location (Latt and Long) of the place where the turtles have been located over the past five years. The other tables include data bout weights sizes and weather conditions for the nature center which can be compared to the temp conditions at the exact location where the turtles were located. If you have any questions email me. If you have any ideas about how to improve what I have done here let me know. We could use the suggestions. (Email from Payton to Casey, January 24, 2010)

Casey expressed that the classroom turtle project took priority over other topics when he stated:

At the end of this year they had that turtles project and one, a couple of the students were trying to use that data for their own projects and they were under deadlines and I had to complete my work based on his priorities in his classroom. He had certain deadlines that students had to hit and I had to get my work done. (Casey’s Final Interview, May 28, 2010, Lines 539-542)

Clearly, Payton had the classroom project as a priority and one that defined how he interacted in the partnership and created meaning of the partnership.

Thus, the partnership meanings were created by five main topics for these individuals.

Creating lessons, incorporating engineering, increasing secondary student learning, communication, and creating classroom projects drove the partnership meaning. I identified three
of the six partnership themes from Chapter 2 from these individuals. Two of these actions, creating lessons and classroom projects, fit with the partnership theme of products. Incorporating engineering and increasing secondary student learning fit within the expectations partnership theme. Finally, I found these participants used communication to build relationships, which is another partnership theme. The individuals at Ford High School also used some of these same categories for negotiations.

**Partnership negotiations**

Partnership negotiations were limited for Ford High School, but there were indications that negotiations were in the beginning stages. Throughout my interactions with the individuals, I witnessed fledgling negotiations, most based on expectations. Describing the decision making process, also a partnership theme from Chapter 2, the individuals have an incredible match of verbal description. In the initial teacher focus group Payton explained:

> We collaborate. I think we both put out there this is what we are trying to accomplish but this is what we have to work with …. so I guess what I’m saying is that we look at the ideas on the table and figure out what ideas are the best. We agree. There doesn’t seem to be any hierarchy to our decisions at all. (Initial Teacher Focus Group Part 1, February 12, 2010, Lines 221-224)

Payton continued by saying, “I think decisions are made collaboratively… we can accomplish those things, I don’t think there’s any pressure either way to accept one side or the other” (Initial Teacher Focus Group Part 2, February 12, 2010, Lines 236-237). Casey continued this trend and agreed:
I think work well together – um – as far as decisions, it’s in some cases the decisions effect one of us more than the other, but more than likely, what happens is we usually throw out on the table what we need done on our end and then we try to make decisions that achieve everyone’s goals. Usually that happens pretty well, there’s usually not much conflict…, not much conflict on reaching our goals. (Initial Graduate Focus Group Part 2, February 22, 2010, Lines 34-38)

These individuals believed that they worked together to form decisions. I found four main categories of beginning negotiations for individuals at Ford High School.

The first area of partnership negotiations surrounded the lessons that Casey created. Lesson creation fell under the partnership product theme from Chapter 2. The biology lesson that Casey produced for Payton was one good example. In one email Casey wrote, I’ve attached the pre and post assessment and the key. Please take a look at it and make sure that you think it will work” (Email from Casey to Payton, February 22, 2010). Two hours later Casey wrote again and said, “I toned down the pre assessment a little. Find the updated version. I am a little iffy on question 6. I may change that question to something related to gene pool or relative frequency. Let me know what you think” (Email from Casey to Payton, February 22, 2010). Payton responded, “Casey, I made a few suggestions in the document with comments. If you will make the changes I will give it to the students tomorrow at the end of class tomorrow. I think it will work well for you” (Email from Payton to Casey, February 22, 2010). Casey responded back to Payton and said, “I wasn’t’ a big fan of question 6 so I changed it to a relative frequency calculation, as you can see in the new attachment. Feel free to make any changes to the last question that you think is appropriate” (Email from Casey to Payton, February 22, 2010). In this
short email interaction Casey and Payton were finalizing documents for a lesson but they were also asking for opinions and using suggestions from the other individual. Casey even went as far to comment, “I am glad and excited that you can continue to use this lesson and exercise in the future. I think we collectively put together a great lesson” (Email from Casey to Payton, February 28, 2010). There was another email exchange very similar to the one above regarding a lesson about geometry using maps. In those email exchanges Payton and Casey carry on the same type of conversation. When I talked with Casey after his biology lesson with Payton in February, we discussed the idea of changing an approach or the content during teaching. Casey explained that he ran the biology card game during first period, but Payton wanted him to “hit the biology terms harder” so during second period Payton ran that part of Casey’s lesson (Field Notes, February 24, 2010). Although I wasn’t there for the original exchange of ideas, it sounded as if Casey and Payton conducted a brief negotiation on how the lesson was presented.

Secondly, incorporating engineering was an area for negotiations. This action fell under the partnership expectation theme from Chapter 2. Taylor spoke many times about how the decisions were crafted by considering engineering. He explained:

I’d, I’d say they are made based upon – um – our respective expertise. So for instance, when Casey was planning his lesson there were things that he wanted to bring out because of – um - the way he looks at the lesson and the world – uh – and in those cases certainly engineering content in those areas – uh – where I feel he’s got more knowledge than I do, he has more knowledge than I do. Um - decisions were, I deferred to him on those. When it came to decisions about the teaching side of it and delivery and those types of things, - um - I think largely he looked to me in that case for guidance and so I
think more often in that case decisions were made by me in that situation. And then there’s that whole area between as were obviously getting down to the nitty-gritty and we think, should we build a model of that or not. I think those decisions were very collaborative or mutual. Um – I, I think when things seemed pretty much – um – to be equal either way – uh – for instance in Casey’s lesson, then I would defer to Casey because he had the daily experience of taking that idea and running with it and see what happened. (Taylor’s Final Interview, May 21, 2010, Lines 389-400)

Then, during the final teacher focus group he came back to the idea of expert knowledge, or engineering, driving decisions. Taylor said:

   I think where we stared with Casey was he took a look at our, our syllabi and so the sort of shared decisions started with, “Here’s what we teach,” and then he picked out some areas that he thought might be good for engineering and we sort of talked about how he might be able to fit into those areas or whether indeed it might not work for that particular, you know, part of our program, covered in our curriculum. (Final Teacher Focus Group, May 26, 2010, Lines 498-502)

Obviously, Taylor worked through decisions while keeping in mind Casey’s engineering content knowledge.

   The third area of negotiations revolved around the classroom projects. Projects are located within the partnership theme of products (see Chapter 2). The turtle data project described under the partnership meanings section was an area that Payton and Casey frequently discussed. During my observations I witnessed many sessions of back and forth comment
sessions involving problem solving, and thus beginning negotiations on what should happen with the turtle data. The following exchange is an example:

Casey: You round the numbers.
Payton: No, you truncate them.
Casey: Why?
Payton: I don’t know. You just do.
Casey: From the GIS point of view you should [list of several items]…
Payton: I can’t answer that? My question is, is it possible that it is drawing them twice?
Casey: Well, the problem that I have with the data is there are so many decimal places.
Payton: Let’s look at it. Pick one, like data point 312.
Casey: How do you think we can make this work? (Field Notes, May 18, 2010).

There are several issues brought up in this short exchange. Should the numbers be rounded? Should the geographical information system (GIS) point of view be used? Should they check how many times the points are being drawn? What should they work on? All of these questions connect these individuals to possible negotiations. I observed three lengthy discussions between Casey and Payton on the classroom turtle project.

The fourth area that showcased negotiations revolved around time schedules. The use of time schedules here fell under the partnership theme of expectations (see Chapter 2). Payton explained:

I want to go back before January because we were able to negotiate… we were able to get Casey to buy into spending more time because he saw it as being necessary and valuable to get the lessons done that he wanted to do, so he spent more time than his
allotted 20 hours a week – um – working with our students before December. And then likewise we were able to get him to spend a little less time when it became crunch time and he was falling behind in his thesis work, and we would, you know, so we negotiated, that yeah, he really didn’t need to be there all that time, the 40 hours that he was spending doing the stuff he was supposed to only be doing for 20, and we were able to get him to cut back on that. And he was, you know, he came to us and said I’ve got to do something. So there was some negotiation to that. I, I think that was really important in the aspect of the partnership and making sure that all the partners were able to rearrange what we were doing in order to…, for his benefit. (Final Graduate Focus Group, June 8, 2010, Lines 275-286)

Many emails showed this investment in negotiating time in the classroom. In one example Casey wrote, “I can wrap it up Monday. The weather is looking like it is on our side so how do we proceed with schedule? Teach Tues/Wed/Thurs or try to squeeze it into two days” (Email from Casey to Payton, February 21, 2010). Payton replied, “Okay. I will teach tomorrow on a normal schedule… then you will teach (with my help) Wednesday and Thursday… ½ the students for the full class time… basically 2 hours” (Email from Payton to Casey, February 22, 2010). Casey did not respond back to Payton. These types of exchanges were common among the individuals. Scheduling time was important to the individuals at Ford High School.

After looking at the emerging negotiations, there were four main areas that offered glimpses into these interactions. I found questions and compromises while the individuals created lessons, incorporated engineering, worked on classroom projects, and adjusted their time schedules. These related to the two main partnership themes of expectations and products.
identified from Chapter 2. The individuals spent a lot of time talking through expectations and products in relation to their work together and areas in need of negotiation.

*Ford High School partnership summary*

The individuals at Ford High School were extremely friendly towards one another. They listened to each other, and helped each other. They had a good working relationship. They spent limited time with each other outside of Ford High School. I overheard stories of running together, collecting turtle data on weekends, and field trips. They thanked each other often. In one very nice example Payton wrote:

> You [Casey] did a Great job. Thanks! I have to tell you I think you did a wonderful job of Planning and executing this. I have a much improved vision for how to teach this content, in a way that students will achieve much higher levels of understanding than I have ever gotten them to in 20 years of doing this. As I was reflecting on this the other night I know would have never pushed this lesson to that level on my own. I have taught the content before and I have always said that what I have done in the past is good enough. So having a repeatable lesson that I can return to year after year that will help kids see how this all comes together is to coin a phrase is “Priceless.” Thank you! See you Next Week. (Email from Payton to Casey, February 28, 2010)

As this example showed, in creating partnership meaning the individuals at Ford High School looked to creating lessons, incorporating engineering, increasing secondary student learning, increasing communication, and working on classroom projects. Within this partnership framework of expectations and products their negotiations centered on creating the lessons, incorporating engineering, working on classroom projects, and adjusting time schedules. The
third question about conceptual change was not directly mentioned in the description above since no conceptual change was noted by any of the individuals in the study. The notions of partnership that they held at the beginning of the study were repeated at the end of the study. Additionally, the meanings and negotiations did not change. What I observed in January, I also observed in May. The same was true for what the individuals said and did. There was a habit to their interactions and actions.

However, the question remains, were these individuals in a partnership? My answer is yes, a partnership (with a small p) where there was simply one pre-partnership dimension (Mullinix, 2001). Besides using the pre-partnership mode of separate organizational strategies with only public information, the individuals showed partnership modes of opportunistic workings as a good match, working on longer-term objectives, increasing capacity with doing and accessing more, trusting and respecting each member, coordinating organizational structures, and signing written agreements about participant roles. Additionally, the individuals exhibited one Partnership (with a big P) dimension when they developed and implemented programs together (Appendix B). They worked together, and they supported one another. They focused on what the grant originally asked them to spotlight, and they focused on lessons and activities involving engineering. They did not engage in true negotiations, yet this was not the fault of the individuals. Time for true negotiations was lacking, but for this group outside time away from Ford allowed for some relationship building. I found that the back and forth verbal interactions between the individuals were limited, but those that were seen and heard were meaningful. The compromises revolved around expectations and goals and priorities. These individuals hung in parallel play as well. The partnership themes of products, expectations, and relationships were
clear in the individuals’ partnership meanings. I found the partnership themes of expectations and products in the individuals’ negotiations. The individuals discussed decision making at the focus groups and interviews, but they did not outwardly incorporate this concept into their daily activities. The partnership themes of perspective, and leadership were not viewed or recorded. They were in a new partnership.

Cross Case Comparisons

Overall, the individuals at Bush, Carter, and Ford had working relationships where the teachers and engineering students engaged each other to fulfill the duties of the grant. These three cases had similarities and differences in many categories. I found that the culture of the schools, the culture of the individuals, and the focus of the individuals as related to partnership meaning and negotiations were pivotal areas. The largest contributor to partnership building was the relationship of the participants. The partnership themes identified in Chapter 2 were also compared.

Analyzing across the cases, in relation to the culture of the schools, I noted that these were very different types of schools. Bush High School was a public urban 9th grade school with a high minority population and high population classified as low income students. Carter High School was a suburban 9th – 12th grade private girl’s school. There were few minorities and few students classified in the low income category. Ford High School was a suburban 9th – 12th grade public school with a moderate population classified as low income students. There were also cultural differences for the teachers. Dakota and Emerson were Bush High School teachers that had teaching experience but with the implementation of a new school wide curriculum and structure there were elements of the school year that made them feel like beginning teachers. The
relationships of Dakota, Emerson, and Alex were tempered by external pressures related to the new school curriculum and structure. They had less flexibility to implement new activities and lessons, even if this lack of flexibility was sometimes self imposed. Yet, often the teachers at Bush were following the orders of the new school, like they were following the grant’s orders, and felt a lack of value in their expertise. These types of pressures did not exist at Carter and Ford where the teachers were in stable environments. Hayden and Logan, from Carter, worked at a private school which encouraged flexibility and creativeness. Ford’s Payton and Taylor were at a school divided into special schools of focus. They both worked in the school of scientific studies which promoted inquiry activities and lessons. With these apparent differences in school populations and set-ups, thus culture, there were differences in what happened in the cases because of this context. There were differences in the actual partnership function at each school.

In order to interact the individuals dealt with many differences in the students. Bush High School students had the most energy in the hallways and classrooms. Carter High School had the most student cooperation on activities and projects. Ford High School had students with the most outward interest in engineering careers. These student differences, based on the school culture, influenced the individuals in the cases. Alex, Dakota, and Emerson worked hard to keep the students on task and engaged in activities and projects. Bailey, Hayden, and Logan incorporated group work into almost every lesson. Casey, Payton, and Taylor encouraged all of the science, math, technology, and engineering fields. There were cultural aspects of the schools that were similar despite their differences. I found incredibly bright students at all three schools. I saw laughing, smiling, and evidence of friendship in all the schools. I noticed that students responded to teachers, even if there was a time difference for that response. The list of similarities like these
is longer than the list of differences. Similarities were just as important to explore, in relation to school cultures, as the differences. These cultural differences and similarities played a part in the partnership meanings and negotiations of each case. I explore these comparisons.

The culture of the individuals that comprised each case impacted their partnerships. The individuals each brought experiences to the classroom and to the partnership that were unique. If I listed all of the similarities and differences between the individuals in the three cases the list would be extensive. So, for this comparison I offer the most vital components of individual personalities that affected the interactions in each case. The individuals at Bush High School had the largest differences in personal cultures and backgrounds. Alex was originally from another country. Dakota and Emerson grew up in the United States but with different ethnic backgrounds. The district created a new school focused on STEM curricula, which restricted the flexibility of the teachers’ choices. Despite these challenges, their ideas about class content and instructional method often matched. I argued that these individuals stretched the furthest to create interactions, but were still in a pre-partnership.

The individuals at Carter High School were more similar than those at Bush. Bailey was not religious, but was working with two women in a religious all girls’ school. Hayden was very organized, and she structured her classes. Logan was focused on the big picture and had a flexible flow to her classes. Bailey fit in and worked well with both teachers, but preferred Logan’s room. Logan had a laid back personality where Hayden was more set to a schedule. Bailey had an organized, structured personality, but seemed to meld her schedule setting more efficiently with Logan. As with Bush, although there were differences, these individuals also exhibited similarities. All three women liked to engage students in activities and projects, and all
of them were enthusiastic about the set-up, implementation, and reflection of those activities and projects. This group of individuals at Carter High School participated in a partnership with comfortable interactions that required minimal amounts of unease to incorporate new ideas.

Ford High School had the teachers and engineering student who were most similar. Casey, Payton, and Taylor were all male and passionate about science content. All of them were enthusiasts for the outdoors and enjoyed chaperoning students in events outside of the classroom. Casey and Taylor previously worked as scientists in industry, and Payton interacted with scientists on a somewhat regular basis because of his grant work. I found the differences in these individuals in their method of approaching others. Casey liked to sit back and listen, ask for clarification, and then interact. Payton enjoyed jumping in right away with thoughts and ideas for discussion. Taylor was a combination of the two with a strong listening and interjecting side. They had a new partnership and participated in comfortable interactions like Carter High School.

I found some of the same patterns for partnership meanings in all of the cases. All three schools, Bush High School, Carter High School, and Ford High School had similarities and differences in creating partnership meanings. All of the individuals in the cases utilized four main areas. The grant lessons, created by the engineering students, were one of the main components of framing the partnership. However, Ford High School had the only category that was not found in the other two cases. The classroom projects were shown to frame the meaning of partnership for Ford. Both grant lessons and projects fell under the partnership product theme from Chapter 2. Also, they all applied incorporating engineering into their partnership meaning and increasing secondary student learning. These fell under the partnership theme of expectations in Chapter 2. Finally, I found communication in all three cases helped build
meanings of partnerships. The individuals focused on communication and thus the partnership relationship theme noted in Chapter 2.

Negotiations were limited for all the cases. The negotiations were mostly clarifications of grant expectations. However, once again for all three cases the emerging negotiations revolved around the grant lessons created by the engineering students. All three cases showed the partnership product theme though their grant lessons. Bush High School and Ford High School used time management as an area of negotiation. I found that only Bush High School used supplies and their use as a means of negotiating. Time and supplies fell into the expectations theme of partnerships (see Chapter 2). Bush and Carter focused some of their relationship on perspective and power while Bush did not. These same two schools, Bush and Carter, looked at decision making as an integral part of their interactions as well. Carter individuals built relationships through classroom communication while Ford individuals built their relationship through outside interactions that did not involve class time. Bush individuals did not focus on communication or communicate often, and this was the only case situated in a pre-partnership.

There were no conceptual changes regarding partnerships for any of the three cases. The beliefs that the individuals held at the beginning of the study were repeated at the end of the study. The individuals based partnership meanings on very definite categories. These viewpoints and actions of the individuals did not change from January through May. I found ways of negotiating, or compromising, in the areas of products and expectations most frequently.

These three cases were similar and at the same time, different. They each had school culture, personal experience, partnership meanings, and partnership negotiations that shaped their overall interactions. All three cases were participating in working relationships or parallel
play. Bush was situated in a pre-partnership while Carter and Ford were in new partnerships with emerging negotiations. In each case the grant itself suggested an externalized set of expectations on how the participants should work together. Therefore, I clarify that this was the focus of the grant and the teachers were upholding their end of the relationship. If these teachers were given different expectations, their meanings of partnership and negotiations in the partnership with the engineering students might be shaped differently.
Chapter Five: Conclusions and Continuations

The Bush, Carter, and Ford High School cases exemplify pre-partnership and partnerships respectively. They were all emerging in their own way. The little girl holding the cat and getting scratched illustrated an emerging partnership too. With time, the girl could understand how to interact more appropriately with the cat and avoid being hurt. Her perspective mattered. Likewise, my perspective in this partnership study mattered. As a researcher I had to embrace the fact that I am ensnared by what I know and how I think. Guba and Lincoln (2005) expressed the importance of viewpoints when they stated, “…Objectivity is a chimera: a mythological creature that never existed, save in the imaginations of those who believe that knowing can be separated from the knower” (p. 208). Using as unbiased a perspective as possible, I found that the partnerships for these cases had both similarities and dissimilarities. Yet, all were tied to the same partnership themes and core phenomena that I discovered. At the end of the study I again asked myself, “What was involved in the formation of a new partnership?” After analyzing the meaning of partnership, the negotiations conducted, and the conceptual changes made in each case, I provide the following insights.

The individuals with whom I worked focused first and foremost on grant lessons created by the engineering students as the focal point for meaning and negotiations. It appears that the teachers and graduate engineering students in new partnerships created their own meanings, expectations, goals, and agendas for the classroom while working with their partner(s). Then the teachers and graduate engineering students created methods of using the meanings, expectations, goals, and agendas. As mentioned above for the cases in general, the particulars of meanings,
expectations, goals and agendas were sometimes similar and sometimes disparate among the partners working together.

Overall, the cases were quite similar when I compared the expectations, goals, and agendas of each individual. The partnership meanings were similar for each case. This amount of similarity in their verbal statements was unexpected, and often mirrored the grant’s responsibility document. The act of negotiating and the demonstrated negotiations were emerging for Carter and Ford but nonexistent for Bush. Again, this level of similarity was not expected. I did not find conceptual change in the partnerships in any of the three cases. I was surprised by the lack of any change, especially since I began the study with focus groups in which the individuals talked explicitly about partnerships for over an hour. During the focus group, some of the individuals even noted that they would pay more attention to their partnership. During the final interviews, four participants mentioned thinking about partnerships more because of my study. In addition to my questions about partnership meanings, negotiations, and change, I found there were consistent partnership themes (see Chapter 2) found throughout the three cases that included perspective, decision-making, and products. I based this perceived lack of change on the emerging stage of the partnership relationship. I concluded that the lack of change may have been due to the fact that these were young, nascent, and not very evolved partnerships. In general, the relationships of the participants had not had time to form to a point of relaxed interaction. Because of the cases’ similarities, partnership meanings and negotiations only slightly impacted the cases. These meanings did not seem to influence the actions of the individuals. The actions should have been grounded in negations, but the individuals had limited negotiations. Therefore, the individuals did not change their routines for the duration of this
The participants appeared stuck in their limited processes, and they exhibited the same habits and were in a system of equilibrium. This system of equilibrium was associated with habitus (Bourdieu, 1977).

It was the relationships among the individuals that impacted the cases. There were notable differences in the relationships among the individuals at the different case sites. The three participants at Bush High School were polite and functioned well enough together in the classroom, but they did not engage in conversation inside or outside of the classroom. They engaged in a limited relationship where there were no true negotiations, and where activities revolved around the grant lessons. Carter High School participants were the most social, and interacted both in the classroom and outside of school hours. Their relationship was open and they were engaged, and their negotiations were stronger and their activities were expanded beyond the grant lessons. The individuals at Ford High School also interacted frequently on an academic and social level, both in and out of the classroom. They participated in a strong, mutually beneficial relationship. These relationships were crucial to the functioning of the partnership. I recognized that even though the expectations, goals, and agendas of the participants in the study were quite similar, each case study did not function in the same way. My recognition of the differences in functioning led me to search for the core phenomena that tied the cases together, as well as those which separated them.

Core Phenomenon of Grounded Theory

Core phenomenon was the central theme that highlighted the interactions in the relationships (Strauss & Corbin, 1990). A central concept emerged after I analyzed the focus groups, interviews, field notes, and emails from each case. By using the open, axial, and
selective coding of grounded theory, I was able to generate a core phenomenon for these cases. Habit was the single core phenomenon which both tied the cases together and separated them. It tied the cases together as similarities in partnership meaning and negotiations emerged. It separated the cases as each case was mired in its own routines revolving around relationships.

I found that these three cases were steeped in habit as seen through the partnership themes (see Chapter 2) of perspective, decision making, relationships, expectations, and products. These habits were based on the individuals’ habitus, or system of practice based on past experiences (Bourdieu, 1977). Although I found the term “habit” mentioned once in the literature, I found the term “change” often. In general, change was difficult to enact in partnerships (Mullinix, 2001), making habit the path of least resistance. I found that once the individuals in the cases developed expectations, worked in a certain way, or established a communication pattern, their actions were repeated throughout the study. I saw these repetitions in the participants’ words, focus group statements, interview descriptions, email exchanges, and actions.

The habit of the individuals in each case was an example of the automatic nature of the grant partnership. The participants functioned automatically to fulfill the grant duties. This was the unspoken message of the grant leaders. The participants were just responding to the requirements of the grant. The individuals in the case studies had only interacted for a short period of time in the partnership, and were following the directives given in the original grant responsibilities document. This was what they understood. In the short period of time during which the participants had been involved in the grant, they had been unsuccessful in building their relationship to a point where they would be able to engage in true negotiations or change.
Another constraint to building relationships was that the participants agreed to a one-year grant partnership. It is possible that by the end of the grant year, participants may have felt that additional investment in the partnership would be a waste of time and energy. The individuals held onto their initial conceptual framework for partnerships throughout the study, and they did not question this framework as it impacted them or others involved in the grant. To question personal beliefs and view different perspectives of partnership definitely requires some sort of relationship with other partnership participants. And it was the relationship between the participants that was emerging but not solidified.

Findings and a Return to the Literature

My revised definition of partnership includes the building of partner relationships. There was a call to define partnerships and explain their form and function. The literature pointed to vague partnership definitions and functions in educational settings (Clifford and Millar, 2008). I define partnership now, based loosely on Goodlad’s (1991) definition, as a planned, mutually beneficial, two or more party relationship which values differences; supports inquiry into practices to encourage change; expects dialogue on expectations/goals/agendas; clearly outlines products and timelines; and above all, builds relationships between its participants by focusing on communication, trust, community issues, context, and culture. This definition grounds the partnership in the relationship.

People actually create the concept of partnership. Partnership itself is an abstract idea enacted by participants through interaction. A partnership is comprised of people, and the relationship amongst the individuals was vital to the partnership’s success as they defined them. When I framed my study, relationship building should have been a focus of my questions instead
of the sub-sets of trust and commitment. This was a flaw in my initial framework and study setup. My study’s focus mirrored the business and educational models that were skewed towards products and process, and I missed the individual contribution in my study structure.

Although limited, the model I used was well grounded in literature. The business models, explained in Chapter 2, included communication, trust, and performance (or the creation of products) as the mainstays of partnerships. Educational partnerships shared many aspects of the business models, but trust was the main characteristic of the educational models. I found that communication, leadership, commitment, and mutual interest were also frequently mentioned in educational models. These categories appeared frequently in the data from Carter High School but seldom from the data at Bush High School.

I compare my study to Patterson, Michelli, and Pacheco’s (1999) detailed educational partnership research. The authors identified six elements for educational partnerships: mutual trust, honest communication, common goals, flexible governance, positive tensions, and a questioning culture. They continued and listed structural characteristics as well. The characteristics they noted that support partnerships included: projects, new roles, realistic expectations/perspectives, reward structures, and sharing opportunities. Although I originally based my study on a business model, I utilized some of the same concepts in my study, including: agendas, decision making, trust, goal setting, clear focus, personal commitment, leader commitment, financial support, and long-term organizational commitment.

All of the themes identified in Chapter 2, were relevant to the cases. The partnership themes included: perspective, negotiations, relationships, expectations, products, and change. Change was an important idea that ran through all the themes. Using these building blocks of
partnership, the three cases that I analyzed produced similar partnership themes for comparison. The three cases had varying degrees of these different themes. Overall, however, using my original partnership concepts, there was little difference between the cases. When I used the partnership themes, outlined in Chapter 2, I found more differences between the cases. Carter and Ford had stronger relationships and more decision-making negotiations than Bush. The products, or lessons, included higher quality activities at Carter and Ford compared to Bush. For all three cases, there was little evidence of conceptual change. It was this absence of change which led to the central theme of the study. The core phenomenon identified in the study was habit and its effect on partnership function.

In summary, the main goal of the NSF grant was to improve the communication skills of the engineering students. This goal led to many of the issues in the partnerships. For example, the relationships, which have been shown to be crucial for partnership development, were not mentioned or nurtured. The lessons were the main grant product and were the focus of the participants. The engineering students created the lessons with the teachers’ help, and then the engineering students would teach the lessons. Most often they would teach the lessons with the teacher watching, not co-teaching. This passive approach dramatically decreases the likelihood of the teachers using the lessons in the future. NSF needs an operational definition of partnership. Without a definition of partnership, competing issues emerge like how to achieve the main goal of the grant. With all the money that is being spent to encourage partnerships, NSF and other funding agencies should focus on generating successful structures through successful partnerships. This partnership impact on the individual level would infiltrate the levels of the conditional matrix (Chapter 3) where the school, school district, state, national, and eventually
international level would benefit. All of the benefits of partnership begin with the individuals’ relationships and examining habitus and the habits of individuals. The three cases examined do not focus on the relationships of the individuals, the habitus in place is not upset, and the habits shown are not questioned. This model for partnership will not have a lasting effect.

Implications

Partnership insights can permeate all aspects of partner interactions. In addition to the value of my study to partnerships (such as the ones with which I identified and worked), studies of the interactions and developing partnerships such as mine could also be valuable to other educational partnerships, such as teachers/students, students/students, and teachers/teachers. Groups such as these could benefit from greater attention in formulating and nurturing partnerships. Creating better partnerships by cultivating relationships and encouraging change, will take an audience beyond the participants at the schools. That audience will need to include the money holders, namely NSF and the universities that create the regulations of what a partnership should be and how it should function. Currently there is not an emphasis on the participant relationships, how these could be fostered, or why this concept is so important. The discussion about repeating social structures, by reinforcing habitus, and thus the habits of the participants needs to become a piece of the partnership question. This information can help partners, from all areas of the partnership, create better and more beneficial partnerships.

In my study, the core phenomenon of habit impacted the partnerships of the cases. It seems probable that if a graduate engineering student and/or a teacher had a firm internal meaning of partnership and related the expectations, goals, and agendas of their partnership to another participating individual, then this meaning should be carried throughout what was said,
enacted, and exchanged between the parties of the partnership in the context of the partnership. If these meanings between the two individuals were dissimilar or at odds, negotiations would take place. The negotiations would then lead to change. These concepts however, are dependent on the partnership relationship of the individuals, and the context and culture of their surrounding environments. The habit of automatically following a grant’s requirements can also be seen in other emerging partnerships. Those who design and oversee grants should take into consideration the habits, views, and perspectives of the participants involved so that negotiations can be fostered.

Partnership quality could be analyzed, although this was not the focus of my study. In addition to the individual differences in personality of the participants in this study, all aspects of the school and culture played a part in how the partnerships created products. Realizing that the relationships, context, and culture shaped the cases, I found that the created grant lessons reflected how similar or dissimilar the expectations, goals, and agendas were of the participants in each study. Another lesson learned was that about the strength of the relationships among participants. I evaluated the lessons on a rubric (Appendix G). Based on the lessons, made by the graduate engineering students and teachers, the partnership with the clearest expectation/goal match and strongest relationships, Carter High School, created the most innovative engineering lessons with the highest rubric scores. The individuals at Ford High School had a moderate definition correlation and a strong relationship, and they constructed only slightly less innovative lessons with scores very close to Carter High School. The individuals at Bush High school showed the least amount of match for expectations, goals, and agendas, had the weakest relationships, and prepared the least innovative lessons with the lowest scores.
Quality of products would be an important aspect for partnership leaders to analyze. A certain item itself is not as important as the production of that item. It is the process, or the relationship throughout the process, that matters to the longevity of the partnership. Why didn’t these teachers and engineering students engage in joint lesson planning? Modeling this behavior would benefit the participants. However, in my study, the quality of the product is related to how well-established the partnership is and how well the participants relate to one another. This quality trend was evidenced in the strength of presentations and support at the grant events by the three engineering students. During the open house for the grant, Bailey showed one of the innovative activities from her classes, and all of her teachers were there to support her. Casey demonstrated a less innovative activity and all of his teachers were there to support him. Alex presented an idea, but did not show an activity from the lesson. Two of his four teachers were there to support him. Again, leaders of partnerships should analyze not only products, but presentations, and the interactions of those presenting. These factors seem to indicate the stage of partnership and the quality of negotiations for the individuals. Quality products and events are important to grant leaders, but grant leaders should focus just as much on the partnership relationships to improve these products.

It was possible for participants to build sustainable partnerships following the study. Looking at the relationships of the individuals after the academic year ended, Bailey and Logan from Carter High School continued to partner without the grant requirements. Casey and Payton from Ford High School also continued to partner after the academic year ended. However, Alex, Dakota, and Emerson from Bush High School are no longer in contact with each other. Partnership leaders, from schools or universities, should look for relationships as a means to
sustain the partnership. The willingness of individuals to continue working on projects or grants, even after the official time frame is over, is an indication of the sustainability of the partnership.

In my study, the relationships of the individuals definitely impacted the partnerships. As shown in the literature review in Chapter 2, these cases were working relationships. They were not static. What this means for the participants building educational partnerships is a more directed focus on the relationship building of the individuals. For partnerships to grow into negotiating groups and for those groups to remain actively together, relationship building is crucial. For my participants, it seems that the expectations, goals, and agendas were important and drove the actions of the individuals, but the relationships of the individuals sustained the negotiations and the willingness of the individuals to negotiate. With true negotiations, I believe that individuals’ conceptual change about partnership would occur.

Leaders of partnerships should enact changes to accommodate building partnerships. One method would be to lighten grant language. To accomplish a more person-centered partnership, leaders could use less formal language and the language included could put value on relationship building and change. Instead of focusing on the products, a focus on the process of the relationship should come first. Teachers and university students and faculty could benefit from collaborative sessions where the partners create revised expectations, goals, and agendas. The expectations could revolve around “getting to know others,” the goal could focus on building relationships, and the agenda could include interaction amongst the participants regarding the processes and products of the partnership. An additional method would be to explicitly look for structural or cultural context barriers, which would hinder or prevent relationship building in partnerships. Teachers, university students, and faculty are busy people. They need time and
physical space for interaction. These two concepts do not always mix. How do busy people find the time to interact? This is an important notion that should be explored for the creation of true partnerships.

One person, a leader, could be the catalyst for the partnership. A catalyst increases the rate of reaction. The leader in a partnership, or leaders, should focus on relationship building and asking questions to enact changes where needed. The partnership group should decide on the areas of focus. The individuals in a partnership should focus on each other’s needs and strengths. In this study the teachers focused more on the engineering students then the engineering students did on the teachers. I found that the participants’ actions were skewed towards the grant needs. To circumvent this from happening, partnership leaders must be constantly vigilant about how the process is working and the ebb and flow of the interaction.

It is the interplay of the structure (expectations, goals, agenda, etc…) and the relationships that should be the measure of success of a partnership. The relationships are of the upmost importance to enacting negotiations. When negotiations are underway, individuals’ habitus can be challenged. Negotiations are crucial for dialogue that leads to change. Change is important to break the habits of automation in any partnership. Leaders can establish a culture of relationship building, questioning, and pushing individuals to more interconnected partnership levels. These true partnerships could enable real sustainability through quality products and processes.

Future Directions

There are still many unanswered questions in relation to new partnerships. More research, with specific attention to all realms of the new partnership would benefit the educational
community forming or involved in partnerships. From this study and beyond into future studies, I pose the following 12 questions: 1) What is the individual contribution to relationship building? How is this accomplished? 2) How does change occur amongst partners? What does the process look like? 3) Overall, would these same results be replicated at other schools or at the same schools with new individuals? 4) Centered on the individual, what factors could be the most important for trust and building relationships? 5) Would explicit dialogue about meanings, expectations, goals, agendas, and negotiations lead to changes in partnership formation and/or function? 6) How do partnerships affect teacher learning and/or scientist learning? 7) How do partnerships affect K-12 student learning? 8) Would different individuals or groups have similar results? 9) How does size affect the partnership relationship? 10) More globally, what is the impact of partnerships on school function? 11) How do partnerships affect organizational change? and 12) What needs to be accomplished in a partnership, and by what means should it be enacted?

These questions lead down other partnership roads that need exploration. As for my study, I am satisfied that I viewed partnerships in a way to determine meanings, negotiations, and conceptual changes. I am vested in helping use these new insights to help others (and myself) work in partnerships. This reminds me of my partnering experience with my son’s teacher. It was the coffee and questions in my son’s elementary school that began my journey into partnerships. I learned that business models leave out important aspects of the educational partnership building. I’m taken with the idea that the relationship of the individuals in the partnership can enact changes in meanings, negotiations, and concepts. The individuals with whom I interacted taught me to look at the person before looking at a function, process, or product, to get to the
heart of a partnership. This insight was the most powerful for me. I knew the power of people and the power of community, but now, that knowledge is even stronger. I look forward to making my priority connections with others, over the work that must be accomplished. I believe the work achieved will be easier and of a higher quality. This is my new concept of partnership, which includes at least two people working together, and supporting one another, to enact change and create useable products. Would anyone like to go have a cup of coffee?
References


Appendix A – Responsibilities of the grant’s constituents 09-10

ROLES AND RESPONSIBILITIES OF HIGH SCHOOL EDUCATOR

- _____ Commit to participate for the entire academic term 2009-2010
- _____ Commit to attend an orientation session in May/June 2009 and a planning session in August 2009, before the start of the school year
- _____ Commit to attend and participate in the Teaching with Technology Workshop in the Autumn/Winter 2009/2010
- _____ Commit to attend the UC Fellow Showcase (Autumn) and Open House (Spring)
- _____ Interact with a STEP Fellow over the summer, prior to the start of the school year, to foster the partnership and plan activities well in advance for the coming year
- _____ Commit to participate in biweekly meetings with all STEP teachers and their Fellow to discuss progress made and opportunities for common themes across classes, courses, and grade levels
- _____ The STEP Teacher Coordinator will organize the meetings and e-mail the minutes of the meetings to the grant coordinator with a copy to the Project Director (Lead PI)
- _____ Participate in a collaborative process for each lesson beginning with several brainstorming discussions in order to focus on specific topics; Fellows focus on linking their expertise to the standards and researching possible activities; presenting to the teacher several possible activity scenarios in which choices are made for the benefits of the students
- _____ Lead, along with university faculty members, the design, creation, and implementation of activities with Fellows. Activities include: 1) lesson plans that focus on a single, specific topic in one or two classes; 2) modules that focus on a coherent theme with activities lasting one to two weeks; 3) projects (or units) that are long term experiences made of groups of modules that extend over several courses and tie together lesson plans and modules in a coherent experience
- _____ During the academic year assist the Fellow to develop lesson plans and modules, and, if possible, projects
- _____ Activities must conform to the project’s STEMcinnati city” theme
- _____ Act as a mentor for the Fellows, providing direct teaching experience and application of “best” educational practices and methods
- _____ Allow open access to your classroom according to school guidelines
- _____ Allow and encourage Fellows to participate in classroom activities
- _____ Work jointly with a Fellow to deliver instruction as a team, modeling professional educator behaviors, realizing that the Fellow legally cannot be left alone to work with students during class
- _____ Participate in all STEP projects developed for your classroom, including implementation of student learning portfolios, which will follow students as they progress to the next year throughout their high school career
- _____ Commit to incorporate the lessons developed into your curriculum for the next 2 years
SECONDARY TEACHER AND UNIVERITY PARTNERSHIPS

• _____ Assist Fellows in collecting the necessary consent forms from students and parents for permission to participate in STEP. We are interested in obtaining, as close as possible, 100% participation
• _____ Complete and turn in assessment forms promptly as well as commit to attend 2 focus groups per year
• _____ Complete Fellow evaluations in a timely fashion
• _____ Assist in the evaluation of Fellows’ projects
• _____ Present the collaborative projects at professional conferences (if possible), or other venue (e.g., faculty meeting).
• _____ Disseminate STEP activities to other mathematics and science teachers within your building and in your district
• _____ Provide feedback to the Fellow about lesson development and implementation
• _____ Facilitate grant evaluation activities such as collection of student data, survey instruments, focus groups, and permission to participate in the project

ROLES AND RESPONSIBILITIES OF STEP GRADUATE FELLOWS
• Successful completion of coursework in Instructional Planning (Summer), Field Practicum I and II (Autumn and Winter, respectively), and Seminar Series (Spring)
• Work in the Family Science Academy and other Emerging Ethnic Engineering (E3) programs, as assigned, during Summer
• Participate in activities with the teachers attending the NSF Research Experiences for Teachers (RET), designed as part of the summer Instructional Planning course.
• Team-teach the “Teaching with Technology” workshop for STEP teachers in Autumn/Winter
• Organize and participate in the UC Fellow Showcase (Autumn) and the Open House (Spring)
• Spend an average of 10 hours/week in the school classrooms
• Attend all bi-weekly coordinator-teacher project meetings at the school
• Fall – spend first two weeks observing classroom activities in each classroom
• Remaining Autumn, Winter and Spring – work with teacher-faculty-Grant Coordinator team developing authentic activities. Activities include: 1) lesson plans that focus on a single, specific topic in one or two classes; 2) modules that focus on a coherent theme with activities lasting one to two weeks; 3) projects (or units) that are long term experiences made of groups of modules that extend over several courses and tie together lesson plans and modules into a coherent experience
• Develop lesson plans and modules during the academic year 2009-2010, and, if possible, projects. At least five activities must be implemented during the academic year. Full implementation includes posting of the activity on the project website and development of a display poster for it, both of which meet STEP requirements
• Assist in designing, creating, and implementing some authentic learning activities which incorporate and integrate social studies topics and issues into science and math teaching
• Discuss the activity with the content provider Principal Investigators (PIs) in the project team, prior to its full development, for technical content and fitness with the “STEMcinnati City” theme
• Get Grant Coordinator approval for format, content, and completeness prior to implementing an activity
• Develop at least one activity with the research advisor
• Invite research advisor for two visits to the school, one of which occurs when the aforementioned activity is implemented in the classroom
• Invite research advisor to one Winter/Spring Fellow Seminar Series to give a presentation.
• Produce annotated guides to help teachers use technology effectively and creatively
• Post all lessons and evaluation data on the project website following the project guidelines
• Prepare a personal Portfolio, which should be also put on the Project website after being approved by the Grant Coordinator. Fellow may be asked by the teacher to implement minor, of short duration, activities in the classroom for which assessment may not be done. These can be included in the Fellow’s Portfolio
• Attend assigned bi-weekly PI meetings (on rotation basis) and weekly Fellow meetings (common time)
• Attend bi-weekly meeting with the assigned STEP Faculty Mentor
• Participate in professional conferences and publications
• Acquire, complete, and turn in assessment instruments that support the grant goals in a timely fashion. In particular, work with the teachers in collecting consent forms from students and parents for permission to participate in STEP. We are interested in obtaining as close as possible 100% participation

FELLOWS DO
• Support, respect, cooperate, rely on each other, and communicate with other STEP Fellows by sharing and exchanging information
• Work closely with their teachers and encourage the teachers’ active involvement
• Keep appointments at scheduled work times
• Work to relate to other teams within their school and within the project
• Discuss concerns/problems/issues directly with the appropriate personnel at the earliest possible time to avoid misunderstandings and hard feelings
• Follow guidelines set forth by Project Step and support the goals of the Grant

FELLOWS DON’T
• Do personal work (on laptops, internet or otherwise) at STEP school sites during class time
• Serve as substitutes in the classrooms, as graders, or work alone on projects
• Skip college classes or research sessions to do STEP work
• Change forms or guidelines as set forth by Project STEP

ROLES AND RESPONSIBILITIES OF GRANT COORDINATOR
• Administer and implement the grant
• Coordinate STEP meetings; disseminate agenda and minutes of the meetings after PI approval
• Coordinate the monthly meetings with the STEP Teacher Coordinators
• Communicate between faculty, Fellows, and teachers
• Communicate expectations to Fellows and teachers
• Maintain a “Master Calendar” for the project and make all aware of it - keep it current
• Collaborate with the Evaluation Services to ensure the evaluation of the grant is progressing
• Collaborate with the IT Coordinator to ensure the development and progress of the website
• Teach summer course and academic year practicum and seminars for Fellows about teaching and working in the schools
• Ensure that Fellows are working productively and teachers are satisfied with their performance
• Visit schools periodically, provide assessment feedback on Fellow teaching, and videotaping Fellow teaching.
• Assist Fellows in completing tasks, including the UC Fellow Showcase, Open House, etc…
• Coordinate the Technology Workshop and Open House
• Coordinate meeting with the Project Oversight Committee (POC) before the Open House
• Explore strategies to disseminate STEP information at schools, university, media, and professional meetings
• Collect information for the Newsletters, edit it, and give for production to the IT Coordinator in a timely manner
• Develop and institutionalize processes for improving the work of the grant
• Prepare quarterly report on progress of Fellow towards his/her degree requirements
• Coordinate recruitment of Fellows
• Coordinate recruitment of teachers
• Assist in preparation of reports to NSF
• Coordinate following for RET (Research Experience from Teachers):
  o Recruitment of teachers
  o RET seminars, biweekly presentations, and final-day presentation
  o RET teacher seminars for STEP Fellows and teacher-Fellow interactive meetings
  o Review and distribution of RET teacher feedback

ROLES AND RESPONSIBILITIES OF GRAPHICS/WEB DEVELOPER
(IT COORDINATOR - GRADUATE ASSISTANT)

• Maintain and update the project website
• Support Fellows to get their professional quality and user friendly lessons on the web
• Be active in knowing the Fellow IT support needs and provide special training, if needed
• Coordinate completion and collection of Fellow weekly reports
• Update online application forms for Fellows and RET teachers and compile information for review of applications
• Coordinate online tracking of Fellows and teachers on an annual basis, and compile
  information for review by the Evaluation Coordinator
• Coordinate online feedback from RET teachers and its collection
• Create online form to collect quarterly progress report from research advisor for Fellow’s
  progress towards his/her degree requirements.
• Coordinate preparation/production and distribution/mailing of STEP brochures,
  dissemination materials, and Newsletters
• Provide IT support for RET Seminars, RET Final Presentations, UC Fellow Showcase,
  Technology Workshop, and Open House
• Attend all STEP PI meetings and STEP Fellow common time
• Work with the Evaluation Services in collecting and disseminating data

ROLES AND RESPONSIBILITIES OF EVALUATION SERVICES
• Coordinate and implement the evaluation of the NSF STEP grant
• Develop evaluation instruments, collect and analyze data, and report results
• Prepare annual report from the tracking surveys given by the IT Coordinator
• Participate in public dissemination of evaluation results through conference participation
  and journal publications
• Participate in meetings of Fellows, PI’s, other grant participants, and the NSF as needed
• Facilitate communication between the various participants—PI’s, Fellows, Teachers, and
  School Administrators regarding grant evaluation during the summer and next academic
  year
• Ensure that the Fellows are completing all evaluation activities in a complete and timely
  fashion
• Collaborate with the Grant Coordinator to ensure the implementation of the evaluation of
  the grant is progressing
• Engage in instructional planning summer course work taught by a science education
  professor
• Make satisfactory progress toward degree requirements in their parent Department
• Evaluation Services participates fully in the RET (Research Experience for Teachers)
  grant and responsibilities include all duties outlined above for STEP, but applied to RET

ROLES AND RESPONSIBILITIES UNIVERSITY OF CINCINNATI FACULTY
• Maintain and run the overall program
• Provide support and guidance for grant coordinator, evaluation services, and web
designer.
• Participate in the Fellows course and seminars
• Mentor Fellows by providing technical expertise and assuring that activities developed by
  Fellows are scientifically accurate
• Observe Fellow in the classroom at least twice during the academic school year
• Hold bi-weekly meetings with assigned Fellows
• Attend bi-weekly PI meetings
• Provide technical and scientific resources for developing activities
• Develop presentations and reports to NSF
• Publicize STEP and connect it with other programs
• Actively participate in disseminating Project STEP outcomes as conference presentations and publications, and journal articles
• Attend at least one Fellows meeting to discuss themselves and their area of research

**ROLES AND RESPONSIBILITIES OF FELLOW’S RESEARCH ADVISOR**

• Support Fellow’s participation in Project STEP
• Report quarterly progress of Fellow towards his/her degree requirements
• Develop at least one activity with the Fellow connected to the research being pursued by the Fellow
• Visit the school twice in a year at the invitation of the Fellow, one of which should occur when the aforementioned activity is implemented in the classroom by the Fellow, and complete an evaluation form of the lesson and its implementation
• Give a presentation to all the Fellows at the Teaching Seminar held during Winter or Spring Quarter
Appendix B – Mullinix’s (2001, p. 83) Partnership Development Continuum

<table>
<thead>
<tr>
<th>Partnership Development Continuum</th>
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<tbody>
<tr>
<td>Dimensions</td>
</tr>
<tr>
<td>pre-partnership</td>
</tr>
<tr>
<td>Focus of Interaction</td>
</tr>
<tr>
<td>Activities/ Projects/ Programs</td>
</tr>
<tr>
<td>Time and Orientation</td>
</tr>
<tr>
<td>Benefit</td>
</tr>
<tr>
<td>Trust and respect</td>
</tr>
<tr>
<td>Organizational Structures</td>
</tr>
<tr>
<td>Organizational Strategies and Information Access</td>
</tr>
<tr>
<td>Locus of Influence</td>
</tr>
<tr>
<td>Written Agreements or Contracts</td>
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</tbody>
</table>
Appendix C – Initial Focus Group Questions

1. For you, what is the meaning, or definition, of the word partnership?

2. What are your expectations of this grant’s school/university partnership?

3. How do you think the addition of someone in a classroom will change, or not change what happens in that classroom?

4. Describe how you spend your time working with your partner. How much time does that take?

5. Describe how you understand the focus of your partnership. Do you have goals that you are working on with your partner?

6. Do you feel that your partner respects you? Do you respect your partner? How do you know?

7. How do you think decisions are made in your partnership?

8. How do you and your partner prioritize your work (your agenda)?

9. How would you describe your commitment to the partnership?

10. Describe the communication pattern in your partnership (flow of information)?

11. Do the terms collaboration and partnership mean the same thing to you? Why or why not?
Appendix D – Final Focus Group Questions

1. Looking at the partnership definition developed by the teachers at the beginning of this research, what would you change about it? Why?

2. Looking at the partnership definition developed by the GE students at the beginning of this research, what would you change about it? Why?

3. What common definition of partnership would this combined group create?

4. What working negotiations were made during the partnership? Explain.

5. Did any of these factors play a part in your partnership:
   
a. common goals
b. trust and respect
c. shared decision-making
d. clear focus
e. feasible agenda
f. leader commitment
g. adequate financial support
h. long-term organizational commitment
i. information sharing, and/or
j. collaboration

6. Have your concepts of a “partnership” changed over the course of this year? How?

7. Do you consider yourself a partner to a teacher or GE student? Why or why not?
Appendix E - Interview Questions

There are three basic sections to this interview and it should take about an hour.

1. Describe your background in school and with jobs.

2. What is your favorite memory of school? Why?

Meaning of Partnership

I’m going to give you some examples of kinds of working relationships that people have, and I want to know if you think that they are partnerships or not. I’d also like you to think about when these cases would not be considered partnerships.

3. Would you consider your (student teaching) (co-op) a partnership? Why or why not?
   
   (When would it be/not be a partnership?)

4. Would you consider a law firm defending a client a partnership? Why or why not?
   
   (When would it be/not be a partnership?)

5. Would you consider Habitat for Humanity, Lowe’s, Schneider Electric, and Whirlpool a partnership? Why or why not?
   
   (When would it be/not be a partnership?)

6. Would you consider a coach and a player a partnership? Why or why not?
   
   (When would it be/not be a partnership?)

7. Would you consider a husband and wife a partnership? Why or why not?
   
   (When would it be/not be a partnership?)

8. What do you think about this picture as a partnership? Why? What would make each one a partnership or not? (Repeat question for each card. See attached card sheet for pictures.)

   (Follow up: What does circle represent? People/Organizations/Etc; Arrow?)
9. How would you draw a partnership? Draw a pattern of it and explain what you are drawing as you go.

10. Have you worked in a partnership before? How?

11. Describe the perfect partnership for a (teacher) (GE student).

12. What is the meaning, or definition, of the word “partnership?”

Negotiation of Work in and Conceptions of Partnership

13. What are your expectations of this grant’s school/university partnership?

14. How do you think the addition of someone in your classroom will change, or not change, what happens?

15. Describe how you spend your time working with your partner. How much time does that take?

16. Describe the focus of your partnership. Do you have goals that you are working on with your partner? Describe the goals you are working on.

17. Does your partner respect you? Do you respect your partner? How do you know?

18. How are decisions made in your partnership?

19. How do you and your partner prioritize your work (your agenda)?

20. Describe your commitment to the partnership.

21. Based on the previous pictures or your drawing, which one best describes your communication pattern (flow of information)?

22. Do the terms collaboration and partnership mean the same thing to you? Why or why not?
SECONDARY TEACHER AND UNIVERSITY PARTNERSHIPS

Card 1

Card 2

Card 3

Card 4

Card 5

Card 6

Card 7

Card 8
Appendix F – Field Note Questions

1. Who are the partners involved?

2. What/When/Where is this interaction happening?

3. Who is interacting with whom (initiating contact, what is the contact, etc…)?

4. How long do the partners interact with each other?

5. What is the setting/context?

6. Are there any concepts of partnerships shared?

7. Are there any working relationships or negotiations shared?

8. Other factors?
## Appendix G – Engineering Lesson Rubric

<table>
<thead>
<tr>
<th>Organization of Lesson Plan:</th>
<th>Excellent</th>
<th>Emerging</th>
<th>Struggling</th>
</tr>
</thead>
<tbody>
<tr>
<td>A, C, S Misconceptions Materials STEM Standards</td>
<td>- Information presented in an orderly sequence &lt;br&gt;Contains all 6: &lt;br&gt;- A (Application of Engineering) &lt;br&gt;- C (Career Connections) &lt;br&gt;- S (Societal Impact) &lt;br&gt;- STEM misconceptions &lt;br&gt;- Materials list &lt;br&gt;- STEM standards</td>
<td>- Information is often hard to follow &lt;br&gt;Contains 4 or 5: &lt;br&gt;- A (Application of Engineering) &lt;br&gt;- C (Career Connections) &lt;br&gt;- S (Societal Impact) &lt;br&gt;- STEM misconceptions &lt;br&gt;- Materials list &lt;br&gt;- STEM standards</td>
<td>- Neither structure nor sequence of information is presented &lt;br&gt;Contains 3 or less: &lt;br&gt;- A (Application of Engineering) &lt;br&gt;- C (Career Connections) &lt;br&gt;- S (Societal Impact) &lt;br&gt;- STEM misconceptions &lt;br&gt;- Materials list &lt;br&gt;- STEM standards</td>
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<tr>
<th>Objectives and Assessment</th>
<th>Excellent</th>
<th>Emerging</th>
<th>Struggling</th>
</tr>
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<tbody>
<tr>
<td>- Measurable objectives &lt;br&gt;- Clear connection of objectives, activities, and assessment</td>
<td>- Measurable objectives &lt;br&gt;- Unclear connection of objectives, activities, and assessment</td>
<td>- Non-measurable objectives &lt;br&gt;- No connection of objectives, activities, and assessment</td>
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<tr>
<th>Activities and Assessments:</th>
<th>Excellent</th>
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<th>Struggling</th>
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<tr>
<td>- Strong activity &lt;br&gt;Contains 4 or 5: &lt;br&gt;- Student interactions &lt;br&gt;- Student movement &lt;br&gt;- Student generated questions and answers &lt;br&gt;- Student critique of self &lt;br&gt;- Student critique of peer &lt;br&gt;- Clear engineering connection</td>
<td>- Moderate activity &lt;br&gt;Contains 2 or 3: &lt;br&gt;- Student interactions &lt;br&gt;- Student movement &lt;br&gt;- Student generated questions and answers &lt;br&gt;- Student critique of self &lt;br&gt;- Student critique of peer &lt;br&gt;- Moderate engineering connection</td>
<td>- Weak activity &lt;br&gt;Contains 0 or 1: &lt;br&gt;- Student interactions &lt;br&gt;- Student movement &lt;br&gt;- Student generated questions and answers &lt;br&gt;- Student critique of self &lt;br&gt;- Student critique of peer &lt;br&gt;- Weak or no engineering connection</td>
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<table>
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<tr>
<th>Question Strength</th>
<th>Excellent</th>
<th>Emerging</th>
<th>Struggling</th>
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<tbody>
<tr>
<td>- Strong essential questions using at 3 levels of Bloom’s taxonomy</td>
<td>- Moderate essential questions using at 2 levels of Bloom’s taxonomy</td>
<td>- Weak essential questions using 1 level of Bloom’s taxonomy</td>
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<table>
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<tr>
<th>Use of Catch and Review</th>
<th>Excellent</th>
<th>Emerging</th>
<th>Struggling</th>
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<tbody>
<tr>
<td>- Excellent catch for beginning (&lt; 5 minutes) &lt;br&gt;- Excellent review (&gt; 5 minutes) built in with essential question use</td>
<td>- Moderate catch for beginning (&lt; 5 minutes) &lt;br&gt;- Moderate review (&gt; 5 minutes) built in with essential question use</td>
<td>-- Weak catch for beginning (&gt;5 minutes) &lt;br&gt;- Weak review (&lt; 5 minutes) without essential question use</td>
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