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To the Graduate Council:

I am submitting herewith a dissertation written by Daniel W. Knight Jr entitled "A Phenomenological Investigation of the Experiences of Engineering Upperclassmen in a Team Facilitator Training Program." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Education.

Mark Hector, Major Professor

We have read this dissertation and recommend its acceptance:

Gary Klukken, Roger Parsons, Ronald Hopson

Accepted for the Council:
Dixie L. Thompson

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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And recommend its acceptance:

Gary Klukken_____

Roger Parsons_____

Ronald Hopson_____

Accepted for the Council
Dr. Anne Mayhew
Vice Provost and
Dean of Graduate Studies

(Original signatures are on file with official student records.)

A Phenomenological Investigation of the Experiences of Engineering Upperclassmen in a Team Facilitator Training Program

A Dissertation

Presented for the Doctor of Philosophy Degree

The University of Tennessee, Knoxville

Daniel Wilson Knight, Jr.

August 2003

DEDICATION

This dissertation is dedicated to my parents, Wilson and Martha Knight for their 34 years of love, help, and patience. Without their generous and unconditional support none of this would have been remotely possible.

ACKNOWLEDGEMENTS

I would like to acknowledge the contributions of several people to this dissertation. I want to thank Dr. Mark Hector, my dissertation chair and advisor for the numerous hours of consultation on the paper as well as the many drafts and transcripts we read through together over the years. I would like to thank Dr. Gary Klukken for his advice and friendship throughout the project. I would also like to thank Dr. Roger Parsons for his encouragement, trust, and more than generous support throughout my association with the College of Engineering. I would like to thank Dr. Ron Hopson for working diligently and faithfully on the project long after he had moved to another institution. Last, but certainly not least, I would like to thank Dr. Bruce Seidner for his many hours of listening and cajoling until at last, the dissertation was complete.

ABSTRACT

The purpose of this study is to describe the experiences of engineering upperclassmen in an engineering design team facilitator training program. Sixteen male and five female engineering students from a large southern university participated in 25 to 45 minute phenomenological interviews in which they were asked to talk about their experiences in a facilitator training program. The students ranged in age from 19 to 22.

Each student was asked to respond to the following statement, "What has been your experience of participating in the facilitator training program?" Interviews were audiotaped and transcribed. The transcripts were analyzed individually and in a group format using an existential/phenomenological method.

Data analysis revealed a thematic structure comprised of five themes: Teams, Facilitation, Learning, Evaluations, and Expectations. The theme of Teams was comprised of five sub-themes: Team Composition, Team Development, Team Differences, Feelings about the Team, and Team Reaction to the Facilitator. The theme of Facilitation was comprised of four sub-themes: Personal Qualities, Defining the Facilitator Role, Understanding the Team, and Intervening. The theme of Learning was comprised of four sub-themes: What I Learned, How I Learned It, Application of the Learning Outside of Class, and Learning by the Freshman Team. The theme of Evaluations was comprised of four sub-themes: Evaluations of the Class, Evaluations of the Facilitation, Evaluations of the Team's Functioning, and Evaluations by the Freshman Team. The theme of Expectations was comprised of the following four sub-themes:

Expectations About the Freshman Team, Expectations About the Class, Expectations About Engineering Students in General, and Expectations From the Freshman Team.

Relationships between the themes are explored. Research on facilitation, engineering education, and training program development is also discussed. There is also a discussion of the implications of these findings for training engineering design team facilitators, developing interdisciplinary programs, and conducting phenomenological research.

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CHAPTER ONE

INTRODUCTION

In the twenty-first century, post-industrial organization, it has become increasingly common for employees to work in interdisciplinary teams (Chapman & Martin, 1996). In this industrial environment, newly graduated engineers have been criticized for lacking teamwork skills (Newport & Elms, 1997). In response to industrial pressures, the Accreditation Board for Engineering and Technology (ABET), which accredits engineering programs, has revised its guidelines (ABET, 1996). The new standards include training in team skills as a necessary requirement for accreditation. The National Science Foundation (NSF) has also been involved in engineering education reform through grant support for innovative engineering curricula. One requirement for obtaining NSF support is to develop a program to train students in ". . . the ability to lead and work effectively as a member of a team" (NSF, 1997, p. 2).

To acquire accreditation, gain federal funding, and secure employment for their graduates, engineering faculty have taken steps to restructure their curricula to include teamwork skills as an educational goal (Byrd & Hudgins, 1995). Engineering students have been placed in teams to produce a variety of products ranging from research papers to design projects (Marchmen, 1998; Schmahl, 1998). Training efforts have been expanded to include skill in understanding and influencing team process as well. Engineering educators have incorporated principles from the Total Quality Management, cooperative learning, and team facilitation literatures for the purposes of improving skill

in working with team process (Hadgraft & Holicek, 1995; Mourtos, 1997; Seat, Poppen, Boone, & Parsons, 1996).

The present study is an investigation of one example of a new team process-oriented curriculum, a facilitator training program at the University of Tennessee. At this university, faculty from the College of Engineering have formed a working relationship with faculty from the College of Education to create an interdisciplinary training program to teach engineering upperclassmen team facilitation skills (Gilliam et al., 1998). This facilitator training program is different from previous facilitator programs in engineering education. Previous programs have been focused on training engineering students to facilitate voluntary study sessions scheduled outside of class. These study sessions typically support difficult subjects such as statics or advanced math (Haynes & Riordan, 1996; Murray, 1999). In the facilitator training program at the University of Tennessee, engineering upperclassmen are placed in an on-going classroom setting to facilitate working freshman design teams.

The design of the facilitator training program is similar to the structure of the traditional group practicum in counseling psychology (Conye, Wilson, & Ward, 1997; Corey, 2000). The program is implemented as a class during a semester. Facilitator training is accomplished through multiple methods of instruction. Each week, training takes place in three settings. In the first setting, the facilitators meet in a classroom environment to learn basic skills of group facilitation. In the second setting an applied training component is introduced. The facilitators are each placed with two engineering design teams and instructed to use their skills to facilitate the teamwork. The teams are

composed of freshmen in engineering that are enrolled in an engineering design class. In this class, teams are required to build a series of design projects. In the third setting of the facilitator training program, the facilitators are separated into small groups of six for group supervision meetings. These supervision groups meet with one of the instructors of the class to process events that have taken place in their freshman team meetings (Knight, Poppen, Parsons, Klukken, Seat, & Glore 1998).

Research on Team Process Skills Curricula in Engineering Education

Although programs to develop skill at working in teams have been increasing in engineering programs, there have been few attempts to study these programs. Often, only a theoretical framework for these new programs is provided. In other cases, anecdotal evidence is offered (Dutson, Todd, Magleby, & Sorensen, 1997). Most of the researchers who have studied the impact of a team process skills program have used quantitative methods such as course evaluation questionnaires and objective criteria such as grades, attendance, or program retention. Merritt, Murman, & Friedman (1997) used course evaluations to evaluate their freshman small group advising seminar. Howell (1996) found that introducing cooperative learning, problem solving groups into the class increased attendance. Murray (1999) used surveys to investigate a study group, facilitator training program. This researcher found that student-facilitators reported development in a number of categories including interpersonal communication skills, learning techniques, and non-verbal communication. Haynes and Riordan (1996) also investigated a study group, facilitator training program. These researchers found that two-thirds of the facilitators petitioned to have the class added to their transcript.

A few researchers have used qualitative methods to investigate team skills programs in engineering education. Tonso (1996) used qualitative, ethnographic techniques to investigate the process by which male and female students acquire knowledge and develop solutions in student design teams. Tonso used participant observations, in-depth interviews, and journal entries to generate a wide variety of data about design team process. Franz, Ferreira, and Thambiratman (1997) used focus groups and a qualitative method known as phenomenography to understand students' experiences of learning engineering coursework. Focus group members were videotaped and audiotaped discussing how they learned various engineering topics. The researchers analyzed transcriptions and videotapes to obtain a structure of the phenomenon. Quinn (1993) used qualitative methods to evaluate a team-oriented engineering curriculum. Data were gathered from student journal entries and structured interviews. The data were thematized and summarized, and comprehensive reports were prepared for the program faculty.

In summary, curricula designed to teach team process skills to engineering students have begun to proliferate, but any investigation of the impact of these curricula on students has been rare and mainly anecdotal. Most of those who have researched team process skills programs have used quantitative methods of investigation. A few researchers have used qualitative methods to investigate students' experiences of team skills programs.

The Present Study

The present study is a phenomenological investigation of the experiences of engineering upperclassmen in a design team facilitator training program. Phenomenological methods are used for the investigation of experience. Unstructured interviews and detailed analyses of written texts are used to develop a clear and thorough description of the experience of the facilitators.

The present study is expected to contribute to the literature on team process training in engineering education. One contribution would be the addition of the students' perspective on the new curricula. Many engineering colleges are engaged in extensive curriculum restructuring efforts. These efforts imply a number of expectations about the utility of these curriculum changes for engineering students. However, very few studies have investigated the perspective of the engineering student on curriculum reform.

This study will also complement the research methods used to investigate team process curricula in engineering education. Currently, anecdotal data and a few quantitative methods have been used to investigate new team curricula. A phenomenological investigation has the advantage of added rigor over anecdotal observations (Polkinghorne, 1989; Tonso, 1996). Phenomenological methods involve a different type of data than do quantitative studies. Quantitative researchers aim for precise specification of variables, prediction, and control in their studies. Phenomenological researchers seek a broader description and deeper understanding of the

research subject than quantitative researchers (Cook & Campbell, 1979; May, 1960; Polkinghorne, 1989).

A thorough description of the experience of the trainees is also an important tool for the development of a new training program (Patton, 1990). An in-depth understanding of the meaning of the experience for the trainees enables trainers to tailor their programs to the needs of their trainees. This type of understanding is especially important for the design team facilitator training program where a large quantity of research on facilitator training exists with little investigation of its application to engineering upperclassmen and engineering design teams.

Summary

Engineering educators have begun restructuring their curricula to include training in team skills. One such program is a design team facilitator training program for engineering upperclassmen taught at The University of Tennessee. In the past, investigators have frequently used anecdotal evidence or quantitative survey research to study their team skills programs. The present study is a qualitative, phenomenological investigation of the experiences of the facilitators in the facilitator training program.

CHAPTER TWO

LITERATURE REVIEW

During the twentieth century, the field of engineering education went through three periods of change: during the increase in mass production at the turn of the twentieth century, during World War II and the Cold War at mid-century, and at the Post-Cold War, post-industrial turning of the new century (Grayson, 1993; Prados, 1998). Changes in engineering education curricula, often called educational paradigm shifts, typically go through several stages. Changes in society and technology lead to changes in industrial practice. These industrial changes bring about a need for an expanded or alternative set of skills for practicing engineering. Industry, through control of hiring practices, and governing bodies, through control of accreditation and monetary grants, pressure engineering programs to revise their curricula to include new skills. Through research and practice, individual programs develop and implement plans for changes in curricula (Board on Engineering Education, 1995). The following literature review will provide an overview of the educational paradigm shifts in engineering education as well as a review of the emerging emphasis on teamwork curricula in the current post-industrial paradigm shift. Additionally, no distinction is made in this review between the terms group and team. This lack of distinction is common among reviewers of the literature on work teams who organize interdisciplinary research from the fields of business, education, and psychology (Conye, Wilson, & Ward, 1997; Guzzo & Shea, 1992; Schwarz, 1994).

The First Educational Paradigm Shift: Mass Production and the Development of Industry

At the turn of the twentieth century, methods of mass production transformed industrial practice. Standardized methods of production greatly increased the size, number, and output of industrial organizations. Industrial employers began to hire increasing numbers of engineering graduates to design and oversee construction of the newly mechanized industrial infrastructure and its products (Panel on Engineering Interactions With Society, 1986). These employers were usually looking for engineers with specialized sets of skills immediately applicable in that particular industry. In response, engineering schools diversified greatly and began to teach a specific type of engineering tailored to the industrial regions in which they were located. For example, a specialized curriculum in coal mining engineering was developed at West Virginia University. Worcester Free Institute developed a distinct form of training for working in the steel and iron industry (Grayson, 1993). Methods of training were focused in "the shop" where students learned mechanical principles and practiced engineering on industrial grade equipment (Panel on Engineering Interactions With Society, 1986). The emphasis was placed on turning out a practical, technically skilled, immediately useful graduate (Grayson, 1993).

The Second Educational Paradigm Shift: World War II and The Cold War

Changes in engineering education were primarily brought about and maintained by World War II and the Cold War (Bowman & Farr, 2000). In response to the war effort, the federal government replaced industry as the major driver of technological development (Prados, 1998). During World War II, the federal government created the

Office of Scientific Research and Development and, after the war, the Department of Defense. With these two initiatives, the federal government became responsible for a dramatic increase in funding for technological research and development (Panel on Engineering Interactions With Society, 1986). These government departments replaced older, market driven systems of development with government research funding in academic institutions, government agencies, and the military (Bowman & Farr, 2000).

In these academic, government, and military environments, newly graduated engineers often found themselves at an employment disadvantage. Their training in basic math, mechanical principles, and the trial and error training methods of the shop proved inadequate for the development of increasingly complex technology such as atomic energy and manned space flight (Beder, 1999).

Engineering institutions revised their curricula to respond to increased technological demands. Engineering programs shifted their curricula from a focus on practical, industry specific skills to a focus on scientific fundamentals. Courses in mechanical drawing and machine shop were replaced by advanced mathematics courses such as differential equations and engineering science courses such as control systems theory (Prados, 1998). Training in a mechanical shop environment was replaced with training in a laboratory environment (Grayson, 1993). Whereas the focus of the shop was to provide the engineering student with the mechanical skills to work with industrial equipment, the focus of the lab was to provide the skills to conduct scientific experimentation (Panel on Engineering Undergraduate Education, 1986). The

educational goal in engineering programs became the development of the necessary skills to function in industry, academe, or government as an applied scientist (Holt, 1995).

Engineering educators were successful in changing their curricula to meet the federal government's high-tech needs. By the end of World War II, the federal government was convinced that maintaining the health of the field of engineering was a matter of strategic national security. Toward the end of the Cold War Era, in 1980, 30% of all practicing engineers were employed in government jobs (Panel on Engineering Interactions With Society, 1986).

The Third Paradigm Shift: The Post-Industrial, Information Society

The end of the Cold War and the emergence of a post-industrial, information-based society at the end of the twentieth century led to another paradigm shift in engineering education (National Science Foundation, [NSF] 1997). The end of the Cold War brought about a substantial reduction in defense budgets and less government funding for technological development (Touma, 1999). Commercial industrial funding took precedence over government and defense funding for technological development (Chapman & Martin, 1996). Industry once again became the major employer of engineering graduates. The federal government reduced its role in engineering education, but still plays a part through grant programs.

The industrial work environment for the modern engineer is a much different type of organization than the one that dominated the early twentieth century. The changing demographics of the U.S. population and international competition have greatly increased the diversity of the workforce (Touma, 1999). Also, environmental concerns are now an

important part of any industrial project. Organizations must account for a much broader context in designing their products and improving technology (McIsaac & Morey, 1998). Information technology has brought about changes in industry as more and better information technology has led to a more informed and connected workforce (Chapman & Martin, 1996).

In the new industrial, work environment, organizations have been restructured into interdisciplinary self-managing teams. In this type of organization, team members are considered equally capable of participating in all levels of organizational decision-making (Chapman & Martin, 1996). These types of teams take advantage of the broad array of skills in a more educated, connected, and diverse population. The teams' interdisciplinary nature assists in solving the complicated problems associated with environmental context and international competition (McIsaac & Morey, 1998).

Pressures for curricula reform. In the new global, team based, industrial environment, engineering graduates are again being criticized for lacking in the skills to succeed (Newport & Elms, 1997). Industrial employers, the federal government, and engineering accreditation bodies are all pressuring engineering programs to change their curricula to include training in a number of new skills.

Industrial employers are not concerned about new engineers' skills as applied scientists. These graduates are typically rated above average in analytical skills, critical thinking, and the ability to focus on a problem (Beder, 1999; Holt, 1995). There is a general agreement that these scientific skills will continue to be useful to advance the field of engineering into the twenty-first century (Bordonga, 1998). The major criticism

from industrial employers is that the traditional training as a technically skilled, applied scientist is too narrow a foundation and comes at the expense of other professional skills needed to practice engineering.

Industrial employers have expressed concerns that training engineering graduates to extensively focus and analyze will leave them deficient in the ability to think holistically about the environmental context of their efforts (McIsaac & Morey, 1998). Other industrial employers have criticized current training efforts as lacking an emphasis on the consideration of the multiple values and customs inherent in a global, multi-cultural, working environment (Jennings, 1998; McIsaac & Morey, 1998). Finally, a number of employers are convinced that rigorous scientific training has come at the expense of training in interpersonal skills (Fletcher, 1997; Kean & Gibson, 1999; Newport & Elms, 1997; Todd, Sorensen, & Magleby, 1993). These researchers have documented employers concerns that engineering graduates will be lacking the political skills to make their point heard, the managerial skills to turn their ideas into reality, and the teamwork skills to negotiate and compromise with co-workers. For engineering educators, these criticisms and concerns from industry translate into pressure for curriculum change.

The federal government has also pressured engineering programs to change their curricula. Although the federal government has reduced its role in engineering education and employment since the Cold War, there is an on-going effort to influence engineering education through the efforts of The National Research Council (NRC) and The National Science Foundation (Board on Engineering Education, 1995). The NRC was developed

in 1916 for the purpose of advising the federal government on scientific and technological matters. In recent years, the NRC has been responsible for developing a series of reports for the purpose of identifying significant issues in engineering education and providing recommendations for change (Panel on Engineering Undergraduate Education, 1986; Panel on Engineering Interactions With Society, 1986; Commission on Behavioral and Social Sciences and Education, 1991; Board on Engineering Education, 1995). These reports have been highly influential in providing direction for curricula changes (Prados, 1998).

The National Science Foundation was created by the federal government in 1950 to promote scientific and engineering progress in the United States and to ensure a consistent supply of college graduates in these areas. In recent years, the NSF has pressured for change in engineering education through its provision of $170 million in grant awards to engineering programs deemed "innovative." Both the NRC and the NSF have expressed the same concerns as industrial employers about the skills of engineering graduates. The NSF instructions for grant proposals cite the need for ". . . skills in communication and persuasion, ability to lead and work effectively as a member of a team, understanding of the non-technical forces that profoundly affect engineering decisions, and a commitment to lifelong learning" (NSF, 1997, p. 2).

Engineering programs have been pressured to change their curricula by their own governing bodies. The field of engineering education regulates itself internally with its Accreditation Board for Engineering and Technology (ABET). ABET is a federation of 28 engineering societies who accredit 1500 engineering programs (Phillips, Peterson, &

Aberle, 2000). Graduation from an accredited engineering program is usually necessary to acquire a license to practice engineering. In 1996, ABET began pressuring for a change in engineering educational curricula by publishing new accreditation standards known as EC2000. Developed with the support of representatives from industry as well as NSF, EC2000 guidelines state that to receive accreditation, engineering programs must demonstrate that graduates have certain skills. These guidelines include the traditional emphasis on scientific and technical skills such as ". . . an ability to design and conduct experiments as well as to analyze and interpret data." The guidelines include a new range of skills as well, specifying ". . . an ability to communicate effectively" and ". . . an ability to function in multidisciplinary teams" (Phillips et al., 2000, p. 98).

Changes in engineering curricula. To acquire accreditation, gain federal funding, and secure employment for their graduates, engineering faculty have responded to criticisms and made a number of changes to include a wider range of professional skills in their curricula. Curricula changes can be classified in the following categories: (a) tailoring the curriculum to attract, retain, and educate a more diverse body of students, (b) integrating the curriculum to provide a unified rather than compartmentalized view of engineering science and practice, and (c) broadening the curriculum to include an emphasis on the additional professional skills needed to practice engineering (Board on Engineering Education, 1995).

In response to the multicultural nature of engineering practice in a global economic community, engineering educators have begun to consider student diversity as an important component in curriculum design (Ircha, 1999). The traditional format for

engineering courses emphasized a content-focused, “boot camp” curriculum. Difficult courses were offered with little faculty support in a style that tended toward a lecture, chalkboard, and engineering formulas. Part of the purpose of this type of course was to weed out uncommitted students. However, this type of curriculum has been found to weed out all types of students. By 1995, engineering programs were losing 35% of their students prior to graduation (Board on Engineering Education, 1995).

Engineering curricula has been revised to appeal to and educate a more diverse student body. Coursework has been developed to offer students opportunities to work in multinational projects (Marchman, 1998). Attention has been focused on the learning needs of women and minorities (Hermond, 1995; Tonso, 1996). Faculty are also beginning to take into account the variety in learning styles of engineering students (Eftekhar & Strong, 1998). Engineering educators are using Kolb’s (1984) learning style model and learning styles theory derived from the Myers-Briggs Type Indicator to design curricula to appeal to a diverse range of students (Holt, 1995; O’Brien, Bernhold, & Akroyd, 1998).

A second category of curricula change has been focused on greater program integration. Previously, engineering programs were heavily compartmentalized. Fundamental courses such as statics and dynamics were typically taught by different departments (Gilliam et al., 1998). After the first year, students were separated into different engineering disciplines such as chemical and electrical engineering (Beeckmans, 1996). Throughout the program, scientific studies and laboratory work were separated from practical training (Schmahl, 1998). Efforts have been made to offer a more

integrated curriculum. Engineering educators have combined diverse scientific courses such as physics and calculus into single courses (Hundhausen & Yeatts, 1995). Others are recommending a "general practice" undergraduate curriculum where disciplinary specialization is reserved for graduate work (Beeckmans, 1996). There has also been a movement toward integrating engineering science and practice through an expansion of the laboratory format (Schmahl, 1998). Efforts to expand the laboratory format have focused on integrating engineering design projects into the lab from the senior year down through the freshman year (Sheppard & Jenison, 1997). Engineering educators hope that an integrated curriculum will provide students with a more solid fundamental education as well as a better understanding of the relationship between engineering science and practice (Yoder, Parsons, Weber, & Pionke, 1998).

A third category of curricula change has been focused on broadening the curriculum to include a wider range of professional skills. Traditional engineering coursework has been oriented toward scientific training. Engineering educators are broadening the engineering curriculum to include coursework devoted to other professional skills. One area of focus is interpersonal skills training (Arms, Duerden, Green, Killingsworth, & Taylor, 1998). To develop interpersonal skills training, engineering faculty have begun to work in interdisciplinary partnerships with other university faculty in a diverse range of university departments including English, communications, education, law, architecture, and psychology (Albano & Salazar, 1998; Arms et al., 1998; Gilliam et al., 1998; Newell, Marchese, Ramachandran, Sukumaran, & Harvey, 1999; Ng, 1997).

Faculty engaged in these interdisciplinary partnerships have developed curricula to teach a range of interpersonal skills. Courses have been developed to teach students how to speak in public through rehearsing, videotaping, and offering feedback on student presentations (Gilliam et al., 1998). Students have been taught how to improve their writing skills by integrating poetry writing into the curriculum (Millan, 1996), and having students keep journals throughout the semester (Hawkins, Coney, & Bystrom, 1996). Students have learned management skills through the addition of Total Quality Management Principles to the curriculum (Hadgraft & Holecek, 1995). Finally, a number of courses have been developed to build skills in teamwork. Curricula development in the team skills area will receive an expanded focus in the following sections.

Teams in Engineering Education

Engineering educators have used two different strategies to include a focus on teams in their curricula. The first strategy is to place faculty and students into several different types of teams, and the second strategy is to focus on team process. Engineering faculty are more frequently being placed in interdisciplinary teams to design and implement curriculum changes (Gilliam et al., 1998). Team teaching of courses is becoming a popular strategy (Arms, 1994).

At the student level, a number of team structures have been introduced. Students are often separated into teams for educational activities. For example, Seat and Lord (1998) separated students into three person teams for the purposes of teaching interaction skills. Arms (1994) formed teams of students to teach a campus orientation course.

Aglan and Ali (1996) used a team structure to teach mechanical dissection skills to engineering students. Schmahl (1998) used teams in an engineering laboratory to research topics and develop lab exercises.

One of the most common types of engineering teams is the design team. In the field of engineering, design refers to the process of applying mathematics and engineering science to generate project specifications and produce physical objects (Sheppard & Jenison, 1997). In engineering programs, design is typically taught during the senior year, and, increasingly, during the freshman and sophomore years (Marchman, 1998; Sheppard & Jenison, 1997). Students are placed in design teams and assigned design projects. Freshman design teams often design models such as model bridges, stools, or chairs (Gilliam et al., 1998). In later years, projects become more complex. The University of Colorado has a sophomore course where students can design and patent their own products (Carlson, Sullivan, Poole, & Picket-May, 1999). The United States Military Academy has a course for seniors to design and build a solar powered racecar (Catalano & Tonso, 1996).

The second strategy to introduce teamwork into the engineering curriculum has been to focus on team process. The rationale for emphasizing team process is that experience with a variety of team structures is not adequate for either faculty or students to build the necessary team skills (Seat, Parsons, & Poppen 1999). Team process training is typically presented as a theory of group dynamics and a set of techniques to help teams work together to achieve their goals (Seat & Lord, 1998). Three types of team process

training have been used in engineering education: Total Quality Management, cooperative learning, and team facilitation.

One type of team process training incorporates principles from Total Quality Management (TQM) into the engineering curriculum (Hadgraft & Holicek, 1995). W. Edwards Demming developed TQM for use in a team environment after World War II. TQM became a popular method of team process training after the successes of the Japanese who used TQM principles to rebuild their postwar economy (Jensen & Robinson, 1995). During the 1990's, faculty and administrators began to use TQM principles in educational institutions (Shelnutt & Buch, 1996). The TQM framework is constructed around the idea that every aspect of the organization is constantly improved until it is performing at a high level of quality. Organizations employing TQM use teams to implement the theory. TQM has been used in engineering faculty teams for strategic planning and curriculum reform (Shelnutt & Buch, 1996). TQM has also been used to develop student engineering design teams (Newell et al., 1999). Researchers investigating the use of TQM in engineering education have found that this approach can improve communication skills, relationships between instructors and students, and the quality of the final product (Newell et al., 1999; Rust, Hamouda, Hewitt, Shelnutt, & Johnson, 1995).

A second type of engineering team process training is based on the theory of cooperative learning. Pioneered by Johnson and Johnson (1989) and Kagan (1994), cooperative learning is ". . . the instructional use of small groups so that students work together to maximize their own and each others' learning" (Smith, 1995, p. 13).

Cooperative learning instructors use structured exercises to ensure that all team members cooperate to complete a task. Another cooperative learning technique is group accountability where each member is equally accountable for the final outcome (Smith, 1995). Cooperative learning techniques have been used in engineering study workshops to prepare students for tests (Haynes & Riordan, 1996). These techniques have also been used in engineering design projects and lecture courses (Mourtos, 1997). Researchers who have investigated cooperative learning techniques have found that this approach can improve students' ability to interact with others and take defined roles within a group (Johnson, Maruyama, Johnson, Nelson, & Skon, 1981; Kagan, 1994).

A third type of engineering team process training adopts theory and technique from the group facilitation literature. One early pioneer in the area of group facilitation was Carl Rogers. Rogers (1970) developed the role of the facilitator as an alternative to the traditional group leader role. From this perspective, a facilitator is less directive and more process-focused than a leader. The facilitator is responsible for setting up a climate of respect, listening, and connection in the group. The facilitator assumes that group members will set their own goals. Rogers' facilitator role was adopted by business and industry. In 1991, the Association for Specialists in Group Work revised its standards to add a specialization in working with task and work groups (Conye, Wilson, & Ward, 1997).

Schwarz (1994, p. 276) provided a definition of work team facilitation. He describes facilitation as, ". . . a process in which a person who is acceptable to all members of the group, substantively neutral, and has no decision-making authority

intervenes to help a group improve the way it identifies and solves problems and makes decisions, in order to increase the group's effectiveness." Working from a position of neutrality, with no accountability for the final product, the main advantage of having a work team facilitator is that he or she is free to focus on team process (Schwarz, 1994).

At the Queensland University of Technology in Australia, facilitator training is included as part of a peer mentoring program for engineering upperclassmen. Peer mentors are trained to facilitate voluntary, extra-course study groups in engineering statics (Murray, 1999). Peer mentors are trained prior to the semester and at mid-term in facilitation skills. Using survey research, Murray found that facilitated group members improved their grades each year they participated in the groups, particularly among students who had lower high school grades. Peer mentors also reported personal skill improvement in a number of interpersonal skills.

At the University of Missouri-Rolla, student-facilitators have been trained to facilitate extra-course, cooperative learning workshops for lower division math and science courses (Haynes & Riordan, 1996). Facilitators receive training prior to the semester and during one hour per week sessions with speech communication and university counseling center staff. These researchers report that the workshops' participants had higher grades and were more often retained in engineering than those who did not participate. These researchers infer facilitator enthusiasm for the program from the fact that two-thirds of the facilitators petitioned to have the workshop added to their transcripts.

At the University of Tennessee, student facilitators have been used in freshman and senior engineering design courses to facilitate engineering design projects such as a model tractor or a new tent design for the U.S. Army. This program is the result of an interdisciplinary partnership between faculty in the College of Education and faculty in the College of Engineering (Seat et al., 1996). Initially, the program participants were graduate students in counseling and seniors in engineering design courses. The graduate students in counseling would meet weekly with engineering seniors in design teams to work on team interpersonal skills and the organization of the design project.

Researchers investigated the program by administering a pre-semester and post-semester measure of team cooperation and satisfaction to members of facilitated and unfacilitated teams. All teams reported high team cooperation and satisfaction at the beginning of the semester. Facilitated teams maintained this high level throughout the semester. On the post-test, unfacilitated teams reported significantly lower scores on team cooperation and satisfaction than on the pre-test. (Knight, Poppen, Klukken, Parsons, & Seat, 1998).

These successful results with the senior design teams led to an expansion of the facilitator program by recruiting engineering upperclassmen to be trained as facilitators of freshman design teams (Gilliam et al., 1998). An overview of the design of the expanded portion of the facilitator training program is presented in the following section.

Design of the Facilitator Training Program

There are three separate groups involved in the facilitator training program. First, there are students who are trained as team facilitators, and they are referred to as

facilitators. Second, the people who taught the facilitator training class are referred to as instructors and also as group supervisors. Those students who received facilitation are referred to as the freshman team members.

The facilitator training program is offered as a semester-long class for engineering upperclassmen through the Department of Counseling, Deafness, and Human Services in the College of Education. The course taken by the facilitators is offered for three hours of engineering program credit as a humanities and social sciences elective, and is taught by the instructors. Facilitator training is conducted across 16 weeks using both engineering and education instructors. Each week, training takes place in three phases. During phase one of the training, facilitators receive instruction on the theory and technique of facilitation. During phase two of the training, facilitators apply their skills with two freshman design teams. In phase three of the training, facilitators are separated into groups of six facilitators to receive group supervision from one of the course instructors. These three phases are described in greater detail in the following sections.

Phase one of the facilitator training program. During the first phase of the training, instructors use a variety of methods to teach four basic team facilitation skills. The facilitators participated for one hour each week in lecture, discussion, simulations, and role plays designed to teach facilitation skills (Harvill, Masson, & Jacobs, 1983). This method of instruction is based on a microskills approach and is focused on the development of very specific, basic skills through the use of didactic, observational and experiential components (Toth & Stockton, 1996; Toth, Stockton, & Erwin, 1998). The instructors teach the following four skills to the facilitators: observing the team process,

building a cohesive team, organizing team meetings and projects, and regulating team participation.

Schwarz (1994) discussed the first skill, observing the team process. The facilitators were taught to observe critical events in their teams and to diagnose the importance of these events for team functioning (Schwarz, 1994). To supplement the observation and diagnosis process, the facilitators were taught a model of group dynamics. Robison, Jones, and Berglund (1996) discuss the importance of providing a model of group dynamics for beginning facilitators. These researchers argue that prior to learning how to intervene in groups, facilitators must have the conceptual knowledge to understand the dynamics of group process. The facilitators learned a model of group dynamics developed by Bales (1988). Facilitators were instructed on components of this model including common group roles, levels of group cohesion, and a variety of possible relationships between group members.

Fujishin (1997) discussed the second skill, building a cohesive team. Cohesion can be defined as ". . . the attraction and connection of group members to one another and to the group" (Fujishin, 1997, p. 126). To help teams become more cohesive, facilitators learned skills to enhance team communication and better resolve team conflict. Communications training was focused on specifying behaviors that clarify or interfere with communication (Seat & Lord, 1998).

Schwarz (1994) discussed the third facilitation skill, organizing team meetings and projects. Facilitators were taught skills for beginning and ending meetings, developing agendas and goals, and developing team ground rules. Facilitators were

taught general problem solving techniques to help the freshman teams brainstorm solutions and evaluate alternatives for their design projects (Schwarz, 1994).

Harvill, Masson, and Jacobs (1983) discussed the fourth skill, regulating team participation. These researchers state that some group members will dominate the discussion while others will not participate in meetings or will not show up at all. Facilitators were given training on techniques to regulate participation by drawing out quiet members, blocking excessively verbal ones, and refocusing the discussion from one member to another (Harvill, Masson, & Jacobs, 1983). Facilitators were instructed to check on team members who were frequently absent to diagnose and intervene on any participation problems at an early stage.

Phase two of the facilitator training program. The goal of phase two of the training is for the facilitators to learn to transfer their facilitation skills to an applied team setting. Robison et al. (1996) stated that incorporating an experiential component into a group leader training program is one of the keys to successful skill development. To accomplish this goal, engineering upperclassmen serve as facilitators of two freshman engineering design teams. These freshman teams are composed of five students who are enrolled in a required course for all freshmen in engineering. In this class, the freshman are separated into teams and assigned a series of projects designed to teach engineering design skills. For example, the goal of one project is to design, build, and test a rubber-band powered tractor. At the end of the project, these groups compete against each other in a contest known as “The Tractor Pull.” Performance is based on the distance traveled, the weight lifted by the tractor, and the cost of building materials. The freshman teams

are also responsible for writing reports and providing computer generated graphics of their designs (Gilliam et al., 1998).

Each facilitator meets with his or her freshman team for one hour per week. During the freshman team meetings, facilitators are instructed to use the facilitation skills learned in phase one of the training to improve the team process. Schwarz (1994) defines team process as the way group members are working together rather than what they are working on. With a process focus, facilitators can avoid becoming involved in the content and goals of the project (Conye, Wilson, & Ward, 1997). To maintain a neutral position on team goals, facilitators are instructed to avoid providing technical advice. Also, the facilitators inform the freshman teams that they will have no input on freshman team project grades. Rather, the facilitators are to use their observation skills and model of group dynamics to diagnose problems in the team process, build group cohesion, provide organizational structure for the team, and/or regulate team participation.

Phase three of the facilitator training program. During the third phase of facilitator training, the facilitators meet for one hour with a group of their peers. Each of these groups is composed of four to six engineering upperclassmen facilitators and led by one of the instructors of the facilitator training program. To distinguish this phase of training from the previous two phases, the instructors of these small groups are called supervisors and meeting in these groups is called group supervision.

Group supervision has two objectives. One objective is to offer an opportunity for the facilitators to process their most recent meetings with the freshman teams. The opportunity to process and clarify facilitation experiences has been found to provide

trainees with a better understanding of similar situations in which they might find themselves in the future (DeLucia, Bowman, & Bowman, 1989). In group supervision, each facilitator is offered an opportunity to talk about their freshman teams while other facilitators and the supervisor work to draw out as much information as possible, clarify emotions and thoughts, share similar situations in which they were involved, and piece together critical incidents into a diagnosis.

The second objective of group supervision is to offer an opportunity for facilitators to make a plan for applying their facilitation skills in specific situations. Here, group supervision serves as an adjunct to phase one, classroom training. The supervisor and others in the supervision group help a facilitator translate theory and basic facilitation techniques into an intervention directed at his or her specific freshman team (Tollerud, Holling, & Dustin, 1992).

Summary

Responding to changes in industry and society, faculty and administrators in the field of engineering education reformed their curricula three times in the twentieth century. The first change in curricula was in the early part of the century when methods of mass production transformed industrial practice. Another change in curricula came at mid-century when World War II and the Cold War led to a large increase in government funding of technological development. The most recent change in curricula was at the turning of the twenty-first century when the end of the Cold War brought about a resurgence of industry as the major employer of engineering graduates.

In the new global, team based, industrial environment, engineering graduates are again being criticized as lacking in the skills to succeed. Industrial employers have expressed concerns that engineering educators have placed too much emphasis on scientific and technical skills at the expense of other professional skills necessary to practice as an engineer. Employers have suggested that engineering graduates need more skill at working interpersonally in teams and with an increasingly diverse workforce.

Engineering faculty have responded to criticisms and made a number of changes to include a wider range of professional skills in their curricula. Engineering curricula has been revised to appeal to and educate a more diverse student body. A second category of curricula change has been focused on greater program integration. Engineering educators have also broadened curricula to include a wider range of professional skills.

Team skills training is one area of emphasis in the newly broadened curricula. Engineering educators have used two different strategies to include a focus on teams in their curricula. One strategy has been to introduce a wide variety of team structures. One of the most common structures is the design team that has most recently been introduced into the freshman curricula. The second strategy to include teamwork into the engineering curriculum has been to focus on team process. Educators have been teaching a process focus by incorporating principles from Total Quality Management, cooperative learning, and team facilitation into the engineering curricula.

Training in team facilitation is becoming a more popular form of team process training in engineering education. One example of a team facilitation program is found at

the University of Tennessee where student facilitators have been trained to facilitate engineering design teams. The facilitator training program is offered as a semester long class for engineering upperclassmen through the Department of Counseling, Deafness, and Human Services in the College of Education. During the first phase of the training, instructors use a variety of methods to teach four basic team facilitation skills. In the second phase of the training program, the facilitators learn to apply the facilitation skills that they have learned with freshman design teams. During the third phase of facilitator training, the facilitators meet in group supervision for one hour with a group of their peers and a course instructor.

CHAPTER THREE

METHOD

As in most empirical studies, there are two main sections. These are data collection and data analysis.

Data Collection

Data collection in the present study was carried out in a three-step process. In the first step, the primary investigator (PI) participated in a bracketing interview. In the next step, the PI selected the participants for the study. The PI conducted phenomenological interviews with these research participants.

The bracketing interview. For the purposes of the present study, the primary researcher engaged in a self-reflective method known as the bracketing interview (Polkinghorne, 1989; Pollio, Henley, & Thompson, 1997). In this interview, the PI was interviewed regarding his own experience in the team facilitator training program. This interview was taped, transcribed, and analyzed by the PI and by members of a phenomenological research group. This analysis provided the PI and the members of the phenomenology research group with an understanding of the PI's perspective on the program prior to the data collection process. The goal of this type of analysis was to approach the topic with an enhanced awareness of the PI's own expectations and biases about the phenomenon under investigation. The PI and phenomenology group members used this awareness to guard against the imposition of the researcher's expectations onto the analysis of the data. The PI attempted to bracket out his pre-conceptions and remain more open to the participants' own experiences.

Research participant selection. The participants selected for the study were 21 engineering upperclassmen enrolled in a team facilitator training program. According to Polkinghorne (1989), the criteria for the selection of research participants is that they have had the experience under investigation and are sufficiently articulate to describe the experience. All 21 of the engineering upperclassmen in the facilitator program met these criteria. An interview was assigned to the students in the facilitator program as the final requirement for the class. Participants signed up for interview times during the week of final examinations. Sixteen males and five females were interviewed. Ages ranged from 19 to 22. All participants were Caucasian.

Interviewing. A second interviewer (SI) was recruited to reduce any biases in reported experiences associated with having one of the course instructors as an interviewer. The SI was a Ph. D. level counseling psychologist who had been trained in the phenomenological methodology. Participants were assigned to the PI or the SI based on the order in which participants signed up and the availability of the SI. The PI interviewed thirteen participants and the SI interviewed eight participants. Interviews were conducted individually in the PI's office or the course classroom.

Prior to interviewing, research participants read and signed an informed consent form (Appendix A). The participants were informed that although an interview was a required part of the class, it was their choice as to whether to include the interview in the study. Participants were also informed that their interviews would not affect their grade in the class. To reinforce this point, the PI recorded their final grade prior to beginning

the interview. Participants were instructed that they could talk about any part of their experience of the facilitator training program for as long as they wanted.

The participants were also informed that steps would be included in the analysis of the data to protect their identity. These steps included not using any names during the interview process, omitting identifying information from the transcribed text, and having the transcriptionist sign a pledge of confidentiality.

Colaizzi (1978) stated that initial phenomenological interview questions should be oriented toward tapping the full experience of the participants. The question, "What has been your experience of participating in the facilitator training program?" was chosen to fully explore participants' experiences in the facilitator training program. Following this initial question, the interview followed a format structured by the participant's descriptions. Participants were encouraged to talk about whatever aspects of the experience stood out to them (Kvale, 1983). All subsequent questions by the interviewers instructed the participants to elaborate, clarify, or add detail to a description of the experience. To focus on specific instances of the experiences, the interviewers would prompt the participants in the following manner, "Focus on a specific time in the program and tell me about that time." These types of prompts helped the participants to avoid interpretations of experience and theoretical analysis (Pollio et al., 1997). The interview proceeded until the participant decided that nothing else about the experience stood out for them. The 21 interviews averaged about 35 minutes in length.

Data Analysis

In a phenomenological study, the data analysis process is known as explication (Von Eckartsberg, 1998). To explicate the data, the PI's goal was to produce an accurate description of the structure of the experience of participating in the facilitator training program. The PI developed a description of the experience by analyzing the collected data both individually and within a group format. The PI analyzed the data via the following four steps (Pollio et al. 1997): transcription of the data, individual analysis of the transcripts, group analysis of the transcripts, and the development of a description of the structure of the experience.

Transcription of the data. The first step in the data analysis process was to hire a transcriptionist to transcribe the taped interviews into verbatim texts. Upon receiving the texts from the transcriptionist the primary researcher checked them against the original tapes to make any needed corrections in accuracy. The transcripts that were produced were as close to verbatim as possible. Incorrect grammatical usage, for example, was not corrected from the tape to the transcript. To ensure the anonymity of the participants' material, a written pledge of confidentiality was obtained from the transcriptionist (Appendix B).

Individual analysis of the transcripts. The primary researcher analyzed the data with an interpretive procedure known as the hermeneutic circle. Data analysis via the hermeneutic circle involved a continuous process of relating the separate parts of the text to the whole (Colaizzi, 1978; Polkinghorne, 1989; Pollio et al., 1997). Based on the work of these researchers, the PI used five steps to complete the hermeneutic circle.

First, each transcript was read through to get a general understanding of its content. The idea of reading the text as a whole is an extension of the phenomenological concept of figure/ground. Certain components of the phenomenon under investigation are described as standing out (figural), against other components that recede into the background (ground). By developing a sense of the entire transcript, the PI had a better background or context for analyzing the separate parts of the text (Polkinghorne, 1989).

Second, the transcript was read through again and analyzed in separate parts. The PI divided the transcript into parts based on participant speaking turns. A speaking turn represented the time from which a participant started speaking until the time he or she stopped and the interviewer began speaking. Statements that captured the meaning of each speaking turn were written in the margins of the transcript. After all the speaking turns were analyzed, the PI made a list of the significant statements from each speaking turn.

In the third step, the researcher developed themes from the list of individual statements. A theme is an organizational term used to describe a pattern of similarity that appears across various situations in the text. Thus, a number of the individual statements describing a participant's speaking turns were similar and could be clustered to form a theme. Some themes were related in such a way as to be subsumed within a larger theme and could be termed sub-themes. In identifying themes, care was taken to use words found only in the transcripts. Using the participant's own words ensured that themes were closely related to the participant's experiences (Pollio et al., 1997).

With themes developed from each transcript, the fourth step was to cluster themes together into global themes that covered all of the texts. Global themes are similar to individual themes in that they describe a pattern of similarity across situations. However, global themes describe a pattern of similarity across texts rather than within an individual text (Pollio et al., 1997). The PI identified global themes by making a list of all the themes from each interview and looking for similarities in this list. The purpose of using multiple texts from a number of participants was to increase the range of perspectives on the phenomenon and provide a more complex and broader description of the experience (Polkinghorne, 1989). Finally, in the fifth step, the PI read through each text again to determine if the global themes fully described participants' experiences. A copy of one of the transcripts is provided in Appendix C.

Group analysis of the transcripts. Portions of all the transcripts were presented in a phenomenology research group. The rationale for including a group in the analysis of transcripts is similar to the rationale for using multiple research participants to describe the phenomenon. The research group members offered multiple perspectives on the transcripts that produced a more detailed description of the experience. In addition, the group aided the researcher in bracketing his expectations regarding the data. Group members often took a critical stance toward data analysis to make sure that any thematic explication took into account the words of the text and the experience of the participant (Pollio et al., 1997).

The phenomenology research group used for this study meets weekly and is composed of graduate students and a professor. Within this group, data analysis followed

several steps. Segments of the text were read aloud, with one person taking the part of the interviewer and the other taking the part of the participant. Each segment was discussed with respect to the significant statements and themes that described that segment. The process continued on in this way until the entire text was read. Finally, the PI would provide a summary of the themes for that transcript.

Description of the structure of the experience. After the themes were identified, a structural diagram was developed to portray each theme and its interrelationships with other themes. The main goal of this diagram is a visual illustration that provides an additional clarity of understanding over a verbal description (Polkinghorne, 1991). The diagram is presented in a figure/ground format. The terms figure and ground are representative of the types of relationships between the themes of an experience (Valle, King, & Halling, 1989). In phenomenological research, a figure is a theme that stands out in comparison to other themes. In contrast, a ground is a theme that provides a context for other themes to emerge against (Pollio et al., 1997). In a description of a phenomenological experience, a theme can be both figure and ground depending on one's perspective. To develop the structural diagram, the theme that was chosen as the ground was the one that placed the other themes in the sharpest relief (Polkinghorne, 1991).

Following the development of the structural diagram of the experience, the diagram was presented to the phenomenology research group to provide additional perspective on the experience under investigation. The group members were invited to discuss, challenge, or substantiate the description of the experience and organization of the structure.

The final step was to develop a written description of themes and sub-themes with written quotes from the transcripts added as support (Pollio et al., 1997). To identify supporting quotes, the PI read back through the transcripts again. The PI highlighted quotes, choosing a different-colored magic marker to highlight statements associated with each theme. When writing up the descriptions of the themes, the PI sorted through the transcripts for the appropriate matching colors.

CHAPTER FOUR

RESULTS

The results are contained in this chapter. The first part of the chapter contains the results of the bracketing interview, and the second part of the chapter contains a thematic analysis of the team facilitators' transcripts. The third part of the chapter contains a presentation of the differences found between the transcripts.

All three sections of the chapter are characterized by themes that were identified in the transcripts. In each section, an overview of the themes is presented followed by more in-depth descriptions of the themes. There are three separate groups involved in the description of the themes. These groups will be referred to as follows: the students who are trained as team facilitators are referred to as students and facilitators, the people who taught the class are referred to as instructors and group supervisors depending on what component of the training program is being described, and those students who received facilitation are refereed to as the freshman teams and team members.

The themes are described and supported by quotes from the research participants. Each quote is single-spaced and indented within the text. These are direct quotes with no effort made to correct grammar. When only a portion of a sentence was used, this portion is introduced or closed with ellipsis points. Names that would identify specific people associated with the program have been removed and replaced with generic identifiers in parentheses such as Instructor, Team Member, or Facilitator. There was no particular order to themes as detected in the transcripts. Different themes became figural to different participants across a range of situations and times. Also, it is

important to remember that although the themes are presented separately, they are interrelated. In reading quotes selected to support a theme, one could find elements of other themes within the same sentence or paragraph of the transcript.

The bracketing interview consists of a description of the primary investigator's (PI) own experience of the team facilitator training program. Themes that emerged from the bracketing interview were as follows: Program Development, Expectations, Teaching, Facilitation, and Evaluations. The theme of Program Development can serve as the background for the description. Descriptions of the other themes usually occurred within the context of starting, improving, or altering the program. Within the context of Program Development, the PI described themes related to expectations from self and others, teaching facilitation skills and roles, facilitation of design teams, and evaluations of the training program. These themes were interrelated in that as one theme emerged as figural, then the others receded into the background.

Program Development

When describing the theme of Program Development, the PI was aware of three aspects: putting the program together, the structure of the program, and reshaping the structure. The PI described putting the program together by gathering information from a number of different sources: feedback from students, a literature review, the PI's facilitation experience, and other faculty involved with the program. He described this aspect of the experience as follows:

> And then it was a very loosely fashioned idea, and in meeting together with the other professors involved, and looking at the literature, we came up the basics, and we piloted it last year.

> Most of my thought as to what went into the class was from talking to other people who have done facilitation as well as reading literature on facilitation. So, that is the way that I put it together.

Another aspect of the theme of Program Development was the structure of the facilitator training program. The PI was aware of the number of students in the program, the length of the program, and the various types of meetings involved:

> The first year with the freshman program we ran it with 60 freshmen, twelve teams, and we recruited 18 sophomores and juniors to be in the facilitator training program that we had put together.

A third aspect of the theme of Program Development was the experience of restructuring the program. The PI described reshaping the structure of the program in response to data gathered from the facilitators and freshman teams:

> Another piece of feedback that we got on the qualitative questionnaires was that some groups were really disappointed in the problem solving abilities of their other group members. . . . So, we also selected on ACT scores this year and balanced the group according to ACT scores, which seems to have helped out a lot too.

> Another thing that came out of the empirical research that we did was the importance of extroversion in the whole process. We took personality information and extroversion seemed to be related to all the good things that we were trying to test. So we took great care when we structured the groups themselves, the freshman, to select and make sure that everyone had as much extroversion as we had to give out.

Expectations

The PI described two aspects of the theme of Expectations: an awareness of expectations from professors involved in the program and an awareness of the PI's expectations about the engineering students. The PI experienced expectations from several professors about the design of the program.

> When I started working with (Instructor), who was the professor over in engineering, he told me that the work that we were doing with the seniors, which was the graduate class where we put counseling graduate students with senior engineering design teams, he though that was very important. He said he wanted to take some of that work and translate it down to the sophomore level.
>
> I met extensively with (Instructor), (Instructor), and (Instructor), the other people involved in the program. We talked a lot about what a group facilitator training program would look like.

The PI described his expectations about the engineering students. He expected that engineering students would be difficult to team and generally skeptical and critical:

> Engineering students, well, the whole reason we end up there in the first place is because they have a reputation for being tough to team, tough to put in groups. And they are very skeptical and critical folks as a stereotype. I mean there is obviously variability in that, but they can kind of be a tough audience for any facilitator.

Teaching

The PI was aware of the experience of teaching team facilitation to the engineering students. He described two aspects of the theme of Teaching, teaching facilitation skills and teaching the facilitator role. The PI described developing a set of facilitation skills to teach the students:

> I picked out initially, well, initially I went through the literature and I looked for all the different skills that were important in facilitating. And in the literature they always talk about various skills that facilitators need. So, I kind of grouped them all together into four areas and taught that as the skills for the program.

There was also an awareness of teaching the students various facilitator roles: observing, coaching, facilitating, and mentoring:

> In the class we emphasized the distinction between a facilitator and a coach. . . . You have coaching days. You go in with a structured exercise and coach them through it. But, on other days we don't have structured exercises and we emphasize being more of a facilitator, which is someone who observes and sort of diagnoses the situation and intervenes when they think it is most necessary.

> There is a time when they do a mentoring type thing, sort of outside of the team, helping people, you know these are freshman, helping them just get used to college and campus life.

Facilitation

The PI described his experience as a facilitator of a senior engineering design team. There were two aspects to the theme of Facilitation, an awareness of the design team and an awareness of intervening in the team. The PI was aware of the senior engineers as a team with specific goals:

> The process of facilitation was definitely influenced by the driving need that the team has to get the project completed, and that their main focus isn't on how much they get along but on completing the project.
>
> I would go in there and they would already be hard at work because they would meet for three or four hours. I would come in the middle of that somewhere. So, I would have to come in and stop them and get to my agenda.

The PI described using three team interventions: calming the team members, focusing the team, and resolving team conflict:

> One time they had this big fight . . . and some people were angry with other people because one guy on the team didn't show up for a presentation. I felt like we needed to all talk about it, and they agreed. We spent some time talking about it, and I think that we resolved some of it.
>
> I set up the rehearsal date, and they were all going to come down and rehearse. Well, I got down there, and they had not gotten far enough to rehearse. They were all, they were just kind of flipping out. So I just sat down with them and encouraged them to calm down a little but and tried to help them focus down on a few things that seemed important.

Evaluations

When describing the theme of Evaluations, the PI was aware of two aspects, the PI's experience of evaluating the facilitator training program and the experience of being

evaluated by the engineering students. The PI described positive evaluations of his experiences in the facilitator training program and working as a graduate teaching assistant for the College of Engineering. The PI evaluated the facilitator training program and research associated with the program as important and novel:

> . . . it's been a good experience for me. I've felt fortunate to get on there, and it has turned out to be really good because they emphasize research and let me teach and create classes. They have sent me out to conferences and paid for me to go there, giving me a good stipend and an office. It has been a good experience for me over there to be involved with the program.
>
> With this sample, I think it is especially important to get feedback because nowhere in the literature previously has anyone, that I have found, tried to teach engineering students how to be group facilitators. Most of the models, techniques, and theories are built up on a sample of psychology graduate students. . . . So, it seems very important from a research standpoint to get feedback from everybody about what is going on.

The PI was aware of being evaluated by the engineering student facilitators. Facilitators provided evaluative feedback about the structure of the facilitator training program. The facilitators reported that there should be more facilitation time scheduled with their freshman teams:

> . . . things I got back from the qualitative questionnaire: their desire to have more time with the groups, so we gave them two groups this year rather than just one and cut down some of the lecture time that they had.

The PI also had the experience of being evaluated as a facilitator of his senior engineering design team. He experienced the senior design team members as initially skeptical of his interventions:

> When I ran that rules exercise, I asked them afterwards, you know, "What did you think of the exercise?" And they said, "Ah, we thought it was a big waste of time." So, that was tough feedback to get. I experienced the skepticism there.

In the second section of this chapter, the results of the thematic analysis of the facilitators' transcripts are presented. This section begins with a short overview of the themes and a diagram illustrating the structure of the experience. This section closes with a description of each theme. Participant descriptions are organized in terms of sub-themes, and are supported with quotes from the transcripts. As with the bracketing interview, there was no set order to the themes as detected in the transcripts. Each theme was detected in all of the transcripts. Although the themes are presented separately, they are interrelated. In reading quotes selected to support a particular theme, one can find elements of other themes within the same sentence or paragraph.

Overview of the Structure of the Experience

Five themes emerged from the participants' experiences of the facilitator-training program: Teams, Facilitation, Learning, Evaluations, and Expectations. Table 1 depicts the themes and sub-themes of the facilitators' experiences. The themes are listed on the left side of the table with corresponding sub-themes listed in the columns to the right of the theme.

A diagram of the structure of this experience is presented in Figure 1. When reviewing this figure, it is important to remember that this is a description from the perspective of the facilitators. From this perspective, the themes of Teams and Facilitation are represented by the circles at the center of the diagram. These two themes were the most frequently described experiences in the transcripts and repeatedly emerged as figure and ground against each other. The arrows between the two circles represent the

figure/ground shifts in awareness between these two themes. One facilitator described this as follows:

> Well, in one of my teams that I had, only three people bothered to show up at a given time and two of those were consistently the same ones, and we had to lay down the law of pretty much how to get this team working properly, And, I thought I did a pretty good job, but it turns out that they let it go in one ear and out the other and it didn't really have the effect that we were looking for . . .

In this example, the facilitator was aware a problem with the team. He was aware of the team. This awareness of the team and the problem receded into the background as he became aware of being a facilitator of the team ("…We had to lay down the law.") Following this intervention, an awareness of the team again became figural as the team reacted to the facilitator's intervention.

The central themes, Teams and Facilitation, were frequently described in the context of two additional themes, Expectations and Evaluations. For example, facilitator expectations about a team would often be followed by an evaluation of whether the team met expectations:

> When I first met them as individuals, there were a couple I thought were going to probably fail out or slack off. Then, there were a couple more that I thought would be really good workers. The couple of good workers ended out to be slackers and the couple of slackers ended out to be the good workers . . .

This relationship is diagrammed in Figure 1 by the concentric circles surrounding the two central themes, Teams and Facilitation. Facilitators also reported the experience of being evaluated by the freshman team members:

> A couple of them in the group were like, "I thought it was really good having you there."

Table 1

Themes and Sub-themes of the Experience of the Facilitator Training Program

Themes	Sub-themes				
Teams	Team Composition	Team Development	Differences Between Teams	Feelings about the Teams	Team Reactions to Facilitation
Facilitation	Personal Qualities	Defining the Facilitator Role	Understanding the Team	Intervention	
Learning	What I Learned	How I Learned it	Applying the Learning	Learning by Freshman Teams	
Evaluations	Evaluations of the Facilitation Program	Evaluations of the Facilitation	Evaluations of the Teams	Evaluations by the Freshman Teams	
Expectations	Expectations about the Facilitation Program	Expectations about the Freshman Teams	Expectations about Engineering Students	Expectations from the Freshman Teams	

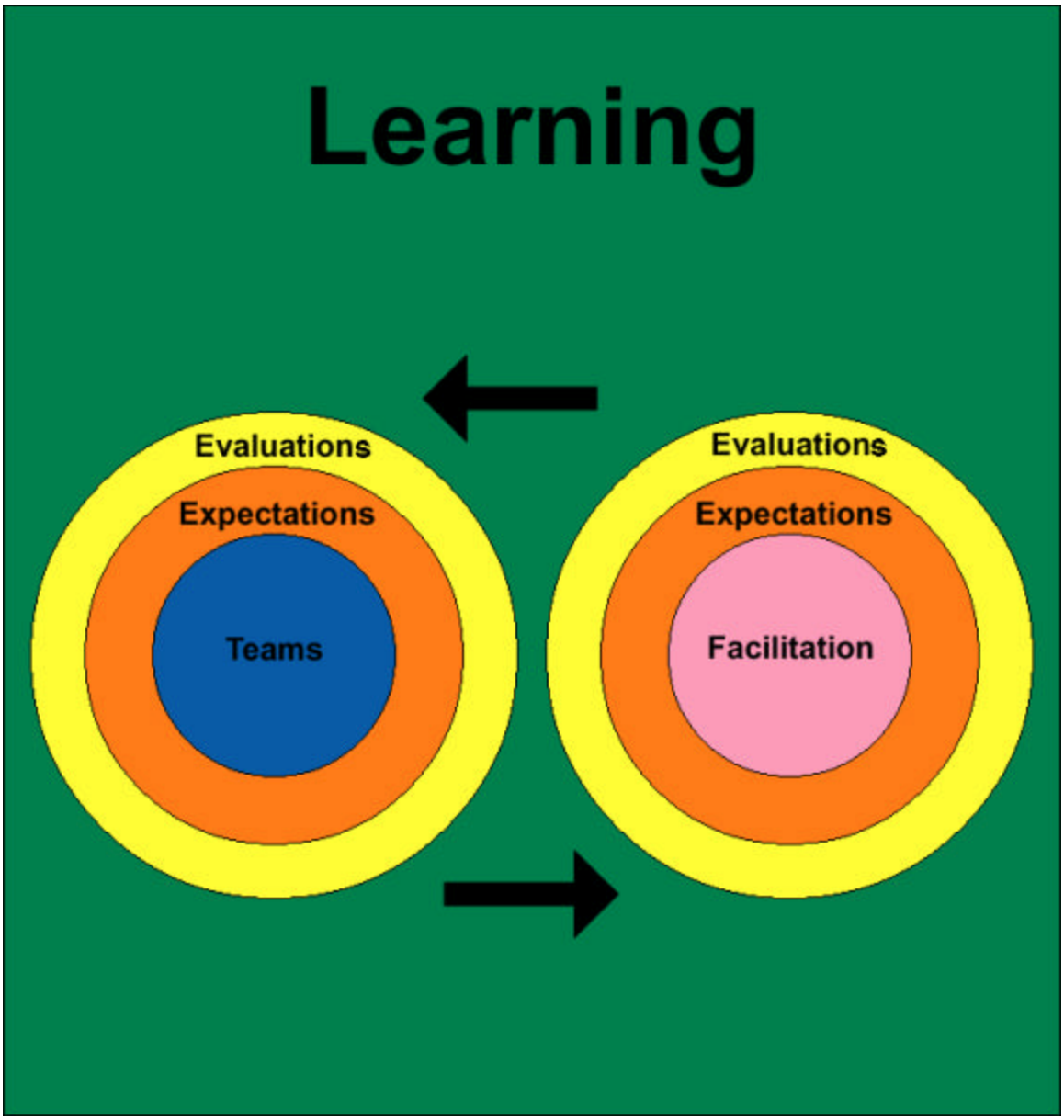

Figure 1: Thematic Structure of the Experience of the Facilitator Training Program

The arrows between the circles are meant to represent the experience of receiving and delivering both expectations and evaluations.

The rectangle surrounding the outside of the diagram represents the theme of Learning. The theme of Learning was chosen as the ground in the diagram because this theme was most often described as a context for the other four themes, Teams, Facilitation, Evaluations, and Expectations. These four themes were often described within the context of a learning experience with facilitator descriptions including an awareness of what they were learning, where they were learning it, and a consideration of the application of this knowledge. For example, a facilitator description of a team problem would include a description of the learning context in which the problem was discussed. One facilitator described learning to solve team problems within the context of group supervision:

> . . . there were five of us plus the supervisor in our small group. So there are six of us in there. And we got to where we knew everybody's situation and it was like, well how are they dealing with this because some of the problems, though they mutate themselves differently or whatever, they all stem from the same, you know, one person not contributing, or somebody not being there.

Teams

The most frequently described theme across transcripts was the experience of teams. The five sub-themes that describe the Teams theme are as follows: Team Composition, Team Development, Differences Between Teams, Facilitator Feelings About a Team, and Team Reaction to Facilitation. In the first two sub-themes, facilitators described different aspects of individual teams that stood out. In the third sub-theme, facilitators described aspects of different teams that emerged in comparison to

each other. In the fourth sub-theme, facilitators described a range of feelings experienced as a result of interacting with a team. The fifth sub-theme demonstrates the Teams theme as a ground or context for other themes. Here, teams were a continuously present "other" that reacted to facilitators' efforts to intervene. The following sections will provide more detailed descriptions of the sub-themes.

Team Composition. In the first sub-theme, the facilitators were aware of the components of a team. Several components were mentioned: the individual team members, the relationships between team members, and the roles played by team members. When describing individual team members, the facilitators often referred to personal qualities such as gender, race, and hometown:

> All right, I'll talk about my second group, the group with no team name, but a sort of a symbol. Five guys, and five guys from small cities in Tennessee and North Carolina. They've got actually pretty different backgrounds for guys from similar areas. At the same time, they're just five guys all up here, first semester.
>
> . . . and this was the group that had the four guys and the one girl . . .
>
> We had a black guy from Knoxville, who lived all his life with his parents, and still did, and another guy, a bookworm, I guess you could say, that was from the area. . . . I had a guy from Pennsylvania and I think North Carolina.

When describing individual team members, facilitators were also aware of different work styles and personality characteristics of the team members:

> A lot of times, the background similarities can obscure the working and problem-solving dissimilarities in people.
>
> Some people come into the program with a full head of steam, and they're ready to conquer the world. Some of the others are just up there in some other class. They just do the minimum that's required to get through the program.
>
> ...one member was more or less introverted than the rest of them, and wasn't always getting his ideas out. They'd just all sit down, they'd joke, it was all just

> one big bullshit session every time they went to solve problems. He wasn't always getting in on that, and the reason they didn't notice it is because they didn't realize that he works different, and that he thinks different, and that he solves problems different.

Another aspect of team composition that facilitators mentioned was the relationships between team members. Several types of relationships were described, including relationships between team members and the facilitator, between different team members, and between different facilitators. The relationships between different team members and the facilitator were almost always described in a positive fashion:

> It's kind of like me and my three roommates, we wanted to do something for the apartment or we want to go, we wanted to have a party Friday night. We would say, "Hey, let's have a party," and then we sit down and organize our ideas. And that's the kind of camaraderie I had with that team. We were all able to sit down, very low-key working atmosphere, nothing up-tight, nobody ever got their feathers ruffled. It was a very, you know, just relaxed atmosphere; it was a good working environment.

> I seemed to really get along well with both of my teams. We never had any problems with our personalities clashing or anything like that. There weren't any squabbles with me being the facilitator. I think they enjoyed me being there and watching them and, you know, helping them.

> You know, these kids look up to me and they are asking me for advice and what classes to take and you know, what co-op jobs they should look for and things like that. And I'm more than happy to help them out and I feel that I've done my part in getting, in helping them stay in engineering.

These relationships between the facilitators and their team members were experienced as having an effect on the facilitation process:

> And they respected my opinions. They will take what I say as true. Even about other stuff that had nothing to do with the team, you know. . . . So, there seemed to be a mutual respect between us. So, it helped our work together . . . and over the course of the whole semester I mean if you are not really willing to kind of get to know the people a little bit because it's just the six of you together. . . . That's a long time to be around people and um, not really communicating very much may be bad. They felt like they could talk to me and I wouldn't get mad at them.

> . . . it just seems that if you are closer to a person and you know more about them and they feel comfortable talking to you about whatever, you can carry on conversations and have a good time outside of just being in a classroom situation. Not that we were best friends but if you can do that, everything you say is not always taken as being a word of authority. When a teacher tells me something I think—I register in my mind totally different from if a friend were to tell me. The closest example is RA's or resident assistants. When you first move into like a dorm, what they tell you is like, the word of God and you follow that and you do your best to abide by it. But, later down the road, once you become friends with them you kind of know what can be pushed, and you can talk to them, and you know they really do care about me, or they don't care about me and if they do say something a lot of times you may take it more personally rather than just saying, "Oh, its their job." You are saying, "Oh, they are really directing it toward me. It's not just them doing their job."

Facilitators were also aware of relationships between the individual team members:

> . . . they worked together really well. . . . They would hang out and stuff and I think that helped them as a group to become friends as well as just to work in the group.
>
> It was an instance where once he got to know people and they actually warmed up to him, he talked more.
>
> . . . he just kind of made it—even though they were really nice and they were explaining it to him, he is just kind of a defensive person and it just didn't seem to make much difference. So the team, they did well together and they tried to overlook it even though he didn't help really. For a while he came and was kind of doing a little better, but then he slacked off again. So, they tried to just figure out how to make it the last month of the semester you know. There was a little bitterness kind of . . . and they still continued to call him asking how he's doing, you know, telling him meetings, trying to keep him informed and trying to keep up with him . . .

The facilitators were aware of the relationships between themselves and other facilitators. These were descriptions of their relationships with their co-facilitators or, more generally, their experience of interacting with other facilitators in the program.

> I've made a lot of friends in the facilitator class, because we've got in confidence with each other especially in the smaller groups where we talk about the problems and that type of thing. I also made a friend with the guy that was my co-facilitator

> who, personality wise, I would say totally we clash and everything, but we actually got along pretty well, actually really well. And to the point where he's done parties and I've been over, as far as if I need help with a class I will ask him or, you know, sit there talking to him, and getting his perspective on how the group works.
>
> I think that stands out, the fact that everyone in the class got along so well and enjoyed each other's company. So I mean, there was not anybody that was really isolated. Everybody got along extremely well and just had fun together, and its like we are all driving towards the same goal and we had fun with it.

The third aspect of the sub-theme, Team Composition, was a description of roles within the team taken by facilitators and other team members. Facilitators described a role for themselves in which they were both outsider and team member at the same time. Facilitator descriptions of their role varied along the outsider/team member continuum. Some facilitators described feeling more of an outsider. Others described themselves as a more passive member of the team. Some facilitators were comfortable in this role and others were not:

> I like being a part of the group. I liked being able to show up and feel like one of them without feeling like an outsider. Yet, at the same time, it's not my project and I like for them to not feel like I'm interfering with their project or feel like I'm obligated to help them with their project for being in the way all this time.
>
> I feel like I'm in a very frustrating position because for me personally, I'm not in their group. I can't solve their problems for them. I can point them in the right direction. I can help them bring out their problems. I can give them suggestions of ways to work around them. I can do that, but they are the ones who have to do it.
>
> Well, like last year I was able to become like a really, actually like a group member, except I was the non-active group member. This year I didn't feel like I was able to make that bond with the team where I felt like a team member. I always felt like an outsider looking in . . .

Facilitators also described themselves in the role of a mentor whose job as an older student was to keep the team together and on task:

> I guess I saw them as my mentees and I their mentor. I felt like anything I could do to keep the group together and work with them as a whole . . .
>
> . . . I was assigned to these groups to be their facilitator….I thought that I owed it to them to do everything I could to help them as a team, because they're earning a grade as well. It's their first semester in college, and to not have them having a bad impression of the program.
>
> I guess you'd think of it as a cowboy who's trying to herd cattle. They can't all go in different directions, you can't do anything with them, but if you get them all headed toward the same direction, you can work with them.

Facilitators were also aware of various roles taken by group members. The four roles that were reported more frequently were the leader, the outsider, the analytical/technical person, and the devil's advocate. These were described as follows:

> I guess they kind of took on different roles in the group. Like, one person took on the leadership role, and another person took on the grunt work. Another person was kind of the analyst. Well, two of them are actually analysts. I had two leaders I guess.
>
> . . . they never really defined a person as a team leader or anything like that even when they were working. But, like I could see the team leader, and a devil's advocate, or you know there were definite people for each category.
>
> In each group there was one outsider, I guess. They weren't up to snuff I guess with the rest of the group's abilities.

Team Development. Whereas the first sub-theme, the experience of Team Composition, describes more stable components of the facilitators' teams, the second sub-theme, the experience of Team Development, describes more dynamic aspects of the team. Facilitators were aware of teams "gelling", taking on roles, completing projects, and solving problems. Facilitators described team gelling as an awareness of team members learning to work together as a team:

> I think they kind of gelled quickly, at least four out of five.

> I guess the fact that they gelled so quickly. One of my groups had a very diverse background. The fact that all these people have never seen each other before is--from day one, it was almost like best friends.
>
> There were four students that worked pretty well together and then there was one student that was pretty antagonistic and pretty much just caused problems, and absent . . . and a lot of the problems at the beginning--it was just communication. He couldn't communicate with the group. He couldn't relay his ideas. He didn't like being in the group. . . . But, at the same time he wanted to do good. And by the end of the semester you, they were actually functioning halfway, I mean, he was part of the group. As to where at the beginning of the semester, they were trying, but he was just not really anything.

Facilitators experienced the team members taking on roles. This process, known as "dividing up the workload" was described as follows:

> I didn't even really see where they assigned these roles to each other. It was just, they kind of picked them up, and then went from there without anything pushing them together as a team. They just took on these roles by themselves, and I guess that's what I mean by, "they gelled together." Whereas, they didn't stress individuality, they stressed—they spoke of this as a team. They didn't care about who was doing what, just as long as it got done.
>
> It was just neat to see how people would take on the roles that were lacking in the group if needed.
>
> Whenever I'm in a group I try to like, I find my own role, and we all define the roles of each other. And there was like seven in the team maybe and you divide up the workload.

Another aspect of the sub-theme of Team Development that stood out was the teams' efforts to learn how to complete their projects:

> They were just kind of, "Well, we're trying to figure out what we're going to do first.". . . . After they started thinking, they started to throw out, "Well, okay, this would work and that wouldn't," or "We need to do this." So, that got whole process going.
>
> . . . when they were trying to brainstorm their initial ideas on the tractor. They were kind of at a loss, one of our groups was at a loss as to what to actually start on.

> They have a project assigned to them, and they've got to complete it in say, two weeks. They're usually pretty busy then, because they don't do much the first week. They kind of all let off until the next week. So, it's coming down to crunch time.

Facilitator's were aware that teams were developing problem-solving skills.

Some teams "got better" at handling problems:

> She always felt that she had to have an idea, whether it was a good one or not; that she had to fight her point, whether it was right or not. And she got better about that towards the end when she started feeling like the group didn't attack her as much. And then when they saw that she was actually going to contribute good ideas and not just run her mouth all the time, they had more respect for her.

> . . . by them talking about it or saying something about it, it helped the situation. And then the guy started doing his part better than he had so, you know, it had come to everybody in there together that it's worth a try to say something . . .

> . . . at first when they would have disagreements they wouldn't really use their disagreements or their misunderstandings to try and say, "Okay, well we've got these two different options. How can we look at those to try and maybe come up with a third option that might have been better?" And they would just kind of squabble a little bit and pick one . . . and one of them would be like, "Well, I don't want to." But, by the end they had kind of gotten to where they would use their different options that they had and try to come up with a third one that everybody agreed on.

Other teams were less successful at learning how to handle problems. These teams would solve problems that would later re-emerge:

> I think they would come away ready to do things differently and they would start out. But by the end of the project they always reverted back to their old ways.

> We thought, the first week after the intervention session, that they did really well and then they slacked back off again, and I think maybe one of the members kind of started pulling a little more of his weight and the other guy was toning down his attitude, but it just went back to pretty much the way it was.

Differences Between Teams. A third sub-theme of the theme of Team is Differences Between Teams. Facilitators were aware of comparing one team to another. Facilitators compared differences between their two assigned freshman teams:

> . . . One of my groups was the top group in their section every time. And then the other group was a mediocre group, but I probably would have said that the mediocre group functioned better as a team.
>
> Well, on my team and since there is usually only three people there, it was kind of hard with the two of us to sit back and watch those three without saying stuff there. But, ah for the other team that I co-facilitated, ah, it was pretty easy to sit back in the shadows and leave them alone.
>
> . . . the two groups were like night and day . . .

Facilitators also compared differences between teams they were involved with in the current semester and teams they had been involved with in previous semesters:

> . . . last year, we weren't as open-minded to it. We didn't have as much group time to meet, and so we felt like every time the facilitators were there they were kind of infringing on our time so to speak. And these groups this year have been a lot more open-minded . . .
>
> Uh, this being my second time is a lot different from the first. The first time I was uh, it seemed to me that I was a lot more in touch with the team as far as, I had a group of five guys and I was a single facilitator and we kind of formed a bond, an all-guy kind of bonding thing. So I was more friendly with that team and then that group worked really well together. . . . This term, it may have something to do with the fact that you know, now there is a five year difference between me and these kids, and uh, there are some girls in this group, and I'm also a co-facilitator this year. I feel a big separation between last year's group and this year's group.

Feelings About the Teams. The facilitators experienced feelings about their freshman teams that ranged from positive feelings of pride and happiness concerning the team's achievement to frustration or disappointment over poor team performance. Facilitators' also reported some frustration and disappointment with the team's reaction

to them and their role in the group. Facilitators described their positive feelings as follows:

> I was impressed by the fact that they actually put some thought into these ground rules, instead of just, "Okay, let's just focus on how to keep the facilitator happy so that we can get to working on our project."
>
> So I was glad that he did try.
>
> That's fun, to sit there and watch them. Like last week, say, they were dropping eggs, and their sand kisses, and splats, and the works.
>
> I enjoyed doing the group projects, so I was kind of frustrated as I couldn't actually get in and help them, but it was really fun to watch them.

Facilitators described their frustration and disappointment with their teams as well:

> The guy that was there all the time, you couldn't help but to feel sorry for him because he didn't have a team, and at the same time he was pushing the rest of his team members away because he was so cocky.
>
> And they blew me off, they kind of resented that I was in the group. . . . You know not trying to make me happier, not trying to do what I want them to do; they wanted to do their own thing. So when that first happened, I guess I'd never had that experience before so I was kind of upset I was like, "Man I don't like you guys.". . . . I don't think I took it personally, but I was kind of frustrated by it because aside from them doing it to me, that's just not a good thing to do to anyone that comes in there and does that.
>
> Well, it was tough. I mean, you would come in and they would, they would never be talking. They would just be sitting there. You would ask them what did they get done. They would all dig a little bit out of their folders and each one had done a little bit, but none of them really had any idea of what the other one had done. So it was, I mean it's kind of frustrating as far as getting them to work as a group.

Team Reactions to Facilitation. In the fifth sub-theme, the facilitators were aware of their teams reacting to the facilitation. Facilitators experienced teams reacting to them personally as well as to their facilitation efforts. When reacting to them personally, the

facilitators reported experiencing respect and criticism from their teams. These reactions were described as follows:

> I think that it's necessary that they have a mutual type of respect for you. But, I don't know if they have to be your best friend. They have to have respect for you and appreciate you, and they have to like you but they don't have to be like, "Oh, what would I do if she didn't come today," that type of thing.
>
> . . . but I felt that they respected me more than some of my past groups have and saw me as helpful more than some of the other groups.
>
> . . . a couple of people actually questioned why we were there, why are we doing this kind of thing and so I knew that they were watching my every move and that every habit was going to be critiqued . . .
>
> . . . the team this year seemed to show a lot of, I wouldn't say resentment, but they were like, "Well, we are still getting good grades. So why do we care?"

Facilitators also experienced the team reacting to their facilitation efforts. These were reactions to the facilitators' efforts to run exercises or to intervene in the team to affect some aspect of the process:

> So, I just decided, well let's throw out these lists. Let's just come up with some ground rules. So they jumped on that. They were like, "Well no fighting. If you've got a disagreement, wait until your meeting is over and take it outside."
>
> After the exercise, they were like, "You know, we usually do this three or four days before its due," and here we were, like I said, two and a half weeks before it was due.
>
> In some of the past groups you don't find out about it until you are doing those mid-semester interviews because everybody seems to be working, everything seems to be going well, and then all of a sudden every single person was like, "Well this isn't working out. This particular area is not going well." And you get that from almost every person, so you know it's really a problem.

Facilitation

Teams and Facilitation were the two main themes of the present study (See Figure 1). Four sub-themes describe the experience of Facilitation: Personal Qualities, Defining

the Facilitator Role, Understanding the Teams, and Intervention. The first sub-theme, Personal qualities, refers to the facilitator as a person. The facilitators bring a personal range of experience and a personal working style into the training program. The second sub-theme, Defining the Facilitator Role, refers to the job of the facilitator. The facilitators used their personal characteristics and the needs of their teams to define the facilitator role. The third sub-theme, Understanding the Teams, refers to the process by which facilitators reached an understanding of team dynamics. In the fourth sub-theme, Intervention, facilitators described "what I did" to affect the team process. Facilitators described both a general intervention strategy and specific interventions.

Personal Qualities. When describing the first sub-theme, facilitators were aware of their own personality traits and feelings and the effects of these qualities on their facilitation. Facilitators described their own personality characteristics and the effect of these characteristics on their understanding of the team, their efforts to define the facilitator role, and intervention:

> With the first team, it's not that hard at all to not get in the way. None of them work in a similar way that I do, and so it's very easy for me to see, "Well what I'm doing here is interfering," or "What I'm doing here is assisting too much," because its obvious to me when that's happening, because it's the way I'd be working as opposed to the way they'd be working. With the other group these guys are more similar to me.
>
> I didn't want people to tell me I have to confront this because I'm not a big confronting person….I didn't want to be there to make them sort out problems and to be like, "here's a bad thing that's been brought up," you know. Because I don't personally like confrontations, and I tend to be a person who holds in bad stuff until it like explodes one day. I know that is not necessarily healthy, but I have trouble confronting people on negative issues…
>
> I don't ever think of myself as a really—I guess the word is "asshole" is the only way I can think to describe it. But, you know, I don't have any problem telling

> somebody, "This is wrong and you've got to fix it." I can do that. I can do it calmly. I don't ever raise my voice. I'm not one to get angry, get upset, or yell about anything. I just tell them in a very calm fashion and try to be very rational about it.
>
> And I think it has a lot to do with personal maturity over the last year. I've grown up a lot now that I've realized that I'm getting married this summer, I'm getting a job, I'm graduating, and it's all coming around really fast….And when you hit that stage, level of maturity, you start growing up so that a lot of the things that you may have found funny last year, I don't find that amusing this year. And I don't take things as light per say as I did last year. So it probably was a lot of me being a much different person than I was last year. And so when they are cutting up and they are getting off-task, last year I would have thought that that was kind of funny, this year I don't think it's so funny and I try to get them back on task.

Facilitators described a range of personal feelings about their facilitation. Facilitator descriptions tended to cluster in three categories: confidence, nervousness, and awkwardness. In describing their confidence, facilitators were aware of developing a sense of comfort and ease in their facilitation:

> It wasn't that difficult for me.
>
> So, I was very comfortable in doing that.
>
> I guess I felt that because I was more confident in what I was doing because I've done it before several times. Because I came in more like, I know what I'm doing, and I wasn't so tense with them. I was more laid back with them.

When describing their nervousness, facilitators spoke about fears related to inexperience or fears of criticism from the team:

> Sometimes, I just get nervous in front of people, and especially this group. They were all really smart . . .
>
> I knew that they were watching my every move and that every habit was going to be critiqued, and so that made me a little nervous to make sure that I was doing it the way it should be done.
>
> And I was actually really nervous about doing the individual facilitation and that was the first group I had. Then I did that and I was really nervous about it, but

> after it was over with, I liked it a lot because I kind of had my ideas about, compared to last year, how I wanted to approach it this year.

Facilitators also reported feeling awkward about their facilitation efforts:

> They came and asked me for suggestions and I pretty much had to tell them that I couldn't do that. It was kind of awkward actually.
>
> Yeah, I mean, it feels funny making, having someone do something when they all are not really going to put any the effort into it. So, you know, you just kind of feel like—kind of wasting your time.
>
> I was pretty upset considering the fact that my roommate was one of them and I couldn't even drag him out of bed at three o'clock in the afternoon. I don't know. I'm not really one to get upset very easily and it was just an awkward situation.

Defining the Facilitator Role. The second sub-theme of the theme of Facilitation is Defining the Facilitator Role. Facilitators began defining their role in the initial team meetings. They were aware of defining the facilitator role to meet team needs or affect the team process. Facilitators also reported switching roles to meet different team needs.

In initial team meetings, facilitators attempted to provide their teams with a definition of the facilitator role:

> . . . when I went into the first group I was kind of like, you know I want to be your friend and I want to be here if you need me, but I am not going to put on an act. You know I've got a class that I'm trying to get stuff done for period. You know, I hope you like me. I hope that it goes okay, but this is you know, you have to do this. I have to do this. Let's do it. Get it over with in the best way possible, learn from it and I'll let you guys kind of do whatever you want to. And then I still grew a friendship with that group, but it started off from the point of, "This is the way that it has to be. We can make the best out of it or the worst of it, and kind of go from there."
>
> I tried to be real nice and introduce myself and not take up too much of their time but just set it down that I was going to have to take a lot of their time and for like every other week I will always be there.
>
> I talked to them, and tried to explain to them what I was there for and what I wasn't there for.

Facilitators described the process of choosing and defining their role in the team to affect team process or team performance. This was described as follows:

> So, it was, I mean it's kind of frustrating as far as getting them to work as a group because they never wanted to. . . . It was always you being kind of the, I don't want to say leader, but you were kind of the person that kick-started them all the time as far as how they were working, so you kind of had to be a lot more verbal and involved and outgoing.
>
> They always seemed to talk to me like I was some kind of an authority figure. And I never tried to give that appearance, but that's just the way it seemed to work best this year. I took that role as the authority figure, always the one giving back the negative feedback and that sort of thing . . .
>
> I'm trying to see the big picture more than caring about them as people, not trying to be their "best pals" as much as it's just, "I've got a job to do to keep you on task, and I'm going to make sure I get my job done, because that's why I'm doing this. I'd be wasting your time and (Instructor's) time, and everyone else's time if I wasn't doing that."

Facilitators reported switching from role to role, defining the facilitator role differently in response to changing situations in their teams:

> . . . with this year's team I felt like I was kind of outside looking in, and there were times when I had to, kind of, change my position to get a point across. In last year's team, it was—I never had to be outside the group. I never had to change my view-point if I needed to get my point across . . . and when they are cutting up and they are getting off-task, last year I would have thought that that was kind of funny. This year I don't think it's so funny and I try to get them back on task. Which kind of puts me in an opposing role to what the other members of the team are doing, and thus, they put you outside their circle. And then as a facilitator, I'm still able to be effective, but I have to do it from a different angle now. I'm not working from the inside out to the team. I'm working from the outside in.
>
> …I really didn't like that attitude so I kind of, I wouldn't say force my hand a little bit, but I did kind of change from the nice facilitator into, "Hey look, you guys have some issues that need to be addressed. Let's get on the ball and get it done."

> We kind of just fed off each other and one day one of us would be kind of the lead facilitator and the other one would just kind of add in where things needed to be added in. And then we'd swap around for another meeting just depending on what the situation was and whose strong suit it was. They would just take over.

Understanding the Team. Understanding the team is the second sub-theme of the overall theme of Facilitation. Facilitators used a variety of methods to help them reach an understanding of the dynamics of their teams. They described the experience of having reached an understanding and some of the ways this understanding changed over time. Facilitators also were aware of trying to reach decisions about appropriate interventions.

Facilitators described a number of methods that they found useful for understanding their team: team comparisons, supervision, previous experience, observation, and team structured exercises. Facilitators used each method as a tool to develop greater clarity into team dynamics. Facilitators were aware of comparing dynamics across teams to increase their understanding of team performance and clarify intervention choices:

> . . . every group is going to function a little bit differently based on personality types and the make of other groups as far as race--like gender basis and race basis. I liked it a lot, it gave me just parallels between the two and something to compare and kind of contrast with and to make sure things were all on track.

> . . . as the semester went on, I got to see how contrasting both these teams were. It was a cool kind of contrast, too. It wasn't a, "This team is good, this team is bad." It was a, "This team is good here, here, and here. This team could use some adjustments here, here, and here. Whereas, this team doesn't know what in the heck they're doing here, here, and here." It was really cool to try and decide what factors were causing this group to be more effective at this and what factors were causing this group to be more effective at this and this.

> . . . and also see like parallels between the two groups that you have as far as strengths and weaknesses and maybe if you noticed a particular role that's working well in another group and you kind of use it in another group.

Facilitators were aware of group supervision as a tool for understanding team dynamics and choosing interventions:

> . . . I could listen to other teams with different problems with working with different personalities than I'd encountered. I have a team that has similar problems as (Facilitator's) team or (Facilitator's) team or any of the other guy's teams, maybe something will click. Maybe I'd say, "Hey, didn't so-and-so have that problem? Didn't he solve it like this? Maybe I should try that?"
>
> It gave us an opportunity to talk about our teams. I find a lot of times just being either forced to, or allowed to, or being given the opportunity to talk things out will allow you to reason things out at the same time. Having that opportunity every week to sit down and devote an hour to considering your teams definitely helped with gaining insight into what was going on with them.

Facilitators used their previous experience as freshman design team members as a tool for understanding their teams.

> There's just so many people from my class that didn't quite click with their teams. . . . I just want to make sure that even if things aren't working out quite right, that they can see that, well, this works out here, this works out here.
>
> The only thing I know is just that I think that having been through it before was a very, was a good strength that I had, as far as I had been in their position and I knew. I think it helps them as far as it helps me feel a little bit more confident about what they were doing because it was a project similar to what we had done. And I know that type of thing and I think it made them feel more confident because they knew that I had been there before and they—even though they could not necessarily ask me, "What should we do exactly right here to make it work?" they could ask me more related questions about the engineering program and does it get better…and to just be like, "Hey, here is somebody who went through all we went through in another semester and she is doing okay. Here is somebody who is in engineering," and so it gives them somebody that they kind of, to know that it gets better and that it is going to work out.

Facilitators spoke about the advantages of observation as a method for understanding teams. Learning by observation was described as a time to "sit there and watch":

> From above, from being outside, I could see that it was going to work. That these guys had this to bring and these guys had this, and uh, when they came together you could just tell. . . . It was interesting because the group was kind of confused and separated but I thought I knew what was going on and saw how they worked.
>
> On our observation days, we sit there and just watch them. Those things stuck out to me the most. The fact that—because that's the problem with my groups they had, that I noticed, the communication skills, not dividing up the work.
>
> …in the observation process…you really do notice them when they are arguing and all the other things that go along with it, and they have no idea that they are doing it…

Facilitators were aware of gaining knowledge about their teams by running structured group exercises. Three exercises were mentioned: the Myers-Briggs Type Indicator exercise, the interviewing exercise, and the brainstorming exercise:

> But, because I knew that he was an introvert . . . I was able to use the uh, the Myers-Brigs type exercise . . . to help people recognize that he was actually just, you know, more reserved, and they needed to encourage him to bring out his ideas more.
>
> We do interviews mid-stream just to kind of get a feel for how everybody is doing. We interview each member of the group one-on-one and we ask them questions about how they feel the group is working and you get varied responses from different team members and at the same time you also get a lot of similar responses of what the problems that are in the group. . . . We had to set up a specific meeting for that and all the group team members were there and we sat down and I pointed out, you know, "Okay, from everybody's interview I compiled a list of the following problems. Now we are going to address them."
>
> And we had done the brainstorming, the silent brainstorming, they had their ideas of which way they wanted to go, you know what the group thought was the most important things to look at.

A second aspect of the sub-theme of Understanding the Team was and awareness of reaching an understanding of their teams. They described this understanding as developing "impressions" and having "passed judgment" about the teams in terms of

dynamics and problems. Facilitators were aware that their understanding of the teams changed over time:

> Sometimes it very hard to see these things, and then sometimes it is very blatant that there's a problem. I think that a lot of times when there is uh—I felt that in groups where it was mainly just that somebody wasn't working, that tended to come out later. Whereas, if there were personal conflicts, stuff like that, that was very obvious because there was so much tension.
>
> It was interesting to me, when you first meet the teams, your first impression and comparing that to the final impression of the team and the team members. When I first met them, I don't know if I stereotyped or if I just made judgments based on appearances or whatever, but it was totally different. I thought, "Well, I don't think that this group is going to work well," and they proved me wrong.
>
> You know first impressions they say are really important, but they are also wrong a lot of the time. They kind of surprised me.

In another aspect of the sub-theme, Understanding the Team, Facilitators were aware of ultimately reaching "a point" or a "time" where some decision was needed about the appropriate way to handle a situation:

> . . . at first he seemed like he was telling the truth. But then everybody else said he had started lying from the get go, you know, he was just telling excuses, and so it just took a little while to get a feel for it and be able to decide what would be the best way to handle it. Get to know them a little bit for one and see what they are like and then try to figure out how they handle him.
>
> But um, my observation again, even though they noticed it they just kept letting things go on because they were afraid to say anything. So, in a little while longer, it was kind of time to say something and try to make it work better.
>
> Well, it was kind of . . . he wanted me to be understanding about what was going on with him, because he had a lot of problems with his health and his family and different things like that and so . . . you know, I was trying to be understanding but then there's a point where you draw the line, and say, "I know this is going on and things are kind of bad for you right now but the other four group, team members are having a hard time understanding why you keep on missing all the time." So, it was kind of at the point where we needed to draw the line.

Facilitators also described situations where they were not able to decide how to handle a situation in the team. Facilitators were aware that they had either missed opportunities to make the right decisions or were "at a loss" as to what to do:

> I think there was a lot of opportunities that I missed to fix problems that would make the team better.
>
> When instead of me supporting his answer, I should have dealt with how they were working as a team, how you're just telling somebody to, "Shut up, you idiot," isn't the way to get rid of a bad idea, if you think it's a bad idea.
>
> After I realized what was going on, I was at a loss of what to do because the group had already come up with a solution. . . . Whereas, if they were not cohesively decided what they wanted to do, I guess I would have stepped in and tried to work something out, but they decided on their own.

Intervention. Intervention is the fourth sub-theme of the overall theme of Facilitation. Facilitators were aware of intervening in their teams and often referred to their interventions as "stepping in." Facilitators described their interventions in three separate ways: facilitators described a general strategy of intervening, they described interventions that were focused on specific types of team problems, and they described the experience of intervening in their teams with structured team-building exercises.

Facilitators described a general intervention strategy that they applied across teams. When describing a general intervention strategy, facilitators reported clarifying and confronting team problems. Clarification involved asking questions for the purposes of drawing information from the team and encouraging the team to consider their own problems. Facilitators added their observations about team dynamics to the discussion:

> I had to step in with this group several times and just have them sit down and say, and I would let them each go around and you know they would all be angry, and I would say, "Okay, we are going to sit down, everybody is going to go around, everybody is going to tell me what happened this week and what you saw that

> worked well and what you saw that didn't work, and I don't want anybody to interrupt, just everybody get their turn and just I want the facts. I don't want you opinions. I don't want you saying well she just doesn't care anymore because you don't know that. Just tell me how you, from you perspective, how the week went.
>
> So just kind of pointed out a lot of inconsistencies within the group and how one person was really angry about something, but in a lot of ways if they had just picked up the phone, or if they had just let somebody know that they are mad about it, everybody would have been willing to step in and solve the problem. And then I would say, "Okay, what all can we do," and if they didn't offer anything I would start making suggestions and they would then start throwing stuff out. I would ask them, "How can you improve the problem, and what would you like the team to do?" and then just trying to compile all that into some concrete, "Okay, this is what we are going to do," and have them do that.
>
> I had to tell them that I wasn't allowed to give them suggestions or to tell them how to do it. But in turn I just, I tried to ask them questions to what they think would be a good way to come up with an alternative and uh—so I guess instead of getting the information out of me I just turned them toward getting advice from me about how to go about it. Rather than saying, you know, "Connect A to B and do this and do this," I kind of said, "Well, what do you think would work here?"

As another general intervention strategy, facilitators confronted problems with their teams:

> So I took them all out and into the hall and we spent a lot of time while the other groups were presenting, just trying to work something out with the team.
>
> I made them sit down and confront their problems one at a time.
>
> We had to set up a specific meeting for that and all the group members were there, and we sat down and I pointed out, you know, "Okay, from everybody's interview I compiled a list of the following problems. Now we are going to address them."

Another aspect of the sub-theme of Intervention was an awareness of intervening to solve specific team problems. Facilitators described a range of team problems and their efforts to solve them. Facilitators were aware of intervening to solve both social and task-related problems with their teams. They intervened to resolve conflict between their

team members, facilitate involvement in the team, motivate team members, and keep team members focused on the task. Facilitators described their conflict resolution efforts as follows:

> There was a big personality conflict there, and so I talked to her alone outside of class just, "How do you feel about this? Are you acting maybe more confrontational because you feel that you have to prove something?" and to kind of see where she was coming from. And then there was a guy who was the leader of the guys. And so I talked to him one-on-one outside of class as far as, you know, "Maybe you should cut her some slack, she probably feels a little awkward, and maybe the guys feel a little awkward too because there is just one of them." So I kind of tried to talk to both of them individually and then see if they can affect the group. And then, so it made her feel more comfortable to talk about it with the group. So they brought it up with the group and things got a lot better after that.
>
> I wanted to make sure that they got to say what they wanted to say, say what they needed to say so that the team could go on, there wouldn't be any underlying conflicts just waiting to happen as the semester moved forward.

Facilitators were aware of intervening in the group to increase involvement. Interventions were typically focused on assigning tasks and roles to people, attempting to draw members out with questions, and coordinating meetings so that everyone could be there. These interventions were described as follows:

> So in a meeting where he left early from lunch, we stayed and talked about ways that they could get (Team Member) more involved in the next project. Like, in this project we'll let this be (Team Member's) project. He can organize it. He's going to get things done. He might not even have the biggest workload, but (Team Member) is going to have the biggest hand in the direction this project takes, and we're hoping that as he is forced to work with us and forced to get this project done, he'll become more aware of what happens in this process of completing a project and be more sensitive to his obligations to the team and the roles he should fill.
>
> . . . trying to probe a person that usually doesn't come out with their ideas as much and trying to help somebody who doesn't communicate well, trying to sit down with them and figure out exactly what they're saying. Usually it's an

> instance too if they feel a little more comfortable then they have an easier time to communicate.
>
> . . . and this other guy was saying, "Well, nobody showed up." And I said, "Well, did you call anybody?" And he said, "No." And I said, "Well, perhaps in the future if you call somebody because (Team Member) wanted to work, but she didn't know that you all were meeting."

Facilitators described their efforts to motivate their teams. Intervention efforts were focused on "getting them started." Facilitators described situations with their teams when they "lit a fire under their butts":

> They didn't require much guidance. They required a lot of, what's the word, just getting them started. As soon as I got them started they'd take off.
>
> They were kind of stumped and I just, by probing all of them about those things, and you know, have them make more lists and narrow it down again and kind of simplifying. The topics they had were pretty broad. I mean, make sure the car is strong. You know, by just asking them questions like, "What makes the car strong? What do you have here that you can use that is going to be strong?"….So, it helped them to kind of simplify it down to the main parts they needed to look at, and I mean, I didn't bring up those, they had those main parts already. It just took actually probing and getting them to get something out on paper and do it rather than just think about it . . .
>
> So, I just kind of asked them if they felt like they would want to try and talk about it and see what they can do, and they wanted to. But, you know, they didn't want to step on anybody's toes. But, it took this one word from me in starting it by saying, you know, "Maybe there's a little problem."
>
> I could see that this team could really work together pretty well once you lit a fire under their butts . . .

Facilitators were aware of intervening in their teams to keep their teams focused and on task:

> I guess the difficulty of the facilitator was how to melt these different personality types into one homogenous group, to try to focus on one goal and achieve that goal.

> We were trying to encourage them to work together. We were noticing there may be a rift developing, and we were trying to get them to join together.
>
> . . . sometimes you just kind of have to crack the whip and say, "Hey, guys that's enough. You've got to get back on task, and there's no need for that kind of comments or behavior," and I've, on more than one occasion, done that.

A third aspect of the sub-theme of Intervention was a description of intervening with assigned team-building exercises. When describing the exercises, facilitators were aware of the need to sell or explain the exercises and the need to modify the exercises to work with a specific team. Facilitators' efforts to explain the exercises were described as follows:

> I tried not to gloss over the exercise when I ran them. I tried either not to run them at all a couple of times or to run them the whole class period. Just like, "Okay, screw it. You guys are not going to get anything done. We're going to do this, and we're going to do it right, and I don't care what it's going to do.". . . I feel like it ought to—if we're going to do it, we should probably go ahead and smack them over the head with it. . . . If you're not going to make them do the exercise, and force them to at least be able to see how it could have benefited the team, they never will, and there's just going to be this constant conflict between the facilitators and the team. It's the "Okay, here I am. I've got things I've got to do. You've got things you've got to do. Let's see if we can get them done." Rather than, "I'm the facilitator. I'm here to help you guys. This is going to help you guys, and you've just go to trust me on it." That's the approach that I tried to take.
>
> I wanted to run the exercises, because I thought, "Well, if we actually run it maybe they'll see the light, see that it was a worthwhile thing." It was so hard sometimes to get them to see the worthwhileness. I guess I felt like, well, there's no way I'm going to be able to get them to do this.
>
> . . . I tried to stress what the exercises were trying to show them. Whether it be the focus on teamworking or whatever it was that week.

Facilitators also spoke about their efforts to modify exercises to work in a specific team situation:

> I was trying to get the team to follow a standard format that they had given us, somewhat of a brainstorming session. Some of them—was obvious that they weren't too interested in doing it . . . so, I tried to get the whole group to do it informally. Instead of writing it down, they could do it for fifteen minutes by themselves like they told us to do it. I tried to get them to do it verbally as a group and that helped a little bit.
>
> I'm trying to think of one in particular—the benefits and drawbacks of teamwork. . . . I could tell they were bored or just stumped. So, instead of doing it individually, I just put them together as a group and said, "Okay well, what's important about working together on a team?" After that, it ended up getting to what kind of sucks about working on a team. So they kind of jumped on that. So I realized that if you kind of show them why you're doing what you're doing, they can kind of be more agreeable to it. They'll take the time to actually do the exercises.
>
> I decided, well I'm not going to do it the way the instructors had told me to. I just decided, well, as a group to work on this together and throw out some ground rules initially when I'd be looking at the list. Then, after they threw out about six or seven, I said, "Okay, now let's look at the list and make sure we've covered everything.". . . . I was pleased that I was able to get such a good result from something I related to them instead of just running the standard format.

Learning

Four sub-themes are used to describe the theme of Learning: What I Learned, How I Learned It, Application of the Learning, and Learning by the Freshman Team. The first sub-theme, What I Learned, refers to the perceived outcomes of participating in the training program. The second sub-theme, How I Learned It, refers to the educational contexts in which learning took place. In the next sub-theme, Application of the Learning, facilitators were aware of applying what they had learned with their teams, in other classes, and on the job. The final sub-theme of the theme of Learning, Learning by the Freshman Team, describes an experience common across themes, a description of the other as figural. In addition to their own learning, the facilitators were aware of learning taking place in their freshman teams.

What I Learned. When describing the first sub-theme, the facilitators were aware of learning about teamwork and facilitation. Facilitators were aware of learning a variety of subjects including how people work in teams, how to facilitate teams, how to be a better listener, about team roles, and about different teamwork styles. Facilitators described learning about how people work in teams as follows:

> I've learned a lot . . . . I learned a lot of things that I didn't know that I was going to learn. What I mean by that is I learned a lot more about teamworking, and I guess the psychology of how people work together in a group and how that affects the team as a whole, and individuals.
>
> And then just personally my organizational skills have gotten better just because knowing what it takes to keep a team organized . . . you can't keep a team organized if you are not going to keep yourself organized, and you can't lead anybody else if you are not organized. So, my personal goal in every team that I'm in is to be the leader. So, if that's the way it works out, if I'm going to be the leader, I got to lead by example. So, I start with myself and work out. And it's just the way I approach it now. Whereas I used to just lead by, you know, barking orders. I was real good at that.
>
> It's also shown me a lot about how I've worked in groups before; which role I've taken on, group participation number one and then also communication of the team.
>
> It wasn't like I was just taking information you were giving me and relaying it to a group. I was learning for myself too.

Facilitators also described learning to facilitate. When speaking about this type of learning, facilitators often used the phrase, "learning how to deal with them":

> And so it also taught me a lesson about going ahead and confronting things when they came up rather than trying to let them just sit back . . . that it's okay to confront if you don't confront in an accusatory way. Just bring up, "Well, here's an issue. We need to discuss it," instead of saying, "One person is causing the problem." If you just put it on middle ground it will work a lot better . . . and I think knowing how to confront makes me more comfortable with confronting. That maybe I was uncomfortable confronting because I didn't really know how to do it.

> So, I'd say the whole semester was a big learning process, especially for me. You know, learning how to deal with them, learning how to head off problems like that.
>
> I feel that I've learned a whole lot just about dealing with people because I've learned to step away and watch a group work. When I'm in a group I feel like I'm more efficient because I understand . . . I know to look at where people are coming from and to take those types of things into consideration. I don't know, I just feel like I've learned a lot about that.
>
> From beginning to the end, it was basically just being able to learn more or less how to talk with people and deal with them, deal with them well and be more of a neutral party.

Facilitators were aware of learning about their own and others different working styles, and the importance of having different working styles within a team:

> First of all, just the understanding of the fact that different people work and think and feel different ways has been huge . . . starting to look at people and actually trying not to judge immediately . . . . I find myself imagining what they'd be like to work with. What sort of approach they would take to problem solving . . . This whole experience has been something that just really facilitates that part of me and that part of my education here.
>
> That helped me appreciate how important the contributions of other people and other viewpoints is to teamwork. As a facilitator, I've been able to observe how the different personalities, the different problem-solving methods, the different work ethics and work methods of individuals can combine to hinder or to facilitate teamwork.
>
> I think this has facilitated me in learning how to solve problems and learning how things click for different people and how working with other people can illuminate how things click for other people. If someone never has the opportunity to work with someone who's a great musician, they'll never even have a clue what happens when a song gets written. But if they're able to work closely with that type of person and see what goes on, maybe they'll have just a little bit of hint about what they go through when they create. That's the kind of thing that I've wanted to get out of engineering and which has been allowed me by this facilitation program . . . was beyond what I ever expected.
>
> I think the class in general has changed me a bunch. One thing I noticed . . . last year I took the Myers-Briggs type indicator and I was an ESTJ straight down the left side, and this year I was an ESTP. And last year I didn't think that the profile

> quite fit and most engineers, if you talk to them they will tell you, "Oh, these psych tests and personality tests are a bunch of shit, they don't mean anything, they are all wrong." Actually, I read my profile this year and said, "Wait a second. This isn't quite…this is pretty close." And I started thinking about that and I have changed quite a bit. I'm not as quick to judge someone.

Facilitators described learning about the necessity of taking different roles in teams and dividing up the workload so that everyone had a part:

> I think it's helped me just to kind of take a look at myself and make sure, you know, that in groups I've always seen stuff from my point of view and maybe--I've tried to see it from other points of view but I wasn't very good at it. But now that I see the different roles that have to be taken, it makes it easier and better for me when I go into a group that I can kind of, instead of just taking the role that naturally comes to me, see a role that needs to be filled more in the group. Like if there is two or three of us who are all going for the leadership role, that I can look at it and take a step back and say that's great but this role needs to be met too. You know, that somebody needs to be questioning the ideas, and so it's helped me to look at myself and to see how I can do better.

> Well, when I was in the group last year, and I was actually doing the projects, I think I learned how to divide the workload up. But . . . I've learned how to divide the work up better this year. You know, we really didn't look at each other's work. Like it was, "You go do your thing, and I'll see you on the day of the presentation." This year, I say, "We've got to show everybody what you've done to make sure it's approved."

> I've taken two different classes which had groups but I've never really looked at how each person takes on a different role, I mean as definite as they really do. And now this semester as I've had groups along with my own teams, I've noticed those roles taking effect.

Facilitators spoke about learning how to be better listeners and the importance of being open to other team members' ideas:

> I'd have to say as a team member, when I was in the group last year, I'd maybe want to take command, do it my way kind of . . . . I was more of a "take charge" type of guy. I'm still that way to a certain degree, but I listen now. Last year, I didn't listen to them. That's what I feel I did wrong last year. And, I realize this year that I was doing it wrong last year.

> The most important thing that I thought I learned was learning to be a good listener. He taught us the different things you can do and the different ways you do them and different questions to ask yourself . . . I didn't think I knew that to begin with. Not only dealing with these teams, but just with other people I always noticed how people like my parents and teachers were really good at that. They could listen to me talk and not interject and then say something, summarize what I said and it all seems, that seemed really important to me.
>
> I'd say also learning to listen to people's ideas. When we're facilitating, we're not supposed to talk. We sit there and listen a lot of time when they're doing strategy or brainstorming sessions. So, it's taught me that when I'm in teams that other people do have ideas and you can't just shut them out, or close your head to their ideas. You need to listen to them, weigh, and listen to what other people have to say, not be passive, but not be aggressive either. It's like, "Hey, this might not be too bad of an idea." So, it is just the kind of thing that has built up over time, where all of the sudden it's like, you know, it's good to listen . . . . So, maybe when I go out and work in a team, I can sit there and listen to someone's ideas . . .

How I Learned It. The second sub-theme refers to the contexts and sources from which the facilitators learned about facilitation. Facilitators learned in the context of supervision meetings and lectures. Facilitators reported learning from a variety of sources including instructors, supervisors, other facilitators, the course material, and from their own observations and team comparisons.

Facilitators described learning from their supervisors and instructors in the following manner:

> I really like (Supervisor). He's extremely calm and quiet and laid back. He just facilitates the discussion. He lets it go where it goes. Yet, at the same time, he manages to keep it on topic. I liked the interest he shows in us and in our teams. Seeing that we learn from our teams, seeing that we're able to assist our teams, and working together. I just really enjoyed working with him.
>
> I liked it a lot because not only can I learn from my fellow co-facilitator, the people in my small group, but then it was there is somebody who had been down this road even more than any of us had been down it. And they knew even more of like book ways to do stuff and then hey, this really doesn't work but this really does work. I think that it is always comforting to know somebody that has been

> there before you and been down that road, and so it worked out to go to not only somebody who has just done another semester or another two semesters but somebody who has studied this and who teaches it and who knows really how to do it.
>
> I'd say that definitely one of the biggest learning experiences was when I was watching (Supervisor) actually facilitate the group. He was doing everything that (Instructor) had said, but it was in his own style, and not as canned and cheesy as what had been demonstrated in class. I think that helped me to see how you can take the basic knowledge from what was presented in class, and adapt it to your own style.

Facilitators described learning in the context of the supervision group, and were aware of the importance of learning about other facilitators' problems in case these problems came up in their own team:

> At the same time, I could listen to other teams with different problems with working with different personalities than I'd encountered. I have a team that has similar problems as (Facilitator's) team or (Facilitator's) team or any of the other guys' teams. Maybe something will click. Maybe I'd say, "Hey, didn't so-and-so have that problem? Didn't he solve it like this? Maybe I should try that." It gave us an opportunity to talk about our teams. I find a lot of times just being either forced to, or allowed to, or being given the opportunity to talk things out will allow you to reason things out at the same time. Having that opportunity every week to sit down and devote an hour to considering your teams, definitely helped with gaining insight into what was going on with them.
>
> . . . there were five of us plus the supervisor in our small group. So there are six of us in there. And we got to where we knew everybody's situation and it was like, well how are they dealing with this because some of the problems, though they mutate themselves differently or whatever, they all stem from the same, you know, one person not contributing, or somebody not being there. So, it was interesting to see how other people approached it and what their groups were like. And okay, my group is normal; it's okay that they are having problems. And to try different techniques based on other peoples'. I liked it a lot.
>
> We got into small groups and talked about other peoples' problems and it was nice because they had other problems that I didn't have, and so I could get their vantage point too. So it's kind of a group learning project.

Facilitators described learning from lectures on facilitation topics and from course material such as a training video on team roles. This learning was described as follows:

> Well, when you are sitting here in the class and the lights are out and you are watching a horribly acted 15 minute movie on how to work in a team, you are thinking, "This is the dumbest thing I've ever seen in my life, what good is it going to do when you get in a real situation," and you see well, pretty much they cut all of the fat off of it and that is really the way it works . . . And they cut out all of the side conversations that make working in a team interesting but they hit the real stuff on the head. . . . They diagram them pretty well and stereotype them pretty well.
>
> The class sets you in the right direction. I mean it gives you the tools and the skills and the thought process maybe, that you need to have when you are working in the group.
>
> We learned about the Myers-Briggs. You learned what kind of person you are, and now I look at myself in certain situations, and I say, "I did that because I'm an extrovert," or, "Of course I did that, I'm intuitive." That was fun, the Myers-Briggs. It focuses you, even tells you how to deal with different types of situations. . .

Facilitators also reported learning from comparing teams. They learned by comparing their two teams they were assigned to facilitate, and from comparing their current teams to the teams they had been on the previous year:

> It is also a lot different having worked in the same situation that they did. I know how it goes towards the end of that project. And that was another interesting thing. Things that happen that you think are by circumstance, maybe they aren't because it seems like the same events or circumstances reoccur. Like this year I was watching my--I had two groups, and it seemed like the same kind of things come about. Late in the project this happens and you didn't think that it would happen, that it was by chance, but it did. It was kind of interesting.
>
> Mm, it was good. . . I think that did as much as anything because every group is different. I mean not just different people but the way they work, what kind of people you are going to have in it, chemistry, everything. Any group that has different people in it is always going to be different. You just learn. Some groups, some things may work better with them, some groups they may not."

> I think, having gone through it last year and then going through it this year, I think that it is really helpful because you go through it last year and you come in knowing a whole lot about it.

Facilitators reported learning by observing their teams, which they typically referred to as "watching." In their role as observers, facilitators were aware of feeling free from the anxieties of a grade and a project deadline. This freedom allowed them "a bird's view" making it easier to observe the team dynamics. This was described as follows:

> There are so many things that are different when you see them from a bird's view, you are looking down. I guess part of it is you don't have to put up with a lot of, you know, concern with the grades and everything so you can just pay attention to your--the way they are all working. It's really interesting. I guess it's like, suppose you are driving down the road and it's all twisty and turny. It's a lot more disorienting than if you are a bird and you are looking down and you are just seeing it slowly working, moving and . . . are able to catch things maybe for what they are. When you get projects and when you get problems in a group, I think whenever I was in a group the way they seemed to act, you know, all of a sudden they start to get worried, frustrated with the way the projects are working. Everything is kind of flying by, you are running out of time, you are concerned with time, that's all you do, is try and budget your time and everything. That was the least of my concerns. It was their project, it was their time, it was their grade . . . I could just observe it . . . and pay attention to each individual and each facet maybe of the group without other things distracting me.
>
> I don't know. I feel like I was there to watch and observe them. You know, it was easier. Last year, I was worrying about doing a project. I really didn't care how everything else was going. I just wanted to get the project done. This year, I didn't have to worry about that. So, I could really focus on what was going on in the group. . . . It was very easy to, you know, I was able to pick things out that I would have never picked out had I been in the group. That's the biggest thing about it.
>
> I don't think that, as a group, the group realized dynamically that these ideas and concepts were actually a part of the solution. That it helped them achieve the solution, you know, on time and efficiently. I learned that from watching them. I don't think that is something that you could have told me in class. It was something I learned from watching them.

Applying the Learning. The third sub-theme of the theme of Learning is Applying the Learning. The facilitators described several situations in which they applied the "tools and skills" they had learned. Facilitators described applying their facilitation skills in their own freshman teams, in their jobs, and in other classes. Facilitators described applying their knowledge to their freshman team as follows:

> The class sets you in the right direction. I mean it gives you the tools and the skills and the thought process maybe, that you need to have when you are working in the group. But, then when you are in the group, there's--you know, no two groups are ever the same. There's thousands of things that could happen, and you just try to sort through the things that you've learned in the class to use in groups. And actually that thought process of what you use is important--more important than . . . just learning the skills. If you can't apply them then knowing them doesn't do you any good.
>
> Other than like math and number crunching that engineers are supposed to be so good at, I think we all do better…in a hands-on type thing, you know, building things…and I think that having the groups to work with and kind of work on…is kind of our own little hands-on project as far as building this, you know, taking these five supplies, or these five people, and putting them together in a final product that is efficient and works well together. And so, it was it's own little construction project that we did for the semester. And I think it gives us a way to take away what we learned in class and see it actually work.
>
> Well, when we learned about the ODI day . . . and the cycle, I thought it was another one of those things that was just psychobabble or something, until I had to use it for the intervention session, and I ended up having to map out the plan of action there on how to intervene with our team.
>
> It seemed like they were giving us general situations, and every situation isn't general. It's specific when you're inside of the group.

Facilitators were aware of applying their facilitation skills on their current jobs and the possibility of applying these skills in future jobs:

> There were several instances this summer where…at work, at my internship, they would have teams set up for certain tasks and I would go sit in on their meetings, and I mean, I didn't really have much say-so. I didn't ever get a chance to really step in, and you know, kind of help them head on the right track or whatever. But

> I could see a lot of instances where they would just, they would go into the meetings, and this was supposed to be a team to take care of something, they would get in there and they would just kind of delegate everything out. There was no real team, you know…and there were a lot of exercises, I mean, even things like the silent brainstorming exercise that we did in class, I mean just doing things like that. They could have come up with ideas better as a team and talked over those ideas and figured out. You know, I could see a lot of exercises there or exercises that could just be made up, or just making the team sit there and think about things and work together.
>
> Actually, I plan to teach. The whole reason I got into engineering anyway was to facilitate a different approach to teaching in a junior high context. I wanted to come with actual experience behind me. I wanted to come with, "This is what you're learning . . . Here's that situation. It happens. I've been there." You know, I want the confidence to come to that experience. I want the insight into problem solving that comes with that.
>
> Oh yeah, that's a big thing about it. I'd like to work there in the future, after I graduate. So, I go to work now, like, over the summer, I see what's going on there, and then I go to school and learn stuff. You know, I'm like, "Hey, I can apply this here, I can apply this there." You know, I see people arguing down there. We'll sit there and we'll talk, you know, and it helps out there. If I ever get up to a management position, it's going to help out a lot.

Facilitators described using the knowledge gained in the facilitation program to improve their teamwork in other classes. They described using knowledge about their own style of working, other member's work styles, and organizational skills to improve their team projects:

> I've had the opportunity this year with my senior design classes to work in teams and I'm not so quick to be on top of everybody else, or making all the decisions. I'm more apt to listen, to take in and account for the other team members and what they have to offer before I throw out my two cents and say, "That's the only two cents that matters." And that has made a big difference in my effectiveness and my--in just working with teams.
>
> Recently, my senior design project that I just turned in last week as a matter of fact, um--we had four members of the team, myself and three others. And we have got different personalities. We have one guy who is hard working and wants to get it all done because he is super-smart. And we have got a couple of other guys who are smart but they are quiet, and if the other guy is willing to do it all

> they'll let him do it. And uh, knowing that to get the best grade in the class we needed to work together, and I kind of drew upon some of the things--you know, I'm not going to be more vocal than the guy that knows everything. That's not going to work in this situation, so I needed to just organize and just lead by example. So I got myself organized, figured out what needed to be done, and then I let the other team members delegate the tasks by way of what they did best, and it worked out well, and we were able to finish the project two weeks early, and everything worked out really well with that.
>
> . . . another facilitator was in the group with me, actually two more were, and we knew to like, set up time lines and how to work best with everybody and that type of thing. And so it really helped out a lot I thought . . . we were all involved and we all had different ideas and so the overall quality of it was better because it had been questioned all the way through it and been worked through in the group.

Learning by the Freshman Team. When describing the fourth sub-theme, Learning by the Freshman Team, the facilitators were aware of the freshman team members learning about teamwork and problem-solving. Freshman team members were described as learning more about teamwork as the semester progressed. Facilitators described this as follows:

> I think they learned a lot about--not so much what answer you come up with, but how you go about doing it. I think they learned a lot about that and just the techniques of how you use each other and your positive aspects and your negative aspects and you work off each other with techniques to get the answers.
>
> . . . I think that the girl learned a lot as far as she doesn't always have to attack other people and to maybe listen and then talk.
>
> . . . it kind of let them see that sometimes girls know what they are talking about in engineering, and it is okay to let us be a part of the group.

The freshman teams were described by the facilitators as initially unskilled about teamwork and unwilling to learn about teamwork, preferring to focus more on the completion of the projects. Over time, facilitators perceived the freshman teams learning more about teamwork and becoming more open to learning about teamwork:

> And the two spring semester teams that I had last spring, things went very smoothly. . . . The groups tend to not work as well fall semester . . . then, they are learning how to work in a group and they are not really applying it with this group but then they carry it over to next semester and apply it with that group when they get to start over fresh.
>
> I guess I can see definitely too another thing. Even if a group was good at the beginning of the semester, or what seemed to be good, after they had gone--you know working together and no quarrels in the group or whatever--by the end of the semester, through this program and learning about working in teams and everything and having a facilitator, I could see a difference in the group from the beginning to the end as far as how they worked together. I could see they really improved almost always.
>
> Well, I mean just seeing--this program--I can see that from the beginning of the semester there will be a few students who will think and recognize that this is important; a few freshman students, you know. And there will be some that will be really frustrated with it. And then by the end of the year or even once they've worked on another project somewhere else, they will really see the importance of what they went through as far as learning how to work in teams.

Evaluations

The four sub-themes that describe the theme of Evaluations are as follows: Evaluations of the Facilitation Program, Evaluations of the Facilitation, Evaluations of the Teams, and Evaluations by the Freshman Team. The first through the third sub-themes describe facilitator evaluations of various aspects of the three previously described themes, Learning, Facilitation, and Teams. In these situations, one of these themes would serve as ground against which an evaluative description would become figural.

Evaluations of the Facilitation Program. The facilitators described an overall evaluation of the facilitation class along with a detailed critique of the structure of the team facilitation program. The facilitators were also aware of the relevance of the program both professionally and personally. Many facilitators either began or ended

their interview with a brief, overall evaluation of the program. Overall evaluations ranged from positive to very positive and were described as follows:

> I enjoyed the class immensely.
>
> I've just never seen a class like this one. It was so much fun. I really get along like that.
>
> I know it's helped, the class as a whole has helped me a whole lot.
>
> I thought that it was really good. I mean I signed up for next semester.
>
> So, it's been a good experience for me, a fun experience for me, just an all around good time. . . . It's, what, three semesters and it's kind of fun.
>
> I think as a whole the experience is a good one.

The facilitators were aware of evaluating the structure of the facilitator training program. A wide range of program components were evaluated. Facilitators evaluated the instructors, the instruction, the course material, the supervision group, the freshman team meetings, and the value of having two teams. Evaluations were generally positive. However, the facilitators provided a moderate range of constructive criticism as well.

Facilitators were aware of an attitude of enthusiasm when evaluating the program instructors:

> It's also been cool being around guys like you, (Instructor), (Instructor), (Instructor), and (Instructor). People who threw this thing together, that are trying to make it work. That's exactly what you guys are doing, trying to find new ways to make those connections, new ways to get different people to look at things different ways, better ways to deal with things, better ways to teach things, better ways for people to learn things. Being around people that are into that or are working on that gives me ideas, just gives me a lot. I really appreciate being able to be around all this.
>
> (Instructor) made it interesting for us, after the first day we filled out a lot of surveys, and then he wanted some feedback on what we thought, and we said that we don't like this much at all, it's too structured. And we completely changed the format, changed the place we met, and it ended up being an enjoyable experience.

> What's good is that you guys were excited about the class. A lot of the professors aren't excited.

Facilitators were aware of the manner in which the course was instructed. The course was evaluated positively for its social, open, and laid-back environment. However, one facilitator was critical of the style of instruction:

> I liked the relationship that I also got to make with just the other people in the class . . . and the way that the class was held where that was an open forum to talk about things and air issues and stuff I think helped out a lot. It offered a class that actually deals with a pretty serious topic and I think that everybody learned about it without having to make it just real strict and kind of boring and people could discuss their ideas and learn more from a hands-on type of learning environment, and I think engineers as a whole do better in a hands-on type of thing. So I think that . . . it's really valuable for all of us.
>
> I liked the way that we were able to bring up issues like . . . "Hey, this might happen or this might happen," and that type of thing until it wasn't just in the smaller group, it was the whole group of us and everybody kind of airing their ideas of this and their ideas of that. We did a lot of brainstorming and that type of thing. I think that there is kind of a confidence that we all built with each other and just a confidence kind of within ourselves that, hey, we can do this . . . and it was a valuable technique and lesson and all that type of thing but it wasn't taught in a way that makes--you are in a more laid back learning environment.
>
> I enjoy having a social aspect to this school and to be able to say, "Man, I'm really struggling this semester, or here are the classes that I'm taking," and then when everyone is like, "Well, you shouldn't have taken all those classes," at least I feel better for you know, struggling through it, you know that type of thing. And to get to know the people that you see in class everyday and that type of thing I think is beneficial.
>
> There were some things that I felt were a bit belabored. Maybe the childlike repetition was unnecessary.

The facilitators were aware of evaluating the course material in general and the team-building exercises in particular. Facilitators described positive, negative, and constructive evaluations. Some facilitators experienced an initial negative evaluation to

the material that developed into a more positive evaluation. Generally, positive feedback was related to finding the material useful and/or interesting. This was described in the following manner:

> The interview skills is kind of nice to know because I've had a few interviews for jobs in the past, and it would have been nice to have known it then. But, in the future when I do interview for more jobs it will help a lot.
>
> It was fun reading, you know as engineers sometimes we don't read words as much as it is formulas. So that was kind of a nice change of pace.
>
> But it's kind of nice for the leader . . . like getting rules set up . . . "Hey, you said that you would be on time and you weren't on time so you broke the rule," and whatever punishment we came up with. It was kind of nice to have things like that to go back to.

Some facilitators were aware of negatively evaluating the team building exercises. These negative evaluations were generally related to the design, usefulness, or implementation of the exercises:

> I feel like a lot of times, you guys design these exercises for us to do, but you give us a scapegoat by making them to where maybe they don't hit at everything hard enough so it won't take as long, it won't be as frustrating. Then it's just so much fluff, so much stuff to get through.
>
> It's tough to think of one offhand, but just in general a lot of the things we did seemed like something that--when you go in there, a lot of the facilitators and the teams would be concerned with getting it over and done with rather than actually getting it to benefit the team. If it's not going to benefit the team or the facilitator, it's not worth doing at all.
>
> Those were one of the things that I wasn't extremely fond of . . . I don't like that much structure . . . I don't like exercises to force teams to work together . . . I have always seen stuff like that as a waste of my time. An exercise can help me come up with an idea when I've already got an idea, I mean an exercise that takes up my time writing an idea that I have already had down.
>
> Some of the stuff didn't help in a lot of ways. Like we had to do certain activities with them about every other week. And those were kind of weird. They didn't

> directly help at the time, and it was kind of like pulling their leg to get them to do it.

At times, facilitators experienced an initial negative evaluation of the course material that developed into a positive evaluation over time. This usually took place after seeing the usefulness of the results:

> All the Myers-Briggs type tests, those tests that we took where it listed where you were, and we had to circle how much that related to us, those were really beyond annoying. It was really just because my entire freshman year, I had to fill out all those surveys and never got anything back. But, when we finally got our results back, it was pretty interesting seeing how the results were, but also noticing how they didn't exactly apply. . . . When I actually saw them do something with them, it was different."
>
> I feel like most of the things that we had to do were worth doing. For instance, taking it back to the box checking . . . to me that just looked like the dumbest, cheesiest, "I'm never going to learn anything from this." As I sat there, trying to do it, I began to see where this could be useful if we had spent more time talking about it, talking about what it meant.
>
> Well, when you are sitting here in the class and the lights are out and you are watching a horribly acted 15 minute movie on how to work in a team, you are thinking, "This is the dumbest thing I've ever seen in my life. What good is it going to do when you get in a real situation," and you see well, pretty much they cut all of the fat off of it and that is really the way it works.

At other times, the facilitator evaluations took the form of constructive feedback on improving the course material:

> I actually enjoyed the seminars, I enjoyed the topics. A lot of the times, I wished we were given an opportunity to implement some of the activities we'd had planned more effectively and more timely. A lot of the things we did this year, I could see, "Wait a minute! I'm actually learning something about the team from this, but it's running out of control, running out of time, what am I going to do? Oh well, I'll just stick it in a folder and forget about it." Like with the--whatever the deal was where they, where you listen to how they spoke with each other. "Oh, that's a checkmark for listening. That's a checkmark for silent." You can sit there; it seems dumb to put checkmarks in boxes. I'm going along and saying, "That's another interruption for so-and-so, another interruption for so-and-so. So-and-so might have a problem with interrupting people!" But we didn't get to practice it enough that I was able to get

> everything we could out of it. So, I think maybe working on how some of those things get implemented would benefit the class.
>
> Some of the other things, like the activity we did with the note cards, and the butcher paper, that was something I had wanted to do the entire year. Get the team down, get the team together, and more-or-less guide them through an alternative way of getting ideas presented, which would maybe get some of the ideas out of some of the other members that weren't contributing as much. It's something I feel like should be introduced much, much earlier when they haven't gotten locked into a routine process of brainstorming, where they'll be more open to new ways of brainstorming. It should also be more timely, at a time when they need to get at problem solving. I don't think that we met with the teams enough right after they got their project and began brainstorming on it.
>
> Instead of writing it down, I tried to get them to do it verbally as a group, and that helped a little bit. I think it came out better in the long run, because we got more ideas, and I think they actually started to think about their ideas more.

The facilitators were aware of evaluating their group supervision. Facilitator reactions were typically positive. They found value in hearing about other facilitator's teams and in receiving suggestions from facilitators about their teams:

> I thought it was really cool. We spent the meetings mainly talking about our groups, talking about the problems we had with our groups, and discussing ways to solve those problems. A lot of times we have to deal with some of the massively dysfunctional groups. . . . We were able to do what we could to salvage some hope for them getting that team in line, but it's just not as fun when things aren't working right.
>
> At first I didn't like it, but then I got to like it . . . We got to where we knew everybody's situation . . . it was interesting to see how other people approached it and what their groups were like.
>
> It helped a lot when we would get into small discussion groups and other facilitators would have suggestions. Then we would lay out our problems, they would lay out their problems, and then everybody else would offer suggestions on what to do. And then we would get a few good suggestions every now and then and we gave a few.

Facilitators were aware of evaluating the structure of their freshman team meetings. Some found this structure helpful for facilitation, while others suggested modifications to the existing structure of the meetings:

> I didn't realize it at the time, but looking back on it, the meetings on Fridays that were extremely informal, helped to smooth out some of the non-problem-solving problems that arose on the teams. Guys not pulling their own weight, not being organized enough to get everyone involved. . . . Those things could get addressed on Fridays without the pressure of having to get anything done. When they met to get things done, they didn't have to worry about them as much. I think that helped that team a whole lot.
>
> You know, probably the open dates were more important to the groups as far as . . . what they got done on their projects. And then the days where we had scheduled stuff helped them learn more about how they were working in the group. So it was a kind of a good mix between the two . . . At the same time, the open days were good for us because we observed how the groups worked together. The more you observe, the more you learn.
>
> One thing that I do want to say and I've said this a million times but I just wanted it on paper. Friday afternoon is a horrible time for us to have team meetings . . . I felt that if we met on a weekday they would start working on it and say, "Well, we will continue it this afternoon or later tonight." But people aren't going to work on Friday night. That's just not going to happen, especially not with freshmen. And I think just by the end of the week you are just so tired and just ready for the weekend and all of that. I felt that that was poor planning.

Facilitators were aware of positive and negative reactions to having been assigned two freshman teams to facilitate. Positive evaluations were generally focused on the value of learning that "there's different kinds of good teams," while negative evaluations were focused on the consequences of favoring one team over the other:

> This semester it was absolutely great to have two groups. It showed that there's different kinds of good teams. There's different things to look for in a good team. Having two teams with ten people who are committed to engineering, and committed to school, and committed to their teams really helped.
>
> I liked having my two groups a lot. I was looking forward to having it next semester because . . . not only can you compare with other groups that other

> people have, but compare . . . like parallels between the two groups that you have as far as strengths and weaknesses . . .
>
> I don't like having two groups. . . . I don't feel like my entire focus will be on either one of the groups. So, I think it would be great if they could have an individual facilitator for each group. Because I feel like I interact more when I only have one group, and I am more devoted to that group and working with their problems and all that. In our groups when we sit down with the other facilitators and discuss things, a lot of them have a really good group and a really bad group, which is kind of the comparison that you make, is not good for either group.

A third aspect of the sub-theme, Evaluations of the Facilitation Program, was an awareness of the professional and personal relevance of the facilitator training program. The facilitators evaluated the professional benefits of the program as follows:

> My employer right now was extremely impressed with it because they are big on working in teams, and they don't have anybody facilitating how they were working in teams and they were impressed with it. Seeing that people were going into that direction as far as engineering curriculum, I think that's pretty good in itself. And plus I mean, I can see where I'll be able to use all this stuff eventually and put it to use.
>
> I think it will really help out to have this on my resume.
>
> I have some other friends that are in colleges of engineering and I talk to them about what they are doing and they—basically, in all the classes you just do problems, and so just from some of them that I'd heard from so far the facilitation class is just like, wow, I'm so much more prepared than they will be by the time they graduate. Well, I guess a lot of engineering is going to be teamwork, and so it's like I'm set for it. I'm just ready for it.

The facilitators were aware of evaluating the personal benefits of the facilitator training program:

> And I really enjoyed it, and I've met some friends and I think that it has helped me out probably as much as it has helped them.
>
> I think it's going to help out a lot in the rest of my life and in my career. . . . It's interesting that, related to how it works with—usually seeing some thing both with your groups and with many people you interact outside of class similarities

> and stuff. I don't think it just pertains to working with groups. It helps out in real life.
>
> It's been a good personal lesson as well as a professional/academic lesson too.

Evaluations of the Facilitation. When describing the second sub-theme of the theme of Evaluations, the facilitators were aware of evaluating specific facilitation interventions and the entire facilitation process. Facilitators also provide evaluative information on co-facilitation and their co-facilitator. When evaluating the entire facilitation process, the facilitators reported a positive evaluation:

> I guess when they were trying to brainstorm their initial ideas on the tractor, they were kind of at a loss. One of our groups was at a loss as to what to actually start on. So I felt like, as a facilitator, I could help them by starting the brainstorming session the way I did. That seemed to help, and I think I was satisfied with the result. Had I not worked with them the way I did, I feel like they might have been unfocused in their design and possibly--I'm not going to say that they wouldn't have come up with the same design or even as good or better of a design, but I'd say that early on as much guidance and the right direction is a good thing . . . just the fact that we're there to help guide them all toward one goal instead of each person trying to throw in their idea of what they thought was best.
>
> . . . I know several times they would come out of the class after we would do things like that and would be like, "This was definitely the best meeting we've had in a long time." They would be like, you know, "We got a lot more done and talked about more, and actually did more as a team as far as design work or whatever, did a lot more as a team than we had in a long time."
>
> I think it was good because they needed somebody to help them like how they go through the steps and they learn how to work together. I had some bad experiences from last year that I could add to it . . . helped me to find weaknesses in myself, and that helped me to help them. And I felt like they probably came up with better projects because we were there to help them.
>
> . . . we had done the exercises of the Myers-Briggs and the personality tests and things like that, talking about how they would conflict and . . . just helping them keep trying to work with him rather than just giving up. . . . That probably--if it had been a class where the students were just in a group and turned loose and there was . . . no real concentration on how the teams work together, then he

> probably would have--they probably would almost shove him out at the beginning and he probably wouldn't even had made it that first semester.

The facilitators were aware of evaluating specific facilitation interventions with their team. Some interventions were evaluated positively. A positive evaluation usually meant that the intervention seemed to improve the teamwork:

> So, in a meeting where he left early from lunch, we stayed and talked about ways that they could get (Team Member) more involved in the next project. . . . It went well. (Team Member) became one of the guys that was there at every meeting even when most of the other guys weren't.

> It was a little nerve-racking for me to step in with the group, but actually after it was over it helped everybody out because everybody was able to see where they were coming from and kind of meet on middle-ground.

> The group that I had the semester before that, they were all--even if they were extroverted, they didn't hardly say anything. They never, you know, never ever talked about--never any kind of personal talk at all; what they were doing, what they were going to do afterwards, what they were doing that weekend. . . . You know they would just come in, and they would just sit there so . . . In that instance maybe, when I did a communication and listening type exercise, it was an instance where they might learn a little more about each other, uh and get to talking with each other. It probably helped them as far as how they related in the group further on down the road.

Facilitators reported negative evaluations of some interventions. A specific intervention was evaluated negatively when a team initially responded to an intervention, but failed to follow through with the response. At other times, facilitators were aware of evaluating an intervention negatively when a team appeared to reject the intervention by "just going through the motions:"

> The one thing that I suggested for them to do with the next project was to take it from the very beginning, divide it up into five parts, you know the desktop part, the presentation, the paper, all the calculations, and then like the construction of whatever they were building and put each person in charge of something. . . . But that didn't seem to work out too well. They did it but it was kind of like they assigned parts but then they never really followed through with it past that.

> . . . we had to lay down the law of pretty much how to get this team working properly, and I thought I did a pretty good job, but it turns out that he let it go in one ear and out of the other and didn't really have the effect that we were looking for . . .
>
> Yeah, I mean, probably this semester even with the Myers-Briggs type exercise, as far as what type each person was, how they would be different and the same and everything . . . I guess they've had the Myers Briggs stuff in class and they all seemed to click together pretty well, so they probably didn't see the real usefulness of it if they already . . . thought they knew most of it anyway, so they just kind of went through the motions and wrote stuff down.

The facilitators were aware of evaluating their co-facilitation and their co-facilitator. Most facilitators evaluated co-facilitation positively and found that the co-facilitator helped considerably with the workload and offered a different perspective:

> My co-facilitator, he just made a couple of opening comments that I was totally like, that wasn't the way I had approached it in the first group and I was kind of nervous about--I don't know--this isn't going to work, or whatever. But then, I started listening to his ideas, and he had been through it before and kind of why he felt this way about things. And then I presented my ideas and why I felt this way about things and we were able to come to a compromise that I think worked really well for the group.
>
> I enjoyed it. It happened to be one of my best friends that was my co-facilitator so it made it a lot easier to get along with him and to communicate back and forth with each other, but I think it made it a lot easier than doing it by myself.
>
> . . . just working with others in the same capacity. Trying toward a common goal instead of striking out as the lone wolf. This has been a good experience, an enjoyable one too. Also, it was good for me, because my co-facilitator also had a team of her own earlier. So, she's already done this. So, that was a big help for me just to have someone who has been doing the same things.

One facilitator evaluated co-facilitation less favorably than facilitating individually. This facilitator thought that the increased responsibilities of a single facilitator provided more opportunities for learning:

> I know facilitating by yourself is a lot more work, but I think at the same time it's a lot more rewarding because it's your team. When the team succeeds, you feel that you've had a definite impact on that, whereas when you are co-facilitating it's a shared responsibility, but you don't know if it's what you're doing is a good thing or if it's what as a whole is being done is a good thing, or if these kids were just naturally gifted to start with. I thought also that you learn a lot more as a solo facilitator because you are forced to do it all by yourself. You can't throw off, you know, you can't separate the roles, you've got to do it all. And that puts you in a situation where you've got to learn how to give somebody feedback.

Evaluations of the Teams. Another sub-theme of the theme of Evaluations is Evaluations of the Teams. The facilitators were aware of evaluating the performance of their freshman teams both positively and negatively. A negative evaluation was usually a description of the teams' problems including the participation of the members, communication, procrastination, gender problems, members in crisis, and a tendency for the teams to avoid dealing with their problems.

Participation problems were mentioned frequently. Evaluations of the freshman teams' participation problems were focused on the team members' lack of interest, poor attendance, or excessive dominance. Problems with members' lack of interest were described as follows:

> One of the girls just didn't appear to care at all and, you know, she showed up when it was convenient for her and worked when it was convenient for her which was very rare.

> And there always seems to be at least one person in the group that just, I don't know if they really don't care, I don't know if they figure that they see that the other group members do care and so they say, "Oh well, they'll carry me no matter what." I don't know why it happens that way, but there always seems to be one person in the group that just doesn't care.

> . . . this guy is going to transfer out of engineering, and one of the other team members thought that he maybe didn't care about the grade that much.

The facilitators also described attendance problems. These were described as follows:

> There would be people not showing up for the project, people running late . . .
>
> Well, I thought there were lots of occasions, but the one that really sticks out is that they'd plan ahead of time to meet at a certain time, like the library on a Sunday afternoon. One, they might not show up, two, they'd show up late. We had them all showing up at different times.

The facilitators described problems with team members dominating the team meetings:

> There was one girl that felt that she was constantly being left out, she wasn't working because they wouldn't let her work. You know she would go to the meeting and try to help and they wouldn't let her participate.
>
> And then this other guy, the group members felt that they had one guy that was very dominant in the group that kind of ordered everybody around.

The facilitators described communications problems within their freshman teams. Facilitators reported that team members either got into arguments or did not talk enough. This was described as follows:

> One of their problems was that they didn't talk enough.
>
> Just, you know, bad communication for one, their little arguments. You now, they were uncalled for at times. They were rude to each other at times, I felt.
>
> The group I had the semester before that, they were all, even if they were extroverted, they didn't hardly say anything. They never, you know, never ever talked about, never any kind of personal talk at all; what they were doing, what they were going to do afterwards, what they were doing that weekend, how they did on their tests. You know they would just come in and they would just sit there.

The facilitators described problems with their teams' procrastination and inability to stay on a time-line:

> Our main problems were just trying to get them, keeping them on a time-line and trying to say, "Okay, guys I know you have about two weeks left, but you need to be at a certain point. You need to have at least started the project."
>
> Sometimes, the big problem that my team has faced is just the procrastination.
>
> . . . they were late. They would start the projects a few days before they were due.

The facilitators described problems related to the gender composition of the team. Facilitators described tension and conflict within the team between males and females:

> And then the girl of the group walks in and they started calling her "bush." Her last name was (Team Member) so it's kind of understandable, but at the same time you think most girls probably don't want to be called bush for obvious reasons….Then I heard it again and I was like, "Guys, what's up with this?"…and they were, "Well, we've been doing it for a week and she hasn't said anything." I said, "Well, does that mean she doesn't care or does that mean that she just doesn't want to say anything about it because she is trying to fit in?" I heard it again and so finally I just grabbed one of them aside and said, "Look, I don't need that kind of stuff. I'm sure she doesn't appreciate that." And then I proceeded to ask her about it. I said, "If that kind of behavior bothers you, let us know." I said that there is stuff that could be done about that.…No one needs to be harassed.
>
> . . . I have a group with three girls and a guy. As any guy probably would be, he's a little intimidated. He wants to be the dominant male. He wants all the power. So, I felt he was acting smarter than he was. He was acting like a smartass. At one point, he did tell the group, he goes, "I know I'm right. I'm smarter than you all." The girls there really didn't think anything of it. I was like, "Wow, I can't believe he just said that!"
>
> You know, this group this year, we've got one girl in the group and we've got several guys and the guys are good at picking on the girl. It's good that she had a good sense of humor where she could take the kind of jokes that they were throwing out. They were saying some pretty off-color things sometimes . . .

The facilitators described instances in which team members were in crisis. A crisis usually involved a member becoming emotional and "blowing up". This was described as follows:

> I walked in and one of the guys was just like, "Everything is going horrible. Nobody is doing what they are supposed to do." He was like, "I'm really mad." He was like, "We need to talk."
>
> I haven't had anyone with any major life crisis to deal with, no crises within the team.
>
> . . . one kid just blew up on the last day, and I just said, "It's all going to be over soon."

The facilitators were aware of their teams' tendencies to avoid dealing with problems within the team. Facilitators described team members denying or ignoring problems:

> . . . I pointed out, you know, "Okay, from everybody's interview I compiled a list of the following problems. Now we are going to address them." And they were like, "Well, those aren't problems, and those aren't problems." And I was like "Well, why did they come up?" And so it was kind of a battle back and forth between me and the group to get them to realize that, yes, they do have problems and that they do need to work on them.
>
> . . . my team's initial response was to just ignore it and hope that it will go away or hope that it will get better but not say anything.
>
> He probably would have just avoided it and kept it all constant if he could have. He probably would have left, just sail on by with their grades. I think in that sense it did help having someone to talk to about this.

In addition to reporting on team problems, facilitators also evaluated their teams positively at times. Positive evaluations were not as frequent or as detailed as negative evaluations, but covered a wide range of the team's functioning including the ability to organize the project, keep motivated, and communicate with each other. Facilitators also provided overall evaluations of the team's performance:

> Well the first team I had worked so well together that they really didn't need a facilitator almost.
>
> But, all in all the group still worked relatively well.

> They ended up, they worked together really well, and I didn't think they would.

The facilitators provided positive feedback on the team's ability to organize the project:

> Yeah, and they did a good job. I only saw them present one time, but the one time I saw them present their project to their instructors, they did a good job, a real good job. A lot of people go up there, didn't know what to say, throwing their hands around the whole time, and my group, they flowed pretty well.

> They came up with some pretty good designs.

The facilitators evaluated the team's drive and motivation to get the project completed:

> And I could see that this team could really work together pretty well once you lit a fire under their butt and get them to realize, individually, I don't think they would have come out with the same results, because they just don't have the same drive to do what they can as a team.

> They worked harder than I thought they would.

Positive evaluations were made of the team's ability to communicate and get along with one another:

> So you know, they did pretty well as far as communicating, listening, and they were all fairly polite and there was nobody that was a real devil's advocate or anything.

> They learned really well over the course of the semester to compromise, to give a little and take a little and get along better than they had at the beginning.

Evaluations by the Freshman Team. The facilitators were aware of being evaluated by their freshman team members. The facilitators experienced the team members evaluating the team building exercises, their own projects, and the facilitators themselves:

> When they come into the class they will think that it's supposed to be really good. But then after a couple of weeks they sometimes are like, "Why do we need all this Myers-Briggs type stuff and team working together, I don't care about that stuff." But then you know, maybe not even at the end of the semester or end of the year, but once they work on another team in another class, they are definitely probably going to see where it . . . comes into use. Because they are going to have to do it in all their other classes eventually once they get junior, senior classes and once they get out in the work field too.

> . . . the projects they really liked, I mean I think they hated it at times, but for the most part they really enjoyed what they were learning in the class. . . . It's better than taking dynamics, and they are understanding what they can use it for as they go. I mean some of the projects weren't that hard but there was that little, you know, challenge. They really liked it.

> A couple of them in the group were like, "I thought it was really good having you there."

> Sometimes I just get nervous in front of people and like, especially this group they were all really smart, and so I felt like maybe they were going to question how I was doing this. . . . a couple of people actually questioned why we were there, why are we doing this kind of thing, and so I knew that they were watching my every move and that every habit was going to be critiqued and so that made me a little nervous to make sure that I was doing it the way it should be done.

Expectations

Four sub-themes describe the theme of Expectations: Expectations about the Facilitation Program, Expectations about the Freshman Teams, Expectations about Engineering Students, and Expectations from the Freshman Teams. The first sub-theme, Expectations about the Facilitation Program, refers to a set of beliefs held by the facilitators at the beginning of the facilitation program. Another aspect of this sub-theme refers to external expectations from instructors about what the facilitators should be doing with their teams. The second sub-theme, Expectations about the Freshman Teams, refers to pre-conceived notions held by the facilitators about their teams' performance and

reaction to the facilitation. The third sub-theme, Expectations about Engineering Students, refers to an engineering stereotype about the characteristics of the "typical" engineering student. The fourth sub-theme, Expectations from the Freshman Team, refers to the facilitators' awareness of expectations from their team members.

Expectations about the Facilitation Program. When describing the first sub-theme, facilitators were aware of expectations about what the facilitation program would be like. Facilitators were also aware of expectations about what the facilitation program should be like based on instructions from the class teachers. Facilitators described their expectations about what the program would be like as follows:

> Um, since I went through it last year I knew what was going to happen this year. I figured maybe I would kind of get a new perspective and that was kind of my idea in getting into it.
>
> I thought it was going to be one of those courses where you didn't actually learn anything, you just got an easy three hours credit, but I was surprised a lot at how relevant the stuff in the course was and how much I actually had to use it in dealing with my team.
>
> That is what I kind of expected the whole class to be like. That both my teams would be perfect and I would just sit back and watch the whole semester. This other team was hell on wheels, and three wheels fell off.

Facilitators described expectations about what the class should be like. These expectations were based on a series of instructions from the instructors and supervisors in the course and were usually described in terms of "the standard format" and "what we were supposed to do."

> Well, you are not really supposed to take sides but ah, it was kind of hard not to want to. It was hard to remain kind of neutral.
>
> Well, we were working on that last project, the tractor. We got the standard procedure given to us by the instructor, was to put a sheet up on the board and

> have each person list--throw out ideas. . . . What we were supposed to do was to have each person write down on their own pad what they thought would be important to the design. Then, I'd write up each person's ideas, and then they'd vote on them and decide which ones they wanted to concentrate on as a group.
>
> Well, I guess as a facilitator you shouldn't--the way the job was described to me I try to do it. You are not trying to get them to get better grades and you are not trying to get them to be better friends or worse friends. You are just trying to make them work better together as a team.
>
> When they were trying to come up with their initial team rules, they . . . were supposed to . . . write down all the benefits and drawbacks to the team, into different categories, and then come up with rules for each category. . . . But, I decided, "Well, I'm not going do it the way the instructors had told me to." I just decided, well, as a group to work on this together and throw out some ground rules initially. . . . I was pleased that I was able to get such a good result . . . something that I related to them instead of just running the standard format.

Expectations about the Freshman Teams. This is the second sub-theme of the theme of Expectations. When describing the second sub-theme, the facilitators described a number of expectations about their freshman teams. These included expectations about how the team would perform, how the team would react to the facilitation, and expectations about different types of team composition.

Facilitators described expectations about the performance of their freshman teams. Facilitators were aware of expectations about a team as a whole, individual team members, and the effect of the structure of the freshman design program on the freshman teams' performance. Expectations about the team as a whole were described as follows:

> When I first met them I--I don't know if I stereotyped or if I just made judgments based on appearances or whatever, but it was totally different, and I . . . think, "Well, I don't think that this group is going to work well," and they proved me wrong. They grew different and that was surprising to me and I guess it taught me to be a little bit less judgmental.
>
> I would have these ideas of how they would do it and they would do it completely different.

> It's just weird how people don't stay in the roles that they might be in for the week ahead.

Facilitators also described expectations about individual team members and how they would perform:

> When I first met them as individuals there were a couple I thought were going to probably fail out or slack off. Then there were a couple more that I thought would be really good workers. The couple of good workers ended out to be slackers and the couple of the slackers ended out to be the good workers. . . . You know first impressions they say are really important but they are also wrong a lot of the time. They kind of surprised me. I put them each into their own little category and I came up with characteristics for them. A lot of those were wrong. They ended up--they worked together really well. I didn't think they would. They worked harder than I thought they would.
>
> At first, I kind of thought that he might be less--for lack of a better word, a "troublemaker." He really didn't turn out to be a troublemaker as much as he was just not contributing to the group at all.
>
> . . . I didn't want him to not join the fraternity, but I kind of made a judgment that he wouldn't be a good worker based on that he had already been bragging about the, you know, the pre-rush parties in the first week of school and how he found where his place was. That wasn't what frustrated me but he would talk about that before he talked about the team. So I kind of passed judgment on him right then.

Facilitators described expectations about the effect of the structure of the freshman design program on the freshman team and its members:

> If they had fun in freshman engineering they are more likely going to stay in. If they had fun and make good grades at the same time, but if they have a horrible time and they make C's and D's they will probably get to be psychology majors I guess.
>
> I think it will be interesting when they get all the engineering students in this program. Of course they are going to have a lot more people dropping out and I wonder how that is going to affect the groups . . . I wonder how that will work.
>
> Like, when they have all of the freshmen in it and there's four hundred people in it, and we have so many more groups and just dealing with those and you know when you have somebody in the group that won't work or if you had somebody

> that drops out mid-semester, I just feel that these problems will be on a larger scale because of dealing with so many more people.

The facilitators were aware of expectations about how their teams would react to the facilitation:

> . . . So, I talked to the group members individually, me and my co-facilitator. Pretty much the common reply was that, "Yeah, he's not doing anything, but we don't mind." That surprised me, because I thought, "Well, here they are, working on a group project. He's going to get the same grade they are, whether or not he's working on it." I thought that they'd be like, "Okay, well, if he's going to get this grade, he's going to earn his grade," because, me as a student, that was my thought coming into the freshman program.
>
> And I felt like, if I had known about that earlier, if I had maybe met with them earlier in the week . . . I would have been able to kind of--because this is after everybody had gotten angry at each other. Maybe if I could have seen them on Tuesday and gotten some other people to participate more in the project and to do more work on this particular project, that that might have alleviated a lot of hard feelings that I think that they carried with them for the rest of the semester.
>
> . . . that everything I did they were like, going to pull everything under a microscope and be like, "Well!" you know so . . . but it actually turned out okay . . . this group, I said was a lot more open to the fact that we had to be there and everything, and so it ended up working out fine, but originally I was a little, "What is going to happen?" but it's fine.

The facilitators were also aware of expectations about different types of team composition and the effect of team composition on team performance:

> Yeah, I've thought about, I wonder if I traded this team member for that team member if it would be able to increase their efficiency here without taking away from the creativity here. At the same time, if I brought this dude over here, could he increase this team's creativity here without decreasing their work ethic here.
>
> I think that would be interesting to look at the psychological factors that go into . . . having all guys work together. Maybe there is not as much competition and you know, the girls don't feel the need to assert themselves, that kind of thing.
>
> The best kind of group to have would be one that if they had a problem, you made suggestions and you got to help them and they followed . . . they would all work

> together and with you and actually make an effort. I think that would be . . . the easiest position for me to be in.
>
> If they didn't gel so well, where they were kind of suspicious of these other people that are working on the project . . . that they weren't "up to snuff," and didn't have the abilities that they did, then I think they'd be seclusive and try to work on this thing individually. The project wouldn't be unified, and it would be going in different ways.

Expectations about Engineering Students. The facilitators described expectations about engineering students' professional characteristics. These expectations usually took the form of a stereotype of engineering students. Engineering students were expected to have leadership qualities, to be good at math and number crunching, to learn quickly, and to prefer "hands-on" projects to other types of learning:

> Well, engineers probably got a few leadership qualities . . .
>
> I think most of the engineering students I know work better when they can like see stuff work, physical type models and that type of thing, just because that is kind of what the world, you know, the engineering world is based on, physical models. You know building a bridge or building a machine, that type of thing.
>
> . . . the group of people we are working with have a tendency to learn quickly . . .
>
> So, I don't know if its just because I'm an engineer, and we're used to getting through it really quick . . .

Expectations from the Freshman Team. When describing the fourth sub-theme of the overall theme of Expectations, the facilitators experienced expectations from their freshman team members. Facilitators were aware that team members had expectations about their facilitation and the performance of their teams. This was described as follows:

> They had started to wonder if one of the team members might, down the road a couple of projects, start not contributing as much, start not showing up, just because he had missed a couple of outside-of-class meetings for questionable events such as

> parties or intramural football games, and because he didn't seem as into the whole team problem-solving part as the rest of them were.
>
> Well, I guess the students are coming in with the idea that they're going to work on their project the whole hour, whether it's the instructors haven't told them differently, or they didn't listen, or what.
>
> From when I talked to them it seemed that when they first saw me in the group they thought that I was going to be telling them what to do all the time and taking up their whole class period.

Differences Between the Transcripts

While analyzing the transcripts, the primary investigator (PI) was aware of differences between the transcripts. Two types of differences were observed. There were differences between facilitator transcripts. There were also differences between facilitator transcripts and the bracketing interview.

Two types of differences were found between facilitator transcripts. As part of another study (Knight et. al., 1999), the PI had access to facilitator scores on the Myers-Briggs Type Indicator (MBTI) (Myers & McCaulley, 1992). Differences were observed in the content of the transcripts based on the personalities of the facilitators as assessed by the MBTI. Also, there were differences in the content of the transcripts based on who interviewed the facilitators, the primary investigator or the secondary investigator.

There were differences in the content of the transcripts as assessed by facilitator scores on the MBTI Introversion/Extroversion scale and scores on the MBTI Thinking/Feeling scale. Specifically, those facilitators who scored higher on the Extroversion scale provided more content in their interviews. Those facilitators who scored higher on the Thinking scale were the only participants to provide critical or negative evaluation.

Introversion/Extroversion scores were analyzed for the facilitators interviewed by the primary investigator. Of the 21 facilitators, 16 scored higher on the Extroversion scale while 5 scored higher on the Introversion scale. Those facilitators who scored higher on the Extroversion scale provided more content. Those facilitators scoring higher on the Extroversion scale averaged ten pages of text while those facilitators scoring higher on the Introversion scale averaged seven and one-half pages of text.

Thinking/Feeling scores were analyzed for all of the facilitators. Fifteen facilitators scored higher on the Thinking scale and six facilitators scored higher on the Feeling scale. Of those scoring higher on the Thinking scale 9 of 15 reported negative or critical feedback about their teams, the instruction, or the structure of the class. Of the six facilitators who scored higher on the Feeling scale none reported any negative or critical feedback.

MBTI scores on the Sensing/Intuition scale and the Judging/Perceiving scale were also available. The facilitator observed no differences between transcripts based on these scales.

Differences were also observed between the transcripts based on whether the interview was conducted by the primary investigator (PI) or secondary investigator (SI). When conducted by the PI the interview length averaged 14 pages. When conducted by the SI the interview length averaged 8 pages.

When comparing SI and PI transcripts the similarities across transcripts stood out far more than the differences. Both sets of transcripts had the same themes and sub-themes. Also, the initial question and the types of questions asked for the purposes of clarity and

elaboration were similar for PI and SI. By prior agreement, the initial question was identical for both interviewers. When clarifying responses, both the PI and SI asked similar questions to focus the facilitators on specific experiences. The primary investigator asked:

> Can you think of a particular situation where you remember that happening?
>
> Can you think of a specific time in your group whenever something like that happened?

The secondary investigator asked a similar set of questions for the purposes of clarification

> Can you think about a specific time where you were learning to deal with people?
>
> Do you remember a specific time when teamworking stood out to you?

Both interviewers used the same types of questions to offer the facilitators an opportunity to further elaborate on their experiences. Once a facilitator would finish describing and clarifying a section of the experience, both interviewers would typically propose a question similar to the following, "What else would you like to describe about your experience of the facilitation class?"

A final set of differences was observed between the bracketing interview and the facilitator transcripts. The emphasis on the educational component of the experience was one difference between the bracketing and facilitator transcripts. In the facilitator transcripts the theme of Learning served as the context for the experience, but was less frequently a figural, heavily emphasized theme. In the bracketing interview, educational experience was much more heavily emphasized. The bracketing interview had two educational themes, the theme of Program Development and the theme of Teaching.

The emphasis placed on the themes of Teams and Facilitation was another difference between the facilitator transcripts and the bracketing interview. In the facilitator transcripts the facilitator themes of Facilitation and Teams were the most frequently figural themes. In the bracketing interview, the theme of Facilitation was a minor theme, with both the experience of intervening and the experience of the team subsumed under the same theme.

Other differences between the transcripts were the evaluations of the facilitation program and the expectations about engineering students. The bracketing interview contained only positive evaluations of the facilitation program, while the facilitator transcripts had a wider range of evaluations about the program. Similarly, the facilitator transcripts had only positive expectations about engineering students would be like to work with, while the bracketing interview had both positive and negative expectations about working with engineering students.

CHAPTER FIVE

DISCUSSION

This chapter contains a discussion of the results of the present study and is organized into five parts. In the first part, connections are made between the structural description of the experience presented in Figure 1 and theoretical models of facilitator training presented in the facilitation literature. In the second part, connections are made between the themes described in the results section and research on facilitation, training, and engineering education. In the next part, the differences between the transcripts are discussed. In the fourth part, the implications of the study are discussed. In the final part, suggestions for future research are presented.

The Structural Description of the Experience

A structural description of the experience is described in Figure 1. This figure describes the relationships between the five themes. Figure 1 is similar in organization to some of the theoretical models of team facilitation that are presented in the facilitation literature. The main similarity is an emphasis on context as an important part of team facilitation. In Figure 1, the theme of Learning is a context for the experience of the other themes. For example, facilitators reported an awareness of the main themes of Teams and Facilitation in various learning contexts such as group supervision, lecture, and freshman team meetings.

Conye, Wilson, and Ward (1997) and Schwarz (1994) proposed theoretical models of the facilitation process. Schwarz's model includes a component entitled organizational context that is composed of aspects of the organization that are outside of

the facilitators' control. Examples of contextual components include a clear mission statement or parts of the organizational culture such as a supportive climate. Conye et al. discuss a contextual component, environmental press, which is also outside of the facilitator's control. This is the organizational pressure on a team to meet specific performance standards. Any intervention by the facilitator must take into account the demands of the organization.

The facilitators in the present study were also aware of aspects of the learning context that were outside of their control. One facilitator described her evaluation of the structure of the freshman team meetings and the affect of this structure on her facilitation efforts:

> One thing that I do want to say and I've said this a million times but I just wanted it on paper. Friday afternoon is a horrible time for us to have team meetings . . . . I felt that if we met on a weekday they would start working on it and say, "Well, we will continue it this afternoon or later tonight." But people aren't going to work on Friday night. That's just not going to happen, especially not with freshmen. And I think just by the end of the week you are just so tired and just ready for the weekend and all of that. I felt that that was poor planning.

The structural description of the experience of the facilitator training program as presented in Figure 1 is also different in several ways from theoretical models of facilitation. Some of the theoretical models presented in the facilitation literature have abstract and complicated terminology (Conye, Wilson, &Ward 1997; Schwarz, 1994). The purpose of this level of abstraction in a theoretical model is to allow for greater clarity and precision in the description of concepts and their relationships. With clear and precise concepts, researchers can better specify hypotheses, assess variables, and test predictions (Cook & Campbell, 1979).

The phenomenological description of the facilitators' experiences is organized differently than most theoretical models in the facilitation literature. The themes are presented in the words of the participants. Themes are organized in figure/ground relationships to emphasize shifts in perspective as one theme becomes figural and another recedes from experience. This structural description is less abstract and more experience-near than theoretical models of facilitation and might be more useful for helping undergraduate engineering students understand facilitation and the dynamics of their teams.

Rollo May (1960, p. 18-19) described the distinction between a phenomenological description and a theoretical model. May was ill and spent a period of time in a hospital. During this time, he described his experience of reading two prominent books on anxiety, Freud's, The Problem of Anxiety and Kierkegaard's The Concept of Dread:

> What struck me powerfully was that Kierkegaard was writing about exactly what my fellow patients and I were going through. Freud was not; he was writing on a different level, giving formulations of the psychic mechanisms by which anxiety comes about. Kierkegaard was portraying what is immediately experienced by human beings in crisis . . . . Freud was writing on the technical level, where his genius was supreme; perhaps more than any man up to his time, he knew about anxiety. Kierkegaard, a genius of a different order, was writing on the existential, ontological level; he knew anxiety.

In the second part of this chapter, connections are established between the themes found in the facilitators' descriptions and the literature on facilitation, training, and engineering education. Similarities and differences between these themes and the literature are discussed.

Teams

The theme of Teams was the most frequently described theme in the study. One sub-theme of the overall theme of Teams is Team Composition. The facilitators were aware of the composition of their teams in terms of characteristics of individual members, relationships between members, and roles taken within the team. Schwarz (1994) made a similar point when he stated that facilitators must learn to observe the team at three levels: at the individual level by observing the actions of the team members, at the interpersonal level by observing the interactions between the members, and at the group level by observing the patterns within the team.

One part of the sub-theme, Team Composition, is a description of the relationships between facilitators and team members. Facilitators described the effect of these relationships on the facilitation. As facilitators developed closer and more personal relationship with team members, they were aware that team members were becoming more open to facilitation:

> . . . . it just seems that if you are closer to a person and you know more about them and they feel comfortable talking to you about whatever, you can carry on conversations and have a good time outside of just being in a classroom situation. Not that we were best friends but if you can do that, everything you say is not always taken as being a word of authority. When a teacher tells me something I think—I register in my mind totally different from if a friend were to tell me. The closest example is RA's or resident assistants. When you first move into like a dorm, what they tell you is like, the word of God and you follow that and you do your best to abide by it. But later down the road, once you become friends with them, you kind of know what can be pushed and you can talk to them and you know they really do care about me or they don't care about me, and if they do say something a lot of times you may take it more personally rather than just saying, "Oh, its their job," you are saying, "Oh, they are really directing it toward me. It's not just them doing their job."

Rogers (1970) made a similar point in the literature on facilitation. He stated that one important function of the facilitator was to establish a safe psychological climate within the group where each member feels respected. Team members feel safe and are able to be open with each other and with the facilitator. According to Rogers, the facilitator can create this type of climate by developing empathic, warm, and genuine relationships with group members.

Team Development is another sub-theme of the overall theme of Teams. The facilitators described development in the team's functioning: in the ability to work cohesively, take on roles, solve problems, and complete projects. One difference between facilitator descriptions and discussion in the facilitation literature is an emphasis on developmental stages. When describing team development, the facilitators did not indicate an awareness of developmental stages. Much of the literature on facilitator training assumes a stage model of team development (Corey, 2000; Gladding, 1995; Vander Kolk, 1985).

Many models of group development are derived from the work of Tuckman (1965) who theorized that teams move through a sequence of developmental stages as they learn to work together. Team developmental stages are known as forming, storming, norming, and performing. Teams are thought to be unable to complete their tasks in the performing stages without first learning to work together and solve conflicts in the earlier stages. In the present study, the facilitators were aware of development in the ability to work together and solve conflicts. However, they did not describe a series of stages in these developments.

Gersick's (1988) results were similar to facilitator descriptions of team development. In this study, qualitative observation and audiotaping techniques were employed to investigate naturally occurring work teams. Gersick found that the teams did not go through specific developmental stages. Team development varied depending on the composition of the team, type of project, the working context, and the team's time limit.

The sub-theme, Feelings About the Team, is another part of the theme of Teams. Facilitators described feelings of frustration with the team's performance. One facilitator remarked:

> Well, it was tough. I mean, you would come in and they would, they would never be talking. They would just be sitting there. You would ask them what did they get done. They would all dig a little bit out of their folders and each one had done a little bit, but none of them really had any idea of what the other one had done. So it was, I mean it's kind of frustrating as far as getting them to work as a group.

Schwarz (1994) described a tendency for the facilitator to express frustration and anger over a team's poor performance. He stated that this reaction sends a type of message that is similar to that delivered by a medical doctor who tells a patient that he/she cannot help them because they are sick. Schwarz cautioned facilitators against holding the team's disadvantages against them, but to continue to work towards improvement at the team's current level of functioning.

Facilitation

The theme of Facilitation was another frequently described theme. One sub-theme of this theme is Personal Qualities. The facilitators were aware of their own personal qualities as facilitators and the effect of these characteristics on the facilitation

process. Facilitators' were aware of their own personality traits as one personal quality. They often described themselves as serious, involved individuals who were comfortable confronting problems. One facilitator described himself in this fashion:

> I don't ever think of myself as a really—I guess the word is "asshole" is the only way I can think to describe it. But, you know, I don't have any problem telling somebody, "This is wrong and you've got to fix it." I can do that. I can do it calmly. I don't ever raise my voice. I'm not one to get angry, get upset, or yell about anything. I just tell them in a very calm fashion and try to be very rational about it.

The facilitators' descriptions of their personality characteristics often resembled their predominant personality style as assessed by the Myers-Briggs Type Indicator (Myers & McCaulley, 1992). For the facilitators, the prevailing Myers-Briggs style was Extroverted, Sensing, Thinking, and Judging known as the ESTJ style (Knight et al., 1999). ESTJ's are described as "life's natural administrators" who prefer a ". . . lifestyle of structure, schedule, and order" and are ". . . given to freely expressed opinions" (Kroeger & Thuesen, 1992, p. 369-370).

These personality descriptions correspond to a facilitator style described as authoritarian in the facilitation literature. According to Berman (1982), facilitator styles can be described as authoritarian, democratic, or laissez-faire. Authoritarian facilitators take responsibility for the group process and goals. Democratic facilitators negotiate responsibility with the group. Laissez-faire facilitators allow the group to assume responsibility for its own direction.

The authoritarian leadership style has been criticized in the facilitator training literature (Vander Kolk, 1985). The concern is that a highly directive style will interfere

with the autonomy of the group. At times, the facilitators described a concern that their personal style would interfere with the teamwork:

> With the first team, it's not that hard at all to not get in the way. None of them work in a similar way that I do, and so it's very easy for me to see, "Well what I'm doing here is interfering," or, "What I'm doing here is assisting too much," because its obvious to me when that's happening, because it's the way I'd be working as opposed to the way they'd be working.

Other researchers have found the authoritarian style to be effective with groups that need structure (Fujishin, 1997; Guzzo & Shea, 1992). In engineering design teams, freshman have been found to benefit from externally imposed structure, while senior design team members were successful at maintaining their own structure (Knight et al., 1999).

A second part of the sub-theme of Personal Qualities is a description of facilitator feelings about facilitation. The facilitators described feeling confident in their facilitation at certain times and nervous and awkward about their facilitation at other times. One facilitator described her nervousness as follows:

> I knew that they were watching my every move and that every habit was going to be critiqued and so that made me a little nervous to make sure that I was doing it the way it should be done.

This description is an example of a common source of anxiety for beginning facilitators, concerns about negative evaluation from the team members (Corey, 2000). This researcher states that it is important for beginning facilitators to discuss feelings of nervousness so that anxiety can be normalized, and beginning facilitators will not be too inhibited to practice their skills.

Facilitators also described feelings of confidence about their facilitation as a result of increased experience and practice:

> I was actually really nervous about doing the individual facilitation and that was the first group I had. Then I did that and I was really nervous about it, but after it was over with, I liked it a lot because I kind of had my ideas about, compared to last year, how I wanted to approach it this year.
>
> I guess I felt that because I was more confident in what I was doing because I've done it before several times. Because I came in more like, I know what I'm doing, and I wasn't so tense with them. I was more laid back with them.

In the facilitation literature, practicing skills is seen as an important activity for building confidence and reducing anxiety. From practice, the facilitators can experience a sense of accomplishment and develop a belief in their ability to intervene in their teams (Toth & Stockton, 1996).

Another sub-theme of the theme of Facilitation is Defining the Facilitator Role. Facilitators were aware of defining themselves professionally in the role of the facilitator. Facilitators described situations in which the needs of the team required a role that was different from their own personality characteristics. In these situations, facilitators would take a role to improve the team's process:

> So, it was, I mean it's kind of frustrating as far as getting them to work as a group because they never wanted to, so you never got to observe. It was always you being kind of the, I don't want to say leader, but you were kind of the person that kick-started them all the time as far as how they were working, so you kind of had to be a lot more verbal and involved and outgoing.
>
> They always seemed to talk to me like I was some kind of an authority figure. And I never tried to give that appearance, but that's just the way it seemed to work best this year. I took that role as the authority figure, always the one giving back the negative feedback and that sort of thing, and it worked out well with my co-facilitator that way . . .

The need to alternate roles in response to the team is known in the facilitation literature as situational leadership (Fujishin, 1997). Situational team leaders realize that a variety of problems will arise in the team and that they will need to use a wide range of roles, skills, and behaviors to solve these problems (Hersey, Blanchard, & Natemeyer, 1979).

Understanding the Team is an additional sub-theme of the theme of Facilitation. The facilitators were aware of understanding the team's dynamics, reaching a judgment about the team, and reaching a decision about the proper intervention strategy. Facilitator descriptions of this sub-theme were similar to Schwarz' (1994) description of diagnosis in team facilitation. Diagnosis is defined as ". . . the process by which the facilitator observes a group's behavior, determines the nature of the behavior, and infers causal relationships consistent with the facilitator's model of group effectiveness." (Schwarz, 1994, p. 67).

As part of the sub-theme, Understanding the Team, facilitators described working to understand the dynamics of their teams. The facilitators described a number of tools they used to reach an understanding of team dynamics. These tools included direct observation of their teams, comparisons made between their different teams, group supervision, and the use of structured exercises. The use of different tools used by facilitators to aid in reaching an understanding of teams has been discussed in the facilitation literature. Casey, Roberts, and Salaman (1992 p. 9) describe the process of "making sense" out of team data as one in which ". . . the facilitator knowingly applies models and theories to the welter of disjointed information assaulting his/her senses from outside and inside."

Dies (1980) identified four tools that facilitators could use to better understand their groups: structured exercises, observation of groups, supervision, and experience as a group member. Each of these tools was also described by the facilitators. Dies (1980) asked experienced therapists to rank the helpfulness of each of these four tools for understanding groups. He found that both supervised practice and experience as a group member were consistently ranked as most helpful while direct observation of the group was ranked as least helpful. In contrast, the facilitators frequently reported observation as an especially helpful method of understanding their team. One facilitator described the helpful aspects of direct observation as follows:

> I feel like I was there to watch and observe them . . . Last year, I was worrying about doing a project. I really didn't care how everything else was going. I just wanted to get the project done. This year, I didn't have to worry about that. So, I could really focus on what was going on in the group . . . . It was very easy to, you know, I was able to pick things out that I would have never picked out had I been in the group. That's the biggest thing about it.

Intervention is another sub-theme of the theme of Facilitation. The facilitators described a general method of intervening that they referred to as "stepping in." When stepping in, the facilitators were aware of clarifying and confronting team problems. Problem clarification was an active process in which the facilitators worked with team members to gain an understanding of the problem. One facilitator described clarification as follows:

> I had to step in with this group several times and just have them sit down and say, and I would let them each go around and you know they would all be angry, and I would say, "Okay, we are going to sit down, everybody is going to go around, everybody is going to tell me what happened this week and what you saw that worked well and what you saw that didn't work, and I don't want anybody to interrupt, just everybody get their turn and just I want the facts. I don't want your

> opinions. I don't want you saying well she just doesn't care anymore because you don't know that. Just tell me how you, from you perspective, how the week went.

These descriptions of problem clarification have parallels in the literature on intervention. Some models of intervention include clarification as an initial step in intervening. Schwarz (1994) described nine types of facilitator interventions. His first two types, exploring and seeking specifics about the problem, are similar to facilitator descriptions of clarification in that they are focused on gathering more information from the teams. Facilitator descriptions of confronting team problems can also be related to the literature on intervention. Corey (2000) includes skill at confrontation as 1 of 22 important facilitator skills.

There are also some differences between the facilitator descriptions of a general method of intervening and descriptions of intervention proposed in the facilitation literature. The main difference is that the facilitator descriptions are much simpler and less technical than those proposed in the literature. While the facilitators describe two types of intervention, clarification and confrontation, Schwarz (1994) discussed nine types of intervention and Conye, Wilson, & Ward (1997) discussed three types of intervention with each one having as many as four sub-categories. Compare a facilitator description of the intervention process with one from a manual on facilitation. One facilitator described her experience as follows:

> . . . So just kind of pointed out a lot of inconsistencies within the group and how one person was really angry about something, but in a lot of ways if they had just picked up the phone, or if they had just let somebody know that they are mad about it, everybody would have been willing to step in and solve the problem. And then I would say, "Okay, what all can we do," and if they didn't offer anything I would start making suggestions and they would then start throwing stuff out. I would ask them, "How can you improve the problem, and what would

> you like the team to do?" And then just trying to compile all that into some concrete, "Okay this is what we are going to do," and have them do that.

This description can be contrasted with a more complicated description of intervention from Conye et al. (1997, p. 133-134):

> Task group intervention choices . . . emerge from three domains: (a) intervention type-a combination of problem-solving or of group processes; (b) intervention level-either individual, interpersonal, group or organizational; (c) and intervention function-a combination of caring, meaning, motivating, or managing. A task group leader considers making a leader intervention within an ongoing group situation by intentionally weighing the dynamic possibilities existing between the presenting group situation and the three domains of intervention type-level-function.

As another part of the sub-theme of Intervention, facilitators also described intervening to solve specific types of problems. Facilitators tended to separate task problems from social problems when discussing interventions. One facilitator described his efforts to intervene to solve a task-related problem:

> They were kind of stumped and I just, by probing all of them about those things, and you know, have them make more lists and narrow it down again and kind of simplifying. The topics they had were pretty broad. I mean, make sure the car is strong. You know, by just asking them questions like, "What makes the car strong? What do you have here that you can use that is going to be strong?" So, it helped them to kind of simplify it down to the main parts they needed to look at, and I mean, I didn't bring up those, they had those main parts already. It just took actually probing and getting them to get something out on paper and do it rather than just think about it.

The distinction between task problems and social problems in work teams has its roots in work done by the Tavistock Institute of Human Relations during the 1950's (Guzzo & Shea, 1992). These researchers developed sociotechnical theory, which states that any team is composed of two separate but interrelated systems. One system is related to the task functions of the team while the other system is related to the social functions.

Modern models of facilitator intervention typically have this distinction between social and task systems in the teams (Conye, Wilson, & Ward, 1997).

Learning

Another theme described by the facilitators is the theme of Learning. The facilitators described the experience of learning in the facilitator training program. One sub-theme of this theme is What I Learned. When facilitators described what they learned, their descriptions included learning how people work in teams, how to facilitate teams, how to understand individual differences, and how to be a better listener.

These reported outcomes are similar to training outcomes specified in the engineering education literature. Both the National Science Foundation (NSF) and the Accreditation Board for Engineering and Technology (ABET) have specified training outcomes for engineering education programs (ABET, 1996; NSF, 1997). NSF and ABET have delineated three important training outcomes that overlap with facilitator descriptions: the ability to function on multidisciplinary teams, the ability to communicate effectively, and the ability to recognize diverse learning styles (NSF, 1997; Phillips et al. 2000). The following facilitator descriptions highlight some of these similarities:

> I've learned a lot . . . what I mean by that is I learned a lot more about teamworking, and I guess the psychology of how people work together in a group. And how that affects the team as a whole, and individuals.
>
> I'd say also learning to listen to people's ideas . . . . We sit there and listen a lot of time when they're doing strategy or brainstorming sessions. So, it's taught me that when I'm in teams that other people do have ideas and you can't just shut them out, or close your head to their ideas. You need to listen to them, weigh, and listen to what other people have to say, not be passive, but not be aggressive either. It's like, "Hey, this might not be too bad of an idea." So, it is just the kind

> of thing that has built up over time, where all of the sudden it's like, you know, it's good to listen . . . . So maybe when I go out and work in a team, I can sit there and listen to someone's ideas.
>
> That helped me appreciate how important the contributions of other people and other viewpoints is to teamwork. As a facilitator, I've been able to observe how the different personalities, the different problem-solving methods, the different work ethics and work methods of individuals can combine to hinder or to facilitate teamwork.

Facilitator descriptions of what they learned are different than training outcomes specified in the facilitator training literature. In the facilitation literature, researchers most often emphasize the development of specific skills. This approach is known as microskills training (Toth & Stockton, 1996). Microskills programs often specify skills such as clarifying, initiating, linking, and modeling (Corey, 2000). These types of outcomes have a narrower focus than those specified in the engineering education literature and by the facilitators.

The second sub-theme of the overall theme of Learning is How I Learned It. The facilitators described their awareness of the contexts of learning and the sources from which they were taught. Taken together the first sub-theme, What I Learned, and the second sub-theme, How I Learned It, are similar to research in the training literature on training outcomes and training process. When conducting training outcome research, investigators focus on the assessment of success in achieving learning objectives. When conducting training process research, investigators choose and evaluate specific techniques for teaching the material (Cascio, 1987).

Two of the most frequently described aspects of the sub-theme, How I Learned It, were the supervisors and the supervision group meetings. These were described as follows:

> I liked it a lot . . . there is somebody who had been down this road even more than any of us had been down it. And they knew even more of like book ways to do stuff and then, "Hey, this really doesn't work but this really does work." I think that it is always comforting to know somebody that has been there before you and been down that road, and so it worked out to go to not only somebody who has just done another semester or another two semesters but somebody who has studied this and who teaches it and who knows really how to do it.

> . . . there were five of us plus the supervisor in our small group. So there are six of us in there. And we got to where we knew everybody's situation and it was like, well how are they dealing with this because some of the problems, though they mutate themselves differently or whatever, they all stem from the same, you know, one person not contributing, or somebody not being there. So, it was interesting to see how other people approached it and what their groups were like. And okay, my group is normal; it's okay that they are having problems . . . . I liked it a lot.

This emphasis on supervision as an important part of the "how I learned it" in training can be found in the research literature as well. Bradley and Olson (1980) examined a range of counselor training program components including total number of hours of client contact and amount of coursework. These researchers found that only two variables correlated with perceived competence as a counselor, the number of hours of formal supervision and the number of supervisors. Robison, Jones, and Berglund (1996) reported on a survey in which experienced group facilitators were asked to list the training experiences they found most helpful in learning to facilitate. Supervised practice consistently ranked at the top of the lists. Tollerund, Holling, & Dustin (1992) developed a model for teaching group leadership. This model proposed a number of important components (e.g., leadership style) in the training of group facilitators. In this model the supervisor has the central role. The supervisor is responsible for making timely decisions as to how each component is incorporated into the training process.

Application of the Learning is the third sub-theme of the theme of Learning. Facilitators were aware of applying their knowledge outside of the classroom setting. They described applying the techniques learned in class with their freshman teams, in other classes, and on the job. One facilitator described applying his knowledge as follows:

> The class sets you in the right direction. I mean it gives you the tools and the skills and the thought process maybe, that you need to have when you are working in the group. But, then when you are in the group, there's--you know, no two groups are ever the same. There's thousands of things that could happen, and you just try to sort through the things that you've learned in the class to use in groups. And actually that thought process of what you use is important--more important than, you know, just learning the skills. If you can't apply them then knowing them doesn't do you any good.

In the training literature, the idea of applying learned knowledge is known as transfer of training (Cascio, 1987). Campbell (1971) stated that transfer considerations were the single most important issue in designing training programs.

In the engineering education literature, transferring learned skills beyond the classroom setting is known as vertical integration of the curriculum (Marchmen, 1998). In describing curricula, engineering educators distinguish between horizontal integration, which is concerned with broadening the program beyond traditional engineering courses, and vertical integration, which is concerned with applying skills learned in the freshman year in later years of the program (Shepard & Jenison, 1997). Evidence of an integrated curriculum is one criterion used by the NSF in deciding which programs to support with grants. One student described her vertical integration of learned skills as follows:

> I've had the opportunity this year with my senior design classes to work in teams and I'm not so quick to be on top of everybody else, or making all the decisions. I'm more apt to listen, to take in and account for the other team members and

> what they have to offer before I throw out my two cents and say, "That's the only two cents that matters," and that has made a big difference in my effectiveness and my--in just working with teams.

Learning by the Freshman Teams is the final sub-theme of the theme of Learning. The facilitators were aware of learning by their freshman teams. One facilitator described it in the following manner:

> I guess I can see definitely too another thing: Even if a group was good at the beginning of the semester, or what seemed to be good, after they had gone--you know working together and no quarrels in the group or whatever--by the end of the semester, through this program and learning about working in teams and everything and having a facilitator, I could see a difference in the group from the beginning to the end as far as how they worked together. I could see they really improved, almost always.

This sub-theme, Learning by the Freshman Teams, is similar to research in the training literature. Goldstein (1986) stated that a consideration of the effect of training on people in the organization who were not directly trained is an important part of assessing the impact of the training efforts.

Evaluations

The fourth theme described by the facilitators is the theme of Evaluation. Facilitators were aware of evaluations across a range of topics including evaluations of the facilitation program, evaluations of their teams, and evaluations by their team. Evaluation is also an important topic in the training literature. Goldstein (1986) stated that an evaluation plan is one of three key steps, along with needs assessment and an implementation plan, to designing a systematic training program. Bernard and Goodyear (1998, p. 152) described evaluation as "the nucleus" of the training effort.

The first sub-theme of this theme is Evaluations of the Facilitation Program. The facilitators offered both positive and critical evaluations of program components. One component of the class that was evaluated positively was the style of instruction. Some of the facilitators described the style of instruction as follows:

> I liked the relationship that I also got to make with just the other people in the class . . . and the way that the class was held where that was an open forum to talk about things and air issues and stuff I think helped out a lot. It offered a class that actually deals with a pretty serious topic and I think that everybody learned about it without having to make it just real strict and kind of boring . . .
>
> I enjoy having a social aspect to this school and to be able to say, "Man, I'm really struggling this semester, or here are the classes that I'm taking," and then when everyone is like, "Well, you shouldn't have taken all those classes," at least I feel better for you know, struggling through it, you know that type of thing. And to get to know the people that you see in class everyday and that type of thing I think is beneficial.

A more social style of instruction is gaining increasing acceptance within engineering education. In the past, engineering programs have been criticized for being instructed in a "boot camp" manner, emphasizing individual competition and weeding out undesirable students (Board on Engineering Education, 1995). Consequently, engineering programs have been losing a percentage of their intellectually gifted students because the style of course instruction did not match the students' preference for a more interactive, supportive teaching style (Eftekhar & Strong, 1998). Engineering education reform efforts have been focused on making the classes appeal to a wider range of students by including a variety of instructional styles (Gilliam et al. 1998).

One of the program components that received more critical than positive evaluation was the use of structured team building exercises with the freshman teams. Sometimes, the facilitators had a hard time convincing their teams and themselves that

the structured exercises were useful. They criticized the exercises as overly structured and artificial:

> Those were one of the things that I wasn't extremely fond of. I'm not a--I don't like that much structure. I remember when going into engineering projects, I would go and--I like working in teams-- but I don't like exercises to force teams to work together. I don't know, they just--I have always seen stuff like that as a waste of my time. An exercise can help me come up with an idea when I've already got an idea; I mean an exercise that takes up my time writing an idea that I have already had down.
>
> Some of the stuff didn't help in a lot of ways. Like we had to do certain activities with them about every other week. And those were kind of weird. They didn't directly help at the time, and it was kind of like pulling their leg to get them to do it.

There has been some debate about the utility of structured exercises for team building in the facilitation literature. Structured exercises are a very popular group and team development technique in industry, education, and counseling. Kroehnert (1991) stated that the majority of the airline industry, manufacturing firms, human resource companies, and military establishments use structured exercises for training. Kagen (1992) commented on the proliferation of structured exercises as a group based cooperative learning tool in schools. Over thirty years ago, Rogers (1970) remarked on the growing emphasis on structured exercises in counseling groups.

Some researchers have been critical about the use of structured exercises as a team building tool. Rogers (1970) cautioned that planned exercises could be unsuccessful because they do not correspond with the current mood and needs of the group. Similarly, Schwarz (1994) cautioned against imposing unnecessary structure on the team. He stated that facilitators should use only the amount of structure necessary to help the team reach its goals. If facilitators try to use too much structure, teams can

become defensive, and performance will be inhibited rather than facilitated. Finally, Rogers stated that structured exercises most likely did not work in his groups, because he lacked faith that they were really useful.

Evaluations of the Teams is another sub-theme of the theme of Evaluations. The facilitators were aware of evaluating the performance of their freshman teams. The most frequently mentioned team problems were: organizing the project, communication, participation of the members, gender issues, and a tendency for the team to avoid dealing with their problems.

The first two problems, project organization and communication, are mentioned frequently in the facilitation literature. Fujishin (1997), in his book on facilitating small groups, devoted six of nine chapters to either communication or task issues in team performance. Schwarz (1994) divided team problems into five levels of depth. The first two levels are devoted to task-related problems while the second two are devoted to communication problems. The deepest level is devoted to intrapersonal concerns.

Another problem frequently mentioned by facilitators was team participation. When describing participation problems, facilitators were typically aware of members who where either too dominant or too passive:

> There always seems to be at least one person in the group that just, I don't know if they really don't care, I don't know if they figure that they see that the other group members do care and so they say, "Oh well, they'll carry me no matter what." I don't know why it happens that way but there always seems to be one person in the group that just doesn't care.
>
> And then this other guy, the group members felt that they had one guy that was very dominant in the group that kind of ordered everybody around.

Participation problems are mentioned in the facilitation literature as well. Bales (1988), working on a factor analysis of group functioning, found a participation factor similar to the one described above. Bales labeled the poles of his factor dominance and submission. Harvill, Masson, & Jacobs (1983) and Corey, (2000) mention member participation as a problem that facilitators must learn to manage. These researchers specify skills for facilitating group participation. These skills are defined as cutting off and drawing out and are intended to help facilitate group members who are too dominant or too passive.

Another problem described by facilitators was associated with gender. One facilitator described a conflict related to gender:

> And then the girl of the group walks in and they started calling her "bush." Her last name was (Team Member) so it's kind of understandable, but at the same time you think most girls probably don't want to be called bush for obvious reasons . . . . Then I heard it again and I was like, "Guys, what's up with this?" And they are like, "Oh, we just started calling her that." And I said, "Is she cool with that?" And they said, "Oh, she doesn't care." And I was like, "How do you know she doesn't care?" And they were, "Well, we've been doing it for a week and she hasn't said anything."

For many years, gender problems were rarely discussed in the facilitation literature (Gladding, 1995). Recently, gender problems in groups have been discussed more frequently. Corey (2000) described how client contracts made with female clients could guard against male therapists imposing their values on female clients. Vander Kolk (1985) described the relationship between culture and gender in groups. He stated that the relationship between men and women in groups could best be understood by taking in to account the cultural background of group members, as the nature of male-female relationships varies significantly across cultures and sub-cultures. Gladding (1995)

described problems more frequently associated with women in a group such as dependency and passivity.

Although attention to gender issues in groups has been receiving increased attention, this focus has been confined to discussions of facilitation in counseling and therapy groups. There has been little discussion of gender issues in the facilitation of work teams (Fujishin, 1997; Schwarz, 1994). A comprehensive review of the literature on work teams did not include any mention of gender or gender problems in teams (Guzzo & Shea, 1992). Problems associated with gender are mentioned in the engineering education literature. Some researchers have observed that engineering is a male dominated profession with a masculine culture (Carter & Kirkup, 1990). Tonso (1996) used an ethnographic methodology to investigate sophomore engineering design teams and found that team norms marginalized feminine values and often excluded the women on the team from any significant participation in the design process. These types of gender problems were described by facilitators as well.

Facilitators described another problem related to the team's tendency to avoid dealing with its problems. One facilitator described this issue:

> I pointed out, you know, "Okay, from everybody's interview I compiled a list of the following problems. Now we are going to address them." And they were like, "Well, those aren't problems, and those aren't problems." And I was like "Well, why did they come up?" And so, it was kind of a battle back and forth between me and the group to get them to realize that, yes, they do have problems and that they do need to work on them.
>
> . . . my team's initial response was to just ignore it and hope that it will go away or hope that it will get better but not say anything.

The tendency for team members to avoid confronting team problems has been addressed in the facilitation literature. Schwarz (1994) identified a number of strategies by which teams manage problems in the group. One strategy is avoidance. Teams that use an avoidant strategy often see problem solving as a futile effort and will either withdraw or ignore team problems. Avoidance is seen as a problematic strategy in teams because problems that are ignored often persist until relationships are damaged and collaboration becomes impossible.

An additional sub-theme was Evaluations by the Freshman Teams. Facilitators were aware of being evaluated by their freshman teams, and reported that their team members evaluated their facilitation efforts:

> Sometimes, I just get nervous in front of people and like, especially this group they were all really smart, and so I felt like maybe they were going to question how I was doing this and you know, whatever. And they had been, a couple of people actually questioned why we were there, why are we doing this kind of thing, and so I knew that they were watching my every move and that every habit was going to be critiqued and so that made me a little nervous to make sure that I was doing it the way it should be done.

In this description, the facilitator experienced a critical evaluation of her facilitation efforts. In response to this awareness, the facilitator described an increase in anxiety and a corresponding increase in effort aimed at facilitating properly.

Facilitator anxiety about evaluation has been reported in the facilitation literature (Corey, 2000). Beginning and even experienced facilitators can become anxious in the face of criticism from their group members. How facilitators respond to this evaluative criticism is often a function of the degree of anxiety experienced. Yerkes and Dodson (1908) described the relationship between anxiety and performance. While low to

moderate amounts of anxiety lead to the type of increased effort and performance described in the above description, high anxiety tends to inhibit performance.

Expectations

The theme of Expectations was the final theme found in the descriptions of the facilitators. One sub-theme of this theme is Expectations about the Freshman Teams. The facilitators described a set of expectations that they formed about team members and team performance. Once formed, these expectations were held in a rigid fashion. The facilitators expressed surprise when teams did not conform to facilitator expectations:

> When I first met them I--I don't know if I stereotyped or if I just made judgments based on appearances or whatever . . . and I get and think, "Well I don't think that this group is going to work well," and they proved me wrong. They grew different and that was surprising to me and I guess it taught me to be a little bit less judgmental.
>
> It's just weird how people don't stay in the roles that they might be in for the week ahead.
>
> You know first impressions they say are really important but they are also wrong a lot of the time. They kind of surprised me. I put them each into their own little category and I came up with characteristics for them. A lot of those were wrong.

The tendency to develop rigid expectations about team members could be a by-product of traditional engineering educational methods (Beder, 1999). Engineering education has traditionally focused on task issues in teams. To solve task-related problems, engineering students are taught to expect that problems will have one right solution, and when problems are solved that they will stay solved. If the problem is ambiguous and open-ended, then the teacher is at fault for setting up such a problem (Beder, 1999).

Although these expectations about problem solving are reasonably valid for efficiently solving many task-related problems, they are often inappropriate expectations for team social systems (Guzzo & Shea, 1992). In the team social system, people cannot be expected to behave with the predictability of objects. Solutions to social problems are often multiple, ambiguous, and reached through extensive negotiation. In this type of environment, expectations formed about team members should be held tentatively (Seat & Lord, 1998).

Anther sub-theme of the theme of Expectations is Expectations about Engineering Students. The facilitators described expectations about engineering students' professional characteristics:

> Well, engineers probably got a few leadership qualities . . .
>
> Other than like math and number crunching that engineers are supposed to be so well at, I think we all do better, or most of the people that I know, in a hands-on type thing. You know, building things, what most people would say is building things . . .
>
> I think most of the engineering students I know work better when they can like see stuff work, physical type models and that type of thing. And um, just because that is kind of what the world, you know the engineering world is based on, physical models. You know building a bridge or building a machine or, you know, that type of thing.
>
> . . . the group of people we are working with have a tendency to learn quickly . . .

The facilitators were aware of expecting engineering students to be intelligent leaders and builders who prefer hands-on work building physical models. This set of expectations, described by a number of facilitators, is different than the set of expectations described in the engineering education literature. In this literature, expectations about engineering students are discussed as <u>the engineering stereotype</u>

(Beder, 1999). This researcher expressed a concern that the public image and status of engineers is declining in part because of a "nerd" stereotype. Those who subscribe to this stereotype expect an engineering student to be ". . . a nerdy looking character, with thick glasses, short hair, several pens and pencils in his shirt pocket, perhaps in a plastic pocket protector, wearing clothes that are never quite up to fashion" (Beder, 1999, p. 13). The concern is that this stereotype could discourage people who would otherwise be interested from enrolling in the field.

A final sub-theme of this theme is Expectations from the Freshman Team. The facilitators were aware of operating in a context of expectation. Facilitators described expectations from their teams that differed from their own expectations about facilitation:

> Well, I guess the students are coming in with the idea that they're going to work on their project the whole hour, whether it's the instructors haven't told them differently, or they didn't listen, or what.
>
> From when I talked to them it seemed that when they first saw me in the group they thought that I was going to be telling them what to do all the time and taking up their whole class period.

Schwarz (1994) advised facilitators about the necessity of checking team expectations. He reported that team members often have a range of unvoiced expectations about team goals and team facilitation. If left unanalyzed, there is a danger that the meeting will have the official facilitator agenda and multiple unofficial agendas all vying for attention.

Differences Between Transcripts

Some differences between facilitator transcripts could be attributed to the personality of the facilitator. Facilitator personality was assessed by Myers-Briggs Type

Indicator (MBTI) scores that were obtained as data from another study (Knight et. al., 1999). Some differences between transcripts could be attributed to MBTI scores. Specifically, more extroverted facilitators provided more interview content, averaging ten pages of content, while the more introverted facilitators averaged seven and one-half pages. Also, only thinking-oriented facilitators offered negative or critical evaluation with 9 of 14 thinkers offering negative/critical feedback. None of the seven feeling-oriented facilitators offered negative or critical feedback.

These findings are consistent with personality descriptions for the MBTI dimensions. Extroverts can be described as individuals who prefer to interact socially with people, while introverts are more reticent and prefer solitude (Keirsey & Bates, 1984). The extroverted facilitators' greater preference for sociability and engagement could explain the greater length of the transcripts. Thinking types tend to be objective and to make decisions based on impersonal, factual criteria. Feeling types tend to be more sensitive and to base decisions on personal, affective criteria (Keirsey & Bates, 1984). Feeling-oriented facilitators, out of considerations for others' feelings, would be less likely to report an experienced negative or critical evaluation. Thinking-oriented facilitators, operating from a more impersonal style, would be more likely to report criticism if they thought this criticism was an objective fact.

Implications

This part of the chapter is a discussion of the implications of the findings of the present study. Three different sets of implications will be discussed: implications for the design of the facilitator training program, implications for the interdisciplinary

relationship between The College of Engineering and The College of Education at The University of Tennessee, and implications for conducting phenomenological research.

Implications for the design of the program. The results of the present study can be used to improve the design of the facilitator training program in four areas: (a) the use of Figure 1 as a training tool, (b) the need for facilitators to modify expectations about the team during the semester, (c) an emphasis on facilitator personal qualities as a factor in facilitation, and (d) an awareness of the possibility of gender and avoidance problems in their teams. The phenomenological structural description of the experience as presented in Figure 1 could be a useful training tool for engineering student facilitators. Facilitation models were taught to the facilitators, but facilitators did not describe using them to work with their teams. There has been some debate in the literature about the utility of theoretical models of facilitation for beginning facilitators. Some researchers have found that facilitation models are too removed from the experiences of beginning facilitators to be useful as a training tool (Toth & Stockton, 1998). Similarly, researchers investigating the relationship between experience level and use of facilitation models have found that more experienced facilitators use theoretical models more frequently (Wile, Bron, & Pollack, 1970). Toth and Stockton advocate training beginning facilitators to work with very specific intervention skills. Other researchers have argued that for beginning facilitators to learn to practice competently they should be provided with a theoretical model at the beginning of training which they can grow comfortable with over time (Robison, Jones, & Berglund, 1996).

One solution would be to use Figure 1 as a training tool for beginning facilitators. This phenomenological description is simpler and easier to apply than more abstract, theoretical models of team facilitation. Also, the description presented in Figure 1 is in the words of engineering student facilitators. This may increase the likelihood that beginning facilitators will make meaningful connections between this phenomenological description and their own experiences with their teams (May, 1960).

A second way to improve the design of the facilitator training program would be to encourage facilitators to modify their expectations about their teams during the semester. Traditional engineering training encourages students to reach judgments quickly about objects with stable properties (Jennings, 1998; Seat & Lord, 1998). The facilitators expected initial expectations to be valid throughout the semester and often expressed surprised when team members did not behave according to their expectations. During facilitator training, instructors could emphasize the need to modify expectations in response to the dynamic and developmental nature of the teams.

A third way to improve the design of the facilitator training program would be to increase training on facilitator personal qualities. Facilitators were aware of feelings and their own personal characteristics and the effect of these qualities on their facilitation. The facilitator training program emphasized intervention skills over an awareness of personal qualities. In the facilitation literature, training facilitators to be aware of their personal experience is often considered an advanced skill (Harvill, Masson & Jacobs, 1983; Toth & Stockton, 1996). Some researchers have taken an opposing view. Casey et al. (1992) found a relationship between quality facilitation and high awareness of internal

dynamics. These researchers acknowledge that traditionally the training emphasis is either on group dynamics or specific intervention skills. Casey et al. (1992, p. 9) conclude that more balanced training would teach facilitators to attend to inner processes so that they know, ". . . who we are, what sensations we are having, what they mean for us."

A fourth way to improve the facilitator training program would be to make facilitators aware of the possibility of gender and avoidance problems in their teams. The training was focused on three frequently identified team problems in the literature, task problems, communication problems, and participation problems (Bales, 1988; Fujishin, 1997; Guzzo & Shea, 1992). Facilitators were aware of these three problems, but also mentioned conflicts in teams around the issue of gender and a tendency for their teams to avoid dealing with problems.

Facilitators tended to confront gender problems by ordering male team members to stop an offensive behavior. Facilitators could be trained to better understand gender issues in teams. For example, facilitators could be educated on gender differences in learning styles (Eftekhar & Strong, 1998). Facilitators could be taught about covert gender discrimination against women by assigning marginal roles in the team such as scribe or shopper for materials (Tonso, 1996). Facilitators can be taught to anticipate women team member's greater needs for collaborative decision making, discussion of feelings, and personally meaningful goals (Gladding, 1995).

Facilitators could also be taught strategies for confronting avoidance in teams (Schwarz, 1994). The facilitators' generally authoritative facilitation style could be

helpful in countering team members' tendencies to avoid their problems (Fujishin 1997). Facilitators could also be taught how to help teams identify their own problems (Bales, 1988).

Implications for an interdisciplinary relationship. A second set of implications is related to the interdisciplinary partnership between the College of Education and the College of Engineering at the University of Tennessee. The facilitation program is offered by the College of Education as a set of service classes for the College of Engineering. The concerns of members of The College of Education are that the program is well received and meets the needs of the program consumers in the College of Engineering (Cascio, 1987). An implication of the data from the present study is that the program was well received by the students as most of the facilitators provided an overall positive evaluation of the program. Trainee reactions to a training program are typically taken as one important criterion of program success (Goldstein, 1986).

The facilitator training program also appears to be meeting the needs of members of the College of Engineering. The concerns of the College of Engineering faculty are that the program aids in meeting ABET accreditation requirements, aids in securing additional NSF funding, and builds the skills of engineering students. Facilitators reported a range of experiences that are in agreement with ABET requirements. ABET (1996) encourages new and innovative programs and requires evidence of the ability to function in teams. Facilitators described the program as an innovative effort that prepared them for working in teams:

> I have some other friends that are in colleges of engineering and I talk to them about what they are doing and they—basically, in all the classes you just do

> problems, and so just from some of them that I'd heard from so far the facilitation class is just like, wow, I'm so much more prepared than they will be by the time they graduate. Well, I guess a lot of engineering is going to be teamwork, and so it's like I'm set for it. I'm just ready for it.

ABET accreditation requires that the program develop an ability to communicate effectively. Facilitators reported an increase in listening skills:

> I'd have to say as a team member, when I was in the group last year, I'd maybe want to take command, do it my way kind of. I'd listen to other peoples' ideas, of course, but I was more of a "take charge" type of guy. I'm still that way to a certain degree, but I listen now. Last year, I didn't listen to them. That's what I feel I did wrong last year. And, I realize this year that I was doing it wrong last year.

Members of the College of Engineering would like for the program to aid in securing National Science Foundation (NSF) funding. NSF (1997) published a list of requirements for funding engineering programs. To receive funding, an engineering program must show evidence of curricula that, ". . . provide learning experiences that meet the needs of students with different learning styles" (NSF, 1997, p. 4). The data imply that the facilitator training program meets the needs of students who prefer a more social style of instruction. One facilitator reported:

> I enjoy having a social aspect to this school and to be able to say, "Man, I'm really struggling this semester, or here are the classes that I'm taking" and then when everyone is like, "Well, you shouldn't have taken all those classes," at least I feel better for you know, struggling through it, you know that type of thing. And to get to know the people that you see in class everyday and that type of thing I think is beneficial.

To receive NSF funding an engineering program must also, ". . . stress active, collaborative learning with less dependence on lectures" (NSF, 1997, p. 4). The facilitator training program employs a practicum structure that is common in group

counselor training (Corey, 2000). This structure employs a variety of educational methods in addition to traditional lecture methods.

Based on facilitator descriptions, it would appear that members of the College of Education are supplying a facilitator training program that is evaluated favorably by its participants, and that is meeting the needs of The College of Engineering to secure accreditation, funding, and skill development for its students. These results lead to the conclusion that the partnership is beneficial to both parties and should be continued.

Implications for conducting phenomenological research. A third set of implications of the results from the present study is related to the utility of phenomenological methods for investigating a design team facilitator training program. One concern voiced by consumers of phenomenological research is whether or not a specific interviewer influenced the contents of participant descriptions to the extent that the descriptions are not a reflection of participants' experience (Polkinghorne, 1989). In anticipation of this concern, a second interviewer was recruited for the present study. Similar themes and sub-themes were found across both the interviewers in the study. The similarity in findings across two interviewers is evidence that the results are a reflection of facilitator experiences.

These phenomenological data were also useful for generating suggestions for program improvement. Patton (1990) reported on the utility of qualitative data for improving educational programs. Qualitative data are useful because they provide in-depth and direct insight into the experience of the participants. When developing the program, the instructors anticipated the experience of the students and designed the program accordingly.

While anticipation was a useful strategy for piloting the program, phenomenological data provide information for re-structuring the program to account for student experiences.

Suggestions For Future Research

The results of the present study can be used to formulate suggestions for future research. Researchers could apply the phenomenological method to a variety of experiences similar to the experience of a design team facilitator. Future researchers could also explore the relationships between described experience and the characteristics of phenomenological research participants. Investigators could use quantitative research to supplement qualitative findings. Finally, future investigators could research other applications for the group practicum structure used in the facilitator training program.

Future researchers could focus on experiences similar to the facilitation experience investigated in the present study. Researchers could narrow the phenomenological investigation to focus on various aspects of the design team facilitators' experiences or widen the investigation to include different types of facilitators. The investigation could be narrowed to focus on specific themes such as facilitator expectations. Researchers have found that an individual's expectations have a strong effect on goal setting and involvement in a project (Kernan & Lord, 1990; Tinsely, Tokar, & Helwig, 1994). A broader description of facilitator expectations could lead to increased understanding of facilitator actions in the training program.

Researchers could widen their phenomenological investigations to include other types of facilitators. One example of this type of investigation was conducted by Conyne (1998, p. 247) who surveyed experienced counseling group facilitators on a series of open-

ended questions designed to, "... elicit descriptive, qualitative accounts of the leaders' personal experience and meaning in group work leadership." This type of research could be further expanded through the use of phenomenological methods with management team facilitators or group therapy leaders.

Future researchers could supplement their qualitative data with other types of qualitative or quantitative data. This is known as mixed-method investigation, and is becoming a popular method for assessing educational programs (Patton, 1990). Although facilitators provided helpful, critical feedback on the curricula, they provided less critical feedback of the instructor or the instruction. One useful strategy would be to include a series of anonymous written questions for facilitator feedback (Goldstein, 1986). Data collected in this fashion may provide a broader range of critical feedback.

Future researchers could collect quantitative data on design-team facilitators as well. In the present study, facilitators described learning a variety of team skills and applying these skills in their teams, jobs, and classes. These qualitative descriptions could be supplemented with skill surveys filled out by the facilitators or behavioral rating forms filled out by the team members. Poole et al. (2001) developed a skills survey to be administered to freshman to rate engineering skills before and after the semester. A similar skills survey could be developed for facilitators to rate the development of their skills.

Future researchers could further explore the relationship between the characteristics of research participants and the experience under phenomenological investigation. In this study, an investigation of facilitator Myers-Briggs scores indicated that extroverted facilitators provided more content than introverted facilitators, and thinking-type facilitators

provided more critical evaluation than feeling-type facilitators. These findings can be interpreted to suggest that facilitator personality characteristics modified reported experience. Polkinghorne (1989) stated that characteristics of the interviewer might affect reported experience in a phenomenological study. This hypothesis could be extended to suggest that characteristics of the research participant could affect reported experience as well. Currently, the only criteria reported in the literature for research participant selection is that participants have had the experience under investigation and are sufficiently articulate to relate the experience (Polkinghorne, 1989). Future researchers could include individual difference variables in their phenomenological studies to see if other participant characteristics modify reported experience.

Finally, future researchers can look at other applications of the traditional counseling practicum structure which was the model for the facilitator training program. This structure received an overall positive evaluation by the engineering facilitators and appears to meet the needs of the College of Engineering faculty. This type of structure could be exported to other engineering schools or tested in a college of business for management team facilitators.

Summary

Engineering educators have been restructuring their curricula to conform to new industry and accreditation pressures. One curriculum change has focused on integrating teamwork into the curricula. Instructors have included instruction in facilitation skills as one type of teamwork training.

Engineering educators have turned to other university programs for assistance in developing new team-oriented curricula. At the University of Tennessee, members of the College of Engineering have formed a working relationship with members of The College of Education to develop an engineering design team facilitator training program for engineering upperclassmen. This type of program was a novel effort for both colleges and it was determined that a thorough understanding of the experience of the program's participants would be a useful research effort. Existential phenomenological research methods were employed to investigate participant (e.g., facilitator) experience.

Researchers analyzed the data and found five themes in the experience of the facilitators: Teams, Facilitation, Learning, Evaluations, and Expectations. These data were discussed in relation to research on team facilitation, engineering education, and training program design. The data were used to draw implications for restructuring the design of the program, for evaluating the effectiveness of the program, and for the use of phenomenological research methods. Finally, the data were used to generate possibilities for future research.

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APPENDICES

APPENDIX A

INFORMED CONSENT FORM

APPENDIX A: INFORMED CONSENT FORM

You have been invited to participate in a study of the experience of participating in a group facilitation class. Your part in this research will involve participating in an unstructured question-and-answer interview in which you describe your experiences in the group facilitation class. The interview will last approximately 30-45 minutes.

Since your participation in this study involves a question-and-answer interview there should be no risk or discomfort on your part. Your participation in this study is completely voluntary, and you may withdraw from the study at any time without penalty. Your answers to the questions will not in any way affect your standing in the class or future classes you might take.

The information you share about your experiences will help provide the foundation for further research on the experiences of students in a facilitation class. Please understand, however, that your identity will in no way be revealed to anyone other than the interviewer at any time. The audio tapes will be numerically coded before they are transcribed in order to maintain your anonymity. All original tapes will be erased after they have been transcribed. Signed consent forms will be kept for three years after completion of the study. The forms will be stored in a locked file box at a University of Tennessee facility. Tapes and any other identifying information will also be stored at the same location until they are erased at the completion of the study.

Upon completion of this study, the researcher will provide you with an explanation of the findings, if you so desire. Any questions you may have about this study may be answered by contacting Daniel Knight at (423) 974-5131.

I have read and understand this explanation of the research project and have had my questions regarding the study and/or my participation in it answered to my satisfaction. I voluntarily agree to participate.

_____ _____

Name Date

_____

Signature

APPENDIX B

TRANSCRIPTIONIST'S PLEDGE OF CONFIDENTIALITY

APPENDIX B: TRANSCRIPTIONIST'S PLEDGE OF CONFIDENTIALITY

As the transcriptionist for this study, I understand that I will be transcribing confidential interviews. The information in these transcripts has been revealed by research participants who participated in this project in good faith that their interviews would remain strictly confidential. I understand that I have a responsibility to honor this confidentiality agreement. I hereby agree not to share any information in these transcripts with anyone except the primary researcher of this project, Daniel Knight or the research advisor, Mark Hector, Ph. D. Any violation of this agreement would constitute a serious breach of ethical standards, and I pledge not to do so.

Transcriptionist_____

Principal Investigator_____

APPENDIX C

SAMPLE INTERVIEW

APPENDIX B: SAMPLE INTERVIEW

Q: We are here today with one of our facilitators, and I'm going to ask him a question. What has been your experience of participating in the facilitator training program?

A: I really enjoyed it. It's actually a lot of the reason I got into engineering to begin with. I really get off on trying to understand the problem-solving process. Since I've been involved with the entire Freshman Program as a student and now as a facilitator, I've been able to see how different aspects of problem solving can be developed further in certain situations. That's something that I found extremely rewarding in my decision to come to UT to begin with.

Q: Yeah, do you want to say some more about how being in the facilitation class and being in the Freshman Program has affected this understanding of problem solving?

A: Certainly. First of all, just the understanding of the fact that different people work and think and feel different ways has been huge. I was starting to look at people and actually trying not to judge immediately, but when I meet people I generally observe people. I find myself imagining what they'd be like to work with. What sort of approach they would take to problem solving. What sort of things would stimulate that part of their brain which is capable of solving problems. This whole experience has been something that just really facilitates that part of me and that part of my education here.

Q: Do you want to say some more about what in the experience facilitated that?

A: Allright. I wanted to work with the teams and be a part of the teams. My first semester here I was part of an extremely organized, successful, and fun-to-work-with team. We got a lot of creative and efficient projects done. I learned a lot about how having other people to depend on can improve my own work and can pick up for some of the faults I have in the way I work and in the way I problem solve. The second semester I was here, I had a really, really lousy team that pretty much degenerated into me and one other person. The results of our projects, a lot of times, looked a lot like the results of projects which I might have taken on myself as more or less the more dominant of the two people in my group. The results were extremely disappointing. It reflected an individual trying to do a project that's more suited for a team. That helped me appreciate how important the contributions of other people and other viewpoints are to teamwork. As a facilitator, I've been able to observe how the different personalities, the different problem-solving methods, the different work ethics and work methods of individuals can combine to hinder or to facilitate teamwork. That's been something I've really enjoyed. Trying to focus on that, bring that out, and keep the negatives which may be associated with that, and keep the negatives which may be associated with having to work with people in general to a minimum has been a skill that I think I've developed this semester that I didn't have to this extent before.

Q: So something about being a facilitator yourself has developed that beyond--

A: --beyond being on a team. Very much so.

Q: What is it about the facilitation that has developed that for you?

A: Obviously there's no pressure to complete the projects. It's not my work, it's their work. I've really never had much of a problem not crossing that line into helping them technically with their projects. It's not my project, and I don't care that much. On the other hand, I'm usually extremely proud of the work they do. One satisfaction they get from their work could be from them seeing how they themselves have come up with a project that as a team none of them could come up with as individuals, because that's what I got out of it as a freshman. Trying to get that out of everyone I facilitate has been my main goal. There's just so many people from my class that didn't quite click with their teams and never got that experience. I just want to make sure that, even if things aren't working out quite right, that they can see that, "Well, this works out here, this works out here. If things were working out right, this could be a really big deal!" So I try to do what I can toward that end.

Q: Yeah, can you think of a specific time in your group whenever something like that happened?

A: Allright, I'll talk about my second group, the group with no team name, but a sort of a symbol, five guys, and five guys from small cities in Tennessee and North Carolina. They've got actually pretty different backgrounds for guys from similar areas. At the same time, they're just five guys all up here, first semester. A lot of times, the background similarities can obscure the working and problem-solving dissimilarities in people. What I tried to do early on was try to get them to acknowledge where they're different, and try to get them to work with that instead of ignoring it. Ignoring it a lot of times prevents them from seeing some of the negative things that are happening such as one member who was more or less more introverted than the rest of them, and wasn't always getting his ideas out. They'd just all sit down, they'd joke, it was all just one big bullshit session every time they went to solve problems. He wasn't always getting in on that, and the reason they didn't notice it is because they didn't realize that he works different, and that he thinks different, and that he solves problems different. So, that's an example of how I tried to show them what's different about them despite what's the same about them.

Q: Okay, so you tried to get them to focus and bring out the differences rather than sweeping them under the table.

A: Right.

Q: Alright, you mentioned that you had two groups this semester. Did you want to say some more about what that was like to have two groups?

A: This semester it was absolutely great to have two groups. From the first day when I went in there, after I met with the first group, I was so pleased with the way things went and so excited about getting to know the five team members--even though only four of them were there most of the time at that meeting. I was so excited about it that I really didn't even want to meet this second group, because I wanted to focus on this one group and learn about them and be a part of their group. As the semester went on, I got to see how contrasting both these teams were. It was a cool kind of contrast, too. It wasn't a, "This team is good, this team is bad." It was a, "This team is good here, here, and here. This team is good here, here, and here. This team could use some adjustments here, here, and here. Whereas, this team doesn't know what in the heck they're doing here, here, and here." It was really cool to try and decide what factors were causing this group to be more effective at this and what factors were causing this group to be more effective at this and this.

Q: It sounded like, by seeing them both in contrast, it was more helpful in helping you understand each one.

A: Yeah, I've thought about, I wonder if I traded this team member for that team member if it would be able to increase their efficiency here without taking away from the creativity here. At the same time, if I brought this dude over here, could he increase this team's creativity here without decreasing their work ethic here.

Q: Yeah, so having the two teams gave you a broader understanding of dynamics in general.

A: It showed that there's different kinds of good teams. There's different things to look for in a good team. Having two teams with ten people who are committed to engineering, and committed to school, and committed to their teams really helped. I didn't have to deal with the non-teamwork problems of laziness, idleness, or just not caring at all about what was going on.

Q: Yeah, so you've found that both of your teams were very involved.

A: Right. I was able to study how to solve problems rather than how they got everyone together at the library.

Q: Okay. You said something about--you talked both about being outside the group in the project and being a part of the group as well. Do you want to talk about how those fit together?

A: Definitely. I liked being a part of the group. I liked being able to show up and feel like one of them without feeling like an outsider. Yet at the same time, it's not my project and I like for them to not feel like I'm interfering with their project or feel like I'm obligated to help them with their project for being in the way all this time. So, most of the semester I

tried to become a part of the team more or less as like a friend or an extra teammate without being someone they needed to depend on or someone that was getting in the way.

Q: You said you tried to do that. How did you go about it?

A: With the first team, it's not that hard at all to not get in the way. None of them work in a similar way that I do, and so it's very easy for me to see, "Well, what I'm doing here is interfering," or, "What I'm doing here is assisting too much," because it's obvious to me when that's happening, because it's the way I'd be working as opposed to the way they'd be working. With the other group, there's guys that are more similar to me. So I took myself out of the working context even more by all of us going to eat, which served billions of different functions this semester, going to eat with these guys. The reason we started is because they don't get a meal plan on Fridays. It brought out--I could tell that every Friday, they'd be leaving ten minutes early to try to sprint to the cafeterias before they closed. So the only way to get to the cafeteria to eat, to save that ten or fifteen minutes, plus fifteen, twenty, half and hour or an hour, because we'd just sit there and continue talking while we were there. While they met, I wasn't able to see them in a working environment. However, this team was the team that had a little more problem working in general. I didn't realize it at the time, but looking back on it, the meetings on Fridays that were extremely informal, helped to smooth out some of the non-problem-solving problems that arose on the teams. Guys not pulling their own weight, not being organized enough to get everyone involved, just the stupid stuff that happens that you have to deal with that you shouldn't have to deal with. Those things could get addressed on Fridays without the pressure of having to get anything done. When they met to get things done, they didn't have to worry about them as much. I think that helped that team a whole lot. It helped me to observe them in a setting where they're more comfortable working in.

Q: Can you think of a particular time when you were in there with lunch with them when you had to address something?

A: As a matter of fact there was; it turned out to be nothing, maybe because we addressed it, maybe because it was nothing. They had started to wonder if one of the team members might, down the road a couple of projects, start not contributing as much, start not showing up. Just because he had missed a couple of outside-of-class meetings for questionable events such as parties or intramural football games, and because he didn't seem as into the whole team problem-solving part as the rest of them were. So, I started to wonder about if that would happen, and if it would, what they could do. So in a meeting where he left early from lunch, we stayed and talked about ways that they could get (Team Member) more involved in the next project, like, “In this project, we'll let this be (Team Member's) project, he can organize it, he's going to get things done. He might not even have the biggest workload, but (Team Member) is going to have the biggest hand in the direction this project takes, and we're hoping that as he is forced to work with us and forced to get this project done, he'll become more aware of what happens in the process of completing a project and be more sensitive to his obligations to the team and the roles he should fill.”

Q: How did it go?

A: It went well. (Team Member) became one of the guys that were there at every meeting even when most of the other guys weren't, probably just because it was really never a problem to begin with. At the same time, the question was presented, and it gave me the opportunity to at least consider different methods of approach. It gave me something to talk about with (Supervisor) and the other people in our other facilitation group. Even if it wasn't a problem, it was a solution that could be implemented should another problem ever arise in another team I've facilitated--or a member of.

Q: Okay. So, that information--or going through that experience--you think might be helpful if you find yourself in another situation like that.

A: Massively. In fact, I wish I would have addressed problems better like that last year when I was in that second semester group that degenerated very rapidly down to two people. Maybe I could have gotten the other group members more involved.

Q: Yeah. So, some of the stuff that you've gotten out of this semester, looking back, would have been helpful with that.

A: And since looking back, I think it might have been helpful then, I can definitely leave it open that it might be beneficial in the future.

Q: Okay. So these are some of the things that you see yourself taking away from it.

A: Right.

Q: Allright. You mentioned (Supervisor's) group and being in there. Do you want to say some more about what that was like?

A: I thought it was really cool. We spent the meetings mainly talking about our groups, talking about the problems we had with our groups, and discussing ways to solve those problems. A lot of times, we have to deal with some of the massively dysfunctional groups, such as (Facilitator's). Every week it was something different, something totally unrelated to the normal difficulties associated with different personalities. It was the difficulties associated with different people, people with different goals and different directions. We were able to do what we could to salvage some hope for them getting that team in line, but it's just not as fun when things aren't working right.

Q: Right, and you were kind of watching them, or listening to them talk about it.

A: Right. It made me appreciate my own groups a lot more, and how effective both of them were.

Q: Okay, so it kind of gave you some picture into how bad it really could be without actually having to be involved in it.

A: Right. At the same time, I could listen to other teams with different problems with working with different personalities than I'd encountered. I have a team that has similar problems as (Facilitator's) team or (Facilitator's) team or any of the other guys' teams, maybe something will click. Maybe I'd say, "Hey, didn't so-and-so have that problem? Didn't he solve it like this? Maybe I should try that." It gave us an opportunity to talk about our teams. I find a lot of times just being either forced to, or allowed to, or being given the opportunity to talk things out will allow you to reason things out at the same time. Having that opportunity every week to sit down and devote an hour to considering your teams, definitely helped with gaining insight into what was going on with them.

Q: Just the act of going through and talking it out put the pieces together in your head.

A: That alone was beneficial.

Q: You mentioned (Supervisor) as well. Did you want to say a little more about what it was like to be working with him?

A: I really like (Supervisor). He's extremely calm and quiet and laid back. He just facilitates the discussion. He lets it go where it goes. Yet, at the same time, he manages to keep it on topic. I liked the interest he shows in us and in our teams. Seeing that we learn from our teams, seeing that we're able to assist our teams, and working together. I just really enjoyed working with him.

Q: Okay. Anything else about any of the other instructors you worked with.

A: (Instructor), running into her in the computer labs, talked to her about different things, she discussed the possibility of an engineering communications degree. Some of the other things she's doing, like some summer program with middle-school kids in rural areas learning about computers and physics and crazy stuff. It's just neat to talk to people with really different views on education and problem solving.

Q: Anything else about any of the other instructors?

A: Uh, let's see...you! Yeah, I liked you! I actually enjoyed the seminars. I enjoyed the topics. A lot of the times, I wished we were given an opportunity to implement some of the activities we'd had planned more effectively and more timely. A lot of the things we did this year, I could see, wait a minute! I'm actually learning something about the team from this, but it's running out of control, running out of time, what am I going to do? Oh well, I'll just stick it in a folder and forget about it. Like with the-- whatever the deal was where they-- where you listen to how they spoke with each other. Oh, that's a checkmark for listening.

That's a checkmark for silent. You can sit there, it seems dumb to put checkmarks in boxes. I'm going along and saying, "That's another interruption for so-and-so, another interruption for so-and-so. So-and-so might have a problem with interrupting people!"

Q: Right.

A: But we didn't get to practice it enough that I was able to get everything we could out of it. So, I think maybe working on how some of those things get implemented would benefit the class.

Q: Yeah. How would you have it, if you could.

A: First of all, the communication things should be something we do frequently. Frequently, just take five minutes out of any session to just sit there, and say, "Check here, check here, check here, check here." We'd become fluent with it. It would become not that big of a deal, and we'd start noticing things. We'd start actually considering how to address things instead of worrying about how to observe them. Some of the other things, like the activity we did with the notecards, and the butcher paper?

Q: Brainstorming.

A: That was something I had wanted to do the entire year. Get the team down, get the team together, and more-or-less guide them through an alternative way of getting ideas presented, which would maybe get some of the ideas out of some of the other members that weren't contributing as much. It's something I feel like should be introduced much, much earlier when they haven't gotten locked into a routine process of brainstorming...where they'll be more open to new ways of brainstorming. It should also be more timely, at a time when they need to get at problem solving. I don't think that we met with the teams enough right after they got their project and began brainstorming on it. I think that's a lot of where the project is shaped is in those initial meetings where they toss out ideas. If we could alter the way ideas got tossed out, I think it would show a little bit more about the possibilities of using their team to produce different results.

Q: Okay. So, that's several things that you brought up there, one being that you'd like more depth on some of the exercises. Is that--

A: Definitely.

Q: And also some of the exercises to be switched around to different times as well. You were going to say something?

A: I was going to interrupt you is what I was going to do, checkmark for me!

Q: He's learned nothing!

A: Poor communication skills give me away!

Q: The last thing I was going to throw out there was just that it sounded like you wanted the timing of giving the exercise to correspond a bit with your meeting with them. Do you have any more thoughts on any of that?

A: One more thing I'd like to say about the butcher paper activity. A problem my group had with it and a lot of other groups had with it was not knowing what problem it was they were addressing. An activity that is very similar to it, that I toyed with using instead of random observation meetings just for the hell of it a couple of times is one that (Facilitator) had tossed out early on. More or less, get a big sheet of butcher paper, and instead of putting it on the wall, you set it on the table. Everyone is sitting around the table. In a circle you put more or less the topic you'll be addressing. You put spokes radiating from the circle toward each of the team members, same kind of deal where you get five minutes to write down ideas. You write down ideas, try and start going with something. It doesn't really matter what, it can be anything related to the topic. It doesn't have to be related to a specific problem, and then, bam, rotate the butcher paper. Then you've got someone else's ideas, someone else's something in front of you. Maybe it's about the same thing yours is about, but with a different approach. Maybe it's about something else entirely. You look at it, then you add to it, and you say, "Well, that's kind of cool. If we're going to do it this way, why don't we do it this way too," then add something to it, maybe put an argument against it in there. Then you rotate it again. You're like, "Whoa! Here we were talking about design, we've got different things that need to be considered before we know what's going to work well on the designs." So, here's this guy, and he's thinking, "Testing. Well, we'll see. Maybe we can test like this." By the time it gets rotated around a few times, everyone starts looking at all the different aspects of the project instead of getting locked into one. It also solves the problem of not knowing what it is they're trying to accomplish with the butcher paper, because it's open-ended in nature. So it allows them to go into it without feeling obligated to stick to one thing.

Q: Yeah, that's a good idea. So one thing that came up for you and some of the other facilitators is not being totally sure up front what exactly the goal for the butcher paper project was.

A: Right. Well, I knew what the goal was. The goal was to put the project itself in an instructive light. However, to the teams in a functional light, I'm not sure they knew what it was doing, because they didn't have an actual problem that they were addressing. Whereas when we ran the exercise here, it's--what was it? What's cool and what's not cool about teams?

Q: Yeah, what's standing in the way? What barriers--

A: What barriers are standing in the way of teamwork? That's very specific, you can toss out ideas and get them up there. When it's, "Okay how are we going to build a tractor?" Uh--you need some wheels. Okay, wheels! Wheels go up here. Any votes for wheels? Eight of you vote for wheels! Way to go, you guys decided to put wheels on your tractor! This has been an extremely productive team meeting."

Q: So, what was missing was some real integration between the exercise and the task that was laid out for them. Okay, I've got that. Anything else about what it was like for you, running the exercises?

A: I tried not to gloss over the exercises when I ran them. I tried either not to run them at all a couple of times or to run them the whole class period. Just like, "Okay, screw it. You guys are not going to get anything done. We're going to do this, and we're going to do it right, and I don't care what it's going to do." I feel like a lot of times, you guys design these exercises for us to do, but you give us a scapegoat by making them to where maybe they don't hit at everything hard enough so it won't take as long. It won't be as frustrating. Then it's just so much fluff, so much stuff to get through. I feel like it ought to--if you're going to do it, you've got to pound it in there, and say, "This is what we're doing. This is what you guys are doing. This is how it's going to make you a better team regardless of the fact that you aren't actually working on your project."

Q: I gotcha. So when you say, "water it down" or "fluffing it up," it felt to you like some of the exercises were hedged a bit.

A: Oh yeah, definitely.

Q: Okay. Can you think of one in particular?

A: It's tough to think of one offhand, but just in general a lot of the things we did seemed like something that--when you go in there, a lot of the facilitators and the teams would be concerned with getting it over and done with rather than actually getting it to benefit the team. If it's not going to benefit the team or the facilitator, it's not worth doing at all. I feel like we should probably, if we're going to do it, we should probably go ahead and smack them over the head with it. If you're going to do that, neither of my teams have had a problem with it. Every now and then, I'd run across, "Hey, (Facilitator) are we going to have to do anything this week? No. That's cool." Or like, "Yeah, we're going to have to do something this week. Really? Yeah, you're going to do it, and you're going to like it. Alright, whatever."

Q: Right. So what you're describing is--at least you've described other facilitators getting it over with. What was going on there?

A: A lot of times the teams don't immediately see what value can be gained from exercises that don't directly relate to their project or don't obviously relate to the project. If

you're not going to make them do the exercise, and force them to at least be able to see how it could have benefited the team, they never will and there's just going to be this constant conflict between the facilitators and the team, is the "Okay, here I am. I've got things I've got to do. You've got things you've got to do. Let's see if we can get them done," rather than, "I'm the facilitator. I'm here to help you guys. This is going to help you guys, and you've just got to trust me on it." That's the approach that I tried to take.

Q: Right, and you contrast that with the approach where somebody just kind of comes in and gets it done.

A: Where someone wants to appease their team and to not cause problems with their team by doing what the team wants. When actually that might not be what benefits the team.

Q: Right. It would benefit the team the most to get what you want out of running with the exercises. Okay, or not do it at all.

A: Right, or not do it at all. I feel like most of the things that we had to do were worth doing. For instance, taking it back to the box checking of the--to me that just looked like the dumbest, cheesiest, "I'm never going to learn anything from this." As I sat there, trying to do it, I began to see where this could be useful if we had spent more time talking about it, talking about what it meant. After we did it, if we discussed it, looked at the results, discussed what the results might mean, discussed if there is a problem with the results, discuss how you might fix the results. Just running the project for the sake of running the project didn't benefit a lot of people.

Q: I gotcha. It's more depth. Okay. Well, as you look back across the semester what else sticks out for you?

A: Just working on the team, really, being around different team members. I liked walking around campus, "Hey (Team Member)!" It's your team, that's your team dude right there. It's like walking around, “Guys! That's a guy on my team.” If you see them all in a group, it's like you know they're working on their project. It's like, "Oh, you're working on your project!" That's cool.

Q: Yeah. What is it exactly that's cool about it?

A: Getting to see how you can form personal relationships with people from a working environment. That's something that I really, really drew on my first semester up here with my teammates on that first team. Getting to see my teammates now making that kind of connection with each other is cool. It's also cool to see that, as a facilitator, I can develop the same kind of thing with them.

Q: Okay. Just making the connection with them was a real cool experience for you.

A: Right. Definitely.

Q: Seeing them around campus. More people you know. As you think back across it, does anything else come to mind for you?

A: Oh, boy. Lots of things. For me, a lot of it comes back to problem solving and working with people. Those two things are the two things that are huge to me. Actually, I plan to teach. The whole reason I got into engineering anyway was to facilitate a different approach to teaching in a junior high context. I wanted to come with actual experience behind me. I wanted to come with, "This is what you're learning. Yes, you'll use it, and you're going to use it now. I'm not going to gloss over this, and I'm not going to gloss over that. This, you factor in and it sucks, and it's stupid, but at the same time things break down into situations which can be modeled by an equation which you have to factor to find out about it. Here's that situation. It happens. I've been there." You know, I want the confidence to come to that experience. I want the insight into problem solving that comes with that. I want to challenge myself, because I've never been a math person or a science person. I've always been an English person and a language person. Challenging those parts of my brain didn't always click at the right time, and getting them to click helps me understand how you get things, which don't come easily, to click. How to get that future sorority chick in your seventh grade math class to suddenly realize, "Wait a second, this goes from here to here, and it goes this fast. I can find things out from that." That's something, I think, this has facilitated me in learning how to solve problems and learning how things click for different people and how working with other people can illuminate how things click for other people. If someone never has the opportunity to work with someone who's a great musician, they'll never even have a clue what happens when a song gets written. But if they're able to work closely with that type of person and see what goes on, maybe they'll have just a little bit of hint about what they go through when they create. That's the kind of thing that I've wanted to get out of engineering and which has been allowed me by this facilitation program--was beyond what I ever expected.

Q: Just the opportunity to challenge those parts of yourself that you're not inherently good at and hopefully apply them down the road in your teaching goal?

A: It's also been cool being around guys like you, (Instructor), (Instructor), and (Instructor). People who threw this thing together, that are trying to make it work. That's exactly what you guys are doing, trying to find new ways to make those connections, new ways to get different people to look at things different ways, better ways to deal with things, better ways to teach things, better ways for people to learn things. Being around people that are into that or are working on that gives me ideas, just gives me a lot. I really appreciate being able to be around all this.

Q: Okay. So that's a lot about what's made it a really rewarding experience for you. Well, did you have anything else?

A: Not off the top of my head. No.

Q: I don't have anything on my list either. I guess that about does it. I appreciate it.

A: No problem.

VITA

Daniel W. Knight, Jr. was born in Ferriday, LA on January 11, 1967. He was educated in Ferriday at Huntington Academy. He attended Louisiana State University where he was awarded a Bachelor of Science in Psychology. Afterwards, Daniel enrolled in graduate school at the University of Tennessee where he earned his Master's degree in Industrial and Organizational Psychology and his Doctorate of Philosophy in Education. Daniel is currently working as an Assessment Specialist for the Integrated Teaching and Learning Laboratory at the University of Colorado at Boulder.