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Engineering residential learning communities: evaluating the impact on freshmen engineering students

Margaret Flynn

ENGINEERING RESIDENTIAL LEARNING COMMUNITIES:

EVALUATING THE IMPACT ON FRESHMEN

ENGINEERING STUDENTS

by
Margaret A. Flynn

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ABSTRACT

Margaret A. Flynn
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The purpose of this study was to investigate the impact of an engineering living-learning community (ELLC) on freshmen engineering students. A control group of non-ELLC participants was used to compare the experiences of the ELLC students. Data were collected using Likert scale survey items and open-ended questions. Analysis of the survey data showed that there were significant differences between the ELLC students and non-ELLC students in how they responded to questions regarding social support, academic support, connectedness to campus, and satisfaction with the college of engineering and Rowan University. A focus group of ELLC participants was also conducted to get a better understanding of the participants' level of satisfaction in the program. Students reported that the ELLC program allowed them to make friends quickly and provided them with academic support. They also indicated that they wanted more say in ELLC programming and more diversity within the group. Furthermore, they mentioned that disputes were common among peers, but that they tended to be resolved quickly. Overall, the ELLC focus group said they were very satisfied or satisfied with the program and seemed happy to be part of the ELLC.

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As the first Flynn female to go to college, and the first in my family to receive a master's degree, I would like to dedicate this thesis to my family, and particularly to my younger brothers as a reminder that we can accomplish just about anything we put our mind to. Follow your heart and never give up.

TABLE OF CONTENTS

APPENDIXES

LIST OF TABLES

Chapter 1

Introduction

Statement of the Problem

Nationally, only 55% of students enrolled at a public four-year higher education institution earn a bachelor's degree within six years (National Center for Education Statistics, 2011). Tinto (1996) suggests that some causes of low retention rates could be a result of academic difficulty, difficulty adjusting to college, and feelings of isolation. He stresses that universities must focus on integrating the academic experience with the social experience in order to retain more students. Zhao and Kuh (2004) reported that academic performance and retention could be improved by enhancing students' sense of community, developing student-student and student-faculty relationships, and by creating a positive freshman experience.

Research shows that graduation rates tend to be even lower for engineering students. It is estimated that only about half of all freshmen who start out in engineering in the United States actually graduate with an engineering degree (Astin & Astin, 1992). The rigorous course load, mixed with a new environment, could be overwhelming for some freshman engineering students. A lack of community largely affects engineering students' overall satisfaction with college (Astin, 1993), and could attribute to their desire to switch majors, transfer, or drop out.

In an effort to retain more students, Rowan University's College of Engineering has created an engineering living learning community (ELLC) for freshmen students.

The goal of this ELLC is to create a sense of community for engineering students, improve academic success, and increase student satisfaction. To achieve these goals, the ELLC strives to help ease students' transition from high school to college, encourage peer-peer and student-faculty interaction, and assist students in making connections to the campus. This study evaluated the ELLC through surveys and focus groups to measure the impact it had on participants and to see if it met its goals.

Significance of the Problem

Although there is a significant amount of literature on basic learning communities and residential learning communities, there seems to be a lack of published research on engineering living learning communities. Studies show that living learning communities (LLCs) promote critical thinking and that participants are more likely to perform better academically than non-LLC participants (Schroeder, Mable, & Associates, 1994; Shapiro & Levine, 1999; Zhao & Kuh, 2004), but there are little data indicating the academic impact of LLCs on engineering students. Research also suggests that LLCs increase student involvement in and out of the classroom and increase student satisfaction with college overall (Kellogg, 1999; Zhao & Kuh, 2004), but again, there are little data to show the impact of LLCs on engineering student involvement and satisfaction.

Faced with a demanding curriculum and an intense work-load, engineering students are left with little time to socialize or meet new people. This study was designed to compare the ELLC experience with non-ELLC students and to evaluate the impact of the ELLC on participants.

Assumptions and Limitations

This study was completed at Rowan University in Glassboro, NJ and was limited

to the freshmen engineering students during the 2012 spring semester. It is assumed that all surveys and focus questions were answered truthfully and to the best ability of the participants. Researcher perspectives and relationships to the participants in the focus group may present bias in the findings. Participants were purposefully selected to reflect diverse views of the ELLC, but focus group participants may not reflect the views of all ELLC members. Furthermore, research was conducted towards the beginning of spring semester; it is possible that freshmen student opinion could have changed at the end of the academic year.

Operational Definitions

1. College of Engineering: Refers to one of the six academic colleges at Rowan University which contains four undergraduate majors, including chemical, civil and environmental, electrical and computer, and mechanical engineering. Additionally, there are 32 faculty members across the four engineering programs (Rowan University, 2009).

2. Engineering Living Learning Community (ELLC): Refers to 25 students in the College of Engineering at Rowan University during the 2011-2012 academic year who volunteered to live in close proximity to one another in the same residence hall and have four shared classes.

3. Faculty: Refers to the teachers at Rowan University that taught the freshman engineering students during the 2011-2012 academic year.

4. Living Learning Community (LLC): Refers to a general cluster of students who live in close proximity with a common theme and share two or more classes.

5. Resident Assistant (RA): Refers to the undergraduate students who lived on the ELLC floor and was responsible for assisting the ELLC students, and providing programs for them.

6. Residence Hall: Refers to the Rowan University on-campus housing facility where the ELLC students lived during the 2011-2012 academic year.

Research Questions

The study sought to address the following questions:

1. How do ELLC members report their transition to college, connectedness to the university, peer interaction, student-faculty interaction, and their overall satisfaction at Rowan University and with the College of Engineering?

2. How do non-ELLC members report their transition to college, connectedness to the university, peer interaction, student-faculty interaction, and their overall satisfaction at Rowan University and with the College of Engineering?

3. Is there a significant difference in the way ELLC members responded to the survey questions regarding their freshman experience compared to how the non-ELLC members responded?

4. What were the most satisfying and least satisfying aspects of participating in the ELLC?

Overview of the Study

The purpose of this study was to compare the experience of students in an engineering living learning community to engineering students not in an ELLC. The goal of this study was to evaluate the impact of an ELLC on participants' transition from high school to college, their connectedness to and involvement on campus, their peer

relationships, and their interaction with faculty. Additionally, the study sought to report the ELLC participants' level of satisfaction with the program.

Chapter II provides a review of the literature in relation to this study. It includes a brief history on the origins of learning communities; a discussion of the various structures; an examination of the benefits of living learning communities; an examination of the challenges facing living learning communities; and finally a summary of the chapter.

Chapter III describes the methodology used in this study. This chapter includes the context of the study, the population and sample selection, the instrumentation, data gathering procedures, and analysis of the data.

Chapter IV presents the findings and results of the study. The chapter focuses on answering the research questions by analyzing the quantitative and qualitative data.

Chapter V summarizes the findings and discusses the results. It concludes with recommendations for practice and further research.

Chapter II

Review of the Literature

The purpose of this study was to evaluate the effectiveness of a freshmen living-learning community (LLC) at Rowan University. This chapter presents research regarding the types, benefits, and challenges of learning communities. First, a brief history of learning communities is discussed. Next, the various structures of learning communities are examined and defined. The chapter then explores the literature pertaining to the benefits of learning communities, with a specific look at residential learning communities. Lastly, the chapter examines the challenges facing LLCs and the issues that could negatively impact LLC effectiveness.

Origin of Living-Learning Communities

Modern living-learning communities consist of a group of students who live together and have shared courses, thus increasing the potential for peer interaction and student-faculty interaction, with the intention of expanding the overall educational experience beyond the classroom. This concept of living and learning together is not new; it can be traced back to the beginning of American higher education, when colonial universities followed the British educational structure, and believed it was necessary for students to live on campus and be completely submerged in the learning experience. Seventeenth and eighteenth century students, for example, were practically inseparable as they ate, lived, and attended classes together, forming a community of continual learning (Burton, 1996). At that time, students needed to live on campus because it was usually

too far to commute, but also because it was believed that students needed to separate from their family and home-life in order to achieve the optimal learning experience (Vine, 1976).

In the late 19th century, the structure of American higher education slowly moved from the all-inclusive British structure of living and learning on campus to the strategic German research university model. This new structure focused on science and research inside the classroom and viewed residential life as separate and insignificant (Schroeder, Mable, & Associates, 1994). Teachers lectured, while students listened, and there was hardly any interaction between anyone (Stassen, 2003).

In 1927, Alexander Meiklejohn noticed the lack of student involvement in higher education, and formed the first official learning community at the University of Wisconsin-Madison, called the "Experimental College" (Kellogg, 1999; Smith, 2001; Stassen, 2003). Meiklejohn's program was a two-year learning community that focused on democracy and stressed active learning. The curriculum incorporated historical and contemporary issues facing the 20th century, and included assignments that enabled students to apply their lessons to real life. In this learning community, teachers would advise and facilitate learning, rather than lecture all day. For the first time, students were given a voice and were able to collaborate with peers. Meiklejohn, however, did not have the full support of the university, and his program ended after only six years (Smith, 2001).

The idea of the learning community was not practiced again until the 1960s. During that time, higher education had nearly doubled in size, due to the G.I. Bill, the Civil Rights Movement, and Title IV of The Housing Act of 1950 which allowed for a

surplus of new housing on college campuses (Schroeder, Mable, & Associates 1994; Smith, 2001). Universities needed to restructure in order to accommodate the massive changes on campus. Some schools formed cluster colleges, or residential groups, in an effort to promote a sense of community on campus. At the same time, Meiklejohn's "Experimental College" was recreated at the University of California – Berkeley by one of his former students, Joseph Tussman (Smith, 2001). Other attempts were also made, but universities were not able to gain full support from faculty and staff, and the learning community could not be maintained.

Learning communities resurrected once again in the 1980s, and for the first time, were able to sustain and be successful (Smith, 2001). University faculty and administrators collaborated and intentionally restructured the curriculum to connect students and faculty in common courses, and help students establish a support network (Kellogg, 1999; Shapiro & Levine, 1999).

Learning Community Structures

From school to school, and even within schools, there are several forms of learning communities, with a common feature being that students are grouped together sharing the same classes. Though the structures and styles of learning communities may vary, the overall goal remains the same; to promote greater interaction among students and faculty, help students become integrated in the university, and provide students with the ability to obtain a deeper understanding of the material being studied.

Kellogg (1999) describes five major learning community models that are used interchangeably. The first model, "Linked Courses," combines a group of students with two shared classes that are independent of each other; for example, one might be math

and the other could be writing. The next model, called "Learning Clusters," groups students together who share three or four theme-based classes, usually making up their entire course load. Third, the "Freshmen Interest Group (FIG)," links same-major freshmen students with three classes, provides them with peer advisors, and enforces a weekly seminar. Next, students in the "Federated Learning Communities" take three classes together, and a seminar class taught by a professor from a different discipline. Lastly, the "Coordinated Studies" model combines students with the same major, linking them with shared classes and the same teachers for a year (Kellogg, 1999).

In addition to Kellogg's (1999) five variations of learning communities, Lenning and Ebbers (1999) have designed a different, more generic framework, identifying only four models of learning communities. The first, called "Curricular Learning Communities," groups students into two theme-based classes. Secondly, the "Classroom Learning Community" combines students in the classroom and encourages group work. Third, students in the "Residential Learning Community" live on campus in close proximity to one another and take two or more classes together. Lastly, "Student-type Learning Communities" are designed to link a target group, like first generation students, honors students, or historically underrepresented students (Lenning & Ebbers, 1999).

This study focused on living-learning communities, or what Lenning and Ebbers (1999) refer to as the "Residential Learning Community." Adding a residential component to the learning community combines the benefits of having shared classes with the benefits of living on campus. At the same time, creating an effective living and learning atmosphere calls for greater collaboration among administrators and faculty, and full support of the university as a whole. It is suggested that successful living-learning

communities have the potential to increase student satisfaction, enhance retention, and positively influence the academic performance of participants.

Benefits of Living-Learning Communities

Living-learning communities have the potential to benefit participating students, faculty, and the university as a whole. Studies indicate that students who participate in LLCs are more satisfied with their undergraduate experience, are better able to academically integrate, are more involved on campus, more frequently engage in diversity-related activities, and are more likely to stay in college all four years (Kellogg, 1999; Zhao & Kuh, 2004). Additionally, studies suggest that LLCs positively impact faculty by increasing their motivation and creativity. Overall, LLCs help the institution by producing better teachers, increasing student retention and academic performance, and connecting all aspects of the university to a common educational goal (Kellogg, 1999).

Student involvement and satisfaction.

Astin's (1999) student involvement theory suggests that students who are involved in their college experience are more likely to stay in school and graduate. "Student involvement refers to the amount of physical and psychological energy that the student devotes to the academic experience," (Astin, 1999, p. 518). According to Astin, a student who is highly involved in his or her academic experience would, for example, devote a large amount of energy to studying, interacting with faculty, going to class, and participating in school activities. On the other hand, a student who is not involved may neglect his or her studies, skip classes, frequently leave campus, and choose not to participate in school activities (Astin, 1999).

In addition to involvement, Astin (1993) has done extensive studies on what impacts student satisfaction in college. His research indicates that leaving home to attend college positively impacts students' satisfaction with faculty, satisfaction with the curriculum, satisfaction with student life, and satisfaction with the college experience overall. Astin's research also suggests that peer interaction, and student-faculty interaction outside of the classroom positively affects students' satisfaction with faculty, satisfaction with curriculum, satisfaction with student life, and satisfaction with the overall college experience. Students lacking a sense of community on campus reported being less satisfied with their college experience (Astin, 1993).

The set-up of the living learning community allows participants to get involved in their college experience as soon as they arrive on campus. The residential aspect of the LLC gives students more time and opportunity to get involved on campus and to connect with other students in their major. It also allows for more time to study, time to seek help from a professor outside of class, and time to explore helpful resources on campus, such as tutoring. Furthermore, most LLCs are structured so that the participants have shared classes, thus increasing the chances that students are in courses with people they know. Students may be more likely to attend class if they have friends in their class that will hold them accountable and encourage them to attend. Plus, students may be more willing to attend class if they know their friends will be there. Having this community intact as soon as the students arrive on campus has the potential of strongly increasing student involvement and satisfaction.

Academic impact.

"Done well, the interdisciplinary and interactive nature of learning communities introduces students to complex, diverse perspectives, as contrasted with expecting students to come up with the 'right' answer" (Zhao & Kuh, 2004, p. 118). The structure of learning communities alone can increase critical thinking and promote learning (Shapiro & Levine, 1999; Zhao & Kuh, 2004). When a residential aspect is incorporated, the educational benefits have the potential to increase. In LLCs, students live together and share classes together, creating a continuation of learning and academic support inside and outside of the classroom. They are able to form study groups, ask each other questions, discuss academic issues, and encourage one another. Furthermore, living on campus provides students with access to on-campus academic resources, opportunities to meet with teachers outside of class, and the ability to participate in residence hall activities that reinforce education (Inkelas et al., 2006).

Zhao and Kuh (2004) found that participating in learning communities positively affects student's academic performance, is linked to "educationally fruitful" activities, and is positively associated with gains in class attendance. They found that students in learning communities report higher levels of academic effort, academic integration, and reported to be more active in collaborative learning. In addition, Zhao and Kuh's research indicated that students in learning communities interacted more frequently with teachers and had more classes that emphasized critical thinking. Other studies, which focused particularly on residential learning communities, found that students in LLCs had higher GPAs, performed better academically, and had more educationally beneficial

opportunities than non-LLC members (Pasque & Murphy, 2005; Schroeder, Mable, & Associates, 1994).

Retention.

Tinto's (1988) theory on student departure stresses the vitality of students' transition to college, and states that the first six weeks are the most influential in student persistence. To better understand the transition process, Tinto breaks it down into three stages. In the first stage, students must separate themselves from their former high school and home environment. Disassociation may be difficult for some students, especially those with a significant other at home or with close siblings, but students who are able to separate themselves will have a better chance of moving on to stage two in Tinto's theory, the transition period. The transition period is the time in which students are able to break away from past environments and associate themselves with their college community. When students are able to identify with the college community and have begun to socialize and form friendships, they are then considered to be part of the third stage, integration. Students are thought to be fully integrated when they have formed relationships with other members of the institution (Tinto, 1988).

LLCs help students, especially freshmen, through the separation and transition periods by assigning them to a group and creating an automatic community of people for them to see and interact with on a daily basis. When students feel connected to the university, socially and academically, they are more likely to stay at that institution (Stassen, 2003; Tinto, 1993; Tinto, 1996). Students have reported that living on campus, interacting with faculty, and building relationships with peers have positively impacted their willingness to re-enroll. Having a lack of community, however, had a negative

impact on students' willingness to re-enroll (Astin, 1993). Studies also show that being able to talk to faculty and participate in study groups helps students transition to college life (Inkelas et al., 2006). When students are satisfied with their college experience and do well academically, they are more likely to stay at that college and graduate. LLCs provide students with the opportunity and resources to help them successfully transition into college, build friendships, make better grades, and thus increases the likelihood of them persisting through all four years and graduating.

Challenges Facing Living-Learning Communities

LLCs have the potential to create unity within a university, by connecting the institutional mission and goals throughout campus. However, if some people in the university are not supportive of the LLC, unity cannot be achieved and the LLC is unlikely to succeed. For example, residential learning communities require the support of the housing department, faculty, admissions, and the university leaders. If faculty members are unwilling to adjust their teaching styles or agree on altering the curriculum, the LLC concept will not work. Furthermore, if admissions do not link LLC students' courses, or if housing administrators refuse to assign participants to the same floor, the program will not work (Geri, Kuehn, & MacGregor, 1999).

Communication among faculty and administration is the most important factor in creating a successful LLC. Each piece needs to understand what the other is doing in order to fit together. Housing administrators need to know which students are participating in what LLC so that they can assign the students to their appropriate floors. Admissions need to know which students are housed together in order to link them with the same classes. Faculty need to know what courses are geared toward LLC students so

that they can restructure their class. Also, faculty members teaching the same group of students need to communicate with each other to form a cohesive and interactive curriculum. Effective communication, however, is sometimes difficult, and can be a major challenge involving LLCs (Geri, Kuehn, & MacGregor, 1999; Schroeder, Mable, & Associates, 1994; Shapiro & Levine, 1999).

One way universities have been able to increase communication is by forming a leadership group, comprised of both faculty and staff, which is usually in charge of preparing the curriculum, training teachers, and organizing all other aspects of the LLC. Effective leadership teams hold summer retreats for participating faculty members, hosts conferences, and encourage faculty development throughout the year. The leadership team is also in charge of evaluating the LLC program, and creating ways to improving it (Geri, Kuehn, & MacGregor, 1999). The challenge, however, is finding the budget to maintain this leadership team.

Lack of money and resources is one of the major downfalls facing LLCs. Fortunately, most schools already have the residential facilities, but finding the money to adequately train faculty and staff, and evaluate the program is a challenge (Geri, Kuehn, & MacGregor, 1999; Shapiro & Levine, 1999). Also, without a budget, it may be difficult to keep class sizes small. Smaller classes could amount to more classes being taught, and more work for faculty members, therefore, more money would be expected. Yet, having larger class sizes in order to save money, could compromise the success of the LLC program (Shapiro & Levine, 1999). Smaller class sizes tend to positively impact learning because students are more likely to attend and participate in smaller classes.

Issues Concerning Living-Learning Communities

Although most of the research regarding LLCs is positive, there are a few issues that universities need to keep in mind. Having students live together on campus, for example, could cause too much socialization, and not enough effort put into academics. Alexander Astin's (1993) research on student satisfaction suggested that living away from home and peer interaction was positively linked to smoking, drinking alcohol, and being sexually active. Too much partying could detract students from their educational goals, and could negatively impact the overall effectiveness of the LLC.

On the other hand, suit-case students, or those who go home almost every weekend, could have problems transitioning because they cannot get past the separation phase. These students may have decreased satisfaction because their lack of socialization has hindered them from forming meaningful relationships on campus. Furthermore, Inkelas et al. (2006) found that strong faculty-student relationships could also negatively influence LLC students' ability to socialize with peers. Too much time with teachers, for example, could result in less time socializing and interacting with other college students. Lacking socialization could potentially damage the student's ability to fully integrate into college life, and could have a negative impact on the effectiveness of the LLC.

In addition, students wanting to choose their own classes, and/or switch professors could report a lack in satisfaction with their LLC program. LLC students have little choice in selecting their courses, and may like the opportunity to choose from a variety of classes that interest them. Also, students have reported wanting more interaction with other students not in their major, and feeling a lack of diversity within their LLC (Flynn, 2010). Moreover, some research shows that, despite the structure of

the LLC, there is no significant difference in the amount of student contact with faculty outside of the classroom (Flynn, 2010; Stassen, 2003). A key goal of the LLC is to increase student-faculty interaction in an effort to positively impact student satisfaction and academic success. However, students are not necessarily going to make an effort to visit their teachers outside of the classroom. LLC coordinators and faculty must take the initiative and create student-faculty relationships; otherwise, the LLC may not be as effective.

Data on a Similar ELLC

A similar study to this one was conducted by Zobel (2011) at a mid-sized, suburban, public institution in the mid-Atlantic region, much like Rowan University. The ELLC used in the study consisted of minority, female, and low-income freshmen students. A pilot group was conducted first, with results indicating that students had strong student-faculty relationships, but lacked strong peer relationships and did not feel a strong connection to the university. The lack of peer relationships was thought to be the result of the lack of social programming and inconsistent meeting times. Much of the programming that took place in the ELLC consisted of educational activities hosted by engineering faculty; which could attest to why student-faculty relationships were reported to be strong.

After the first year's pilot group, a second group of ELLC participants consisting of minority, female, low-income students were evaluated. Changes were made for the second year group to increase peer relationships, transition to college, and connectedness to campus. These changes included adding social activities along with a zero-credit class to ensure a consistent meeting time for all ELLC members. Zobel's (2011) results from

surveying the second group indicated that approximately 91% of ELLC participants agreed that they felt connected to their university campus, 82% strongly agreed or agreed that the ELLC helped them adjust to academic challenges, and 68% agreed that the ELLC helped ease their transition from high school to college. Additionally, about 91% agreed that the ELLC helped increase their sense of belonging to the university. Furthermore, 86% strongly agreed or agreed that the ELLC improved their peer relationships with other ELLC members, and 91% reported having a strong network of peer support. About 91% of ELLC participants also agreed that the ELLC increased their ability to get to know other non-ELLC engineering students.

When asked about student-faculty relationships, 77% of the ELLC participants agreed that the ELLC increased their opportunities to interact with engineering faculty and staff outside of class. About 68% strongly agreed or agreed that the ELLC helped build their connections with engineering faculty (Zobel, 2011).

After surveying and talking to ELLC participants, Zobel (2011) decided to survey all freshmen and sophomore engineering students to compare the responses of those who had participated in the ELLC to those who did not. Results indicated that more ELLC students felt connected to their university than did non-ELLC students, more ELLC students had formed strong relationships with the engineering faculty than non-ELLC students, and more ELLC students had formed strong relationships with other engineering students than did non-ELLC students. However, the results also indicated that non-ELLC students had a smoother transition from high school to college than did ELLC students.

Summary of the Literature Review

The literature suggests that LLCs can be of tremendous value to students, faculty, and the institution as a whole. Research shows that community involvement is positively linked to student success in college. LLCs are designed to enhance students' interaction with faculty and peers outside of the classroom, thus creating a community and encouraging student involvement. This community structure has been reported to increase student satisfaction, positively impact academic performance, and help students effectively integrate and feel connected to the university. Students who successfully integrate into college life are more likely to persist at that school and graduate. Retention and higher graduation rates can positively influence the fiscal stability of the institution and make it more reputable.

Before implementing any kind of LLC, however, institutions must make sure that everyone involved is on board with the program. A leadership team should be established to provide training, create activities, manage communication, and evaluate the program. Furthermore, the institution must have the financial means to support the LLC program. Without university support, proper training, constant communication, and monetary means, the LLC program will not be able to thrive and reach its full potential. In addition, LLC leaders should provide fun, educational activities for students outside of the classroom so that they can form bonds with others in their cohort and feel included in the college community.

The literature shows that effective LLCs can have a positive impact on students and universities. A similar study conducted by Zobel (2011) indicated that engineering living-learning communities can have a positive impact on peer relationships, student's

transition from high school to college, connectedness to campus, and student-faculty relationships. Her study also suggested that it is important to make changes to the program if goals are not being met. What works for one group or one university may not necessarily work for another.

This study evaluated the impact of an LLC on freshmen engineering students at Rowan University during the 2011-2012 academic year. Specifically, the study examined the impact the LLC had on students' transition to college, their feeling of belonging, relationships with peers, faculty interaction, and their overall satisfaction.

Chapter III

Methodology

Context of Study

Rowan University is a mid-sized, suburban, public institution in the mid-Atlantic region. This selective university enrolls over 11,000 full time and part time students, including approximately 9,900 undergraduate students, and about 1,400 first-time freshman students. Rowan offers about 80 undergraduate majors, divided between six academic colleges, with class sizes averaging 20 students. Most classes are taught by full-time professors, with some being taught by adjuncts. Additionally, Rowan has eight residence halls and four apartment buildings for about 3,600 residential students. Freshman students are required to live on campus, while other students are given housing based on a first come, first serve basis (Rowan University, 2010).

The College of Engineering at Rowan University "is ranked 15th among the nation's best undergraduate engineering programs whose highest degree is a bachelor's or master's degree," and the chemical engineering program is ranked second (Rowan University, 2011, p. 1). The college has four majors; including chemical, civil and environmental, electrical and computer, and mechanical. Additionally, the college has two graduate programs, Master of Science in Engineering and Master of Engineering Management, two minors programs, electrical and computer engineering and mechanical engineering, and two concentrations, bioengineering and systems engineering. There are

32 engineering faculty members, with a strong support staff dedicated to assisting all aspects of the college (Rowan, 2009).

Population and Subjects/Participants

The College of Engineering had about 200 freshmen students in the spring of 2012. With the professors' permission, I was able to visit nine freshmen classes and administer and collect 181 surveys from the 200 freshmen students; including 22 out of 25 ELLC students (an 88% response rate) and 159 out of 175 non-ELLC students (a 91% response rate). In addition to the survey sample, a focus group was conducted with five ELLC participants who were purposively selected to represent diverse experiences within the program.

Instrumentation

Research in this study was divided into two parts. In the first section, a survey was administered in February of 2012 to the freshmen engineering students enrolled in the Freshman Engineering Clinic II class. The survey (Appendix A) was constructed based on two similar surveys; Damminger's (2004) survey for undeclared freshmen learning community participants and Zobel's (2011) survey for freshmen engineering living-learning community students. The survey consists of 10 demographic questions, 37 Likert scale items measuring students' level of agreement, two yes or no questions, and six open-ended questions. The instrument was field tested on several graduate students, two undergraduate engineering students who were previous members of the ELLC, and by one engineering faculty member to verify validity and reliability, and to get an estimate of the time it took to complete the survey.

Part two of the study was conducted in late February, and gathered qualitative data through an hour long focus group discussion. The focus group questions (Appendix B) came directly from Zobel (2011). There are eight open-ended questions and seven yes or no questions to address specific impacts of the ELLC experience. The questions were reviewed by a current engineering faculty member and by former ELLC participants. Participants signed consent forms, and were notified that their responses would be used solely for data collection in this study, and that, to ensure confidentiality, their names would not be used. Participants were also assured that they could skip questions if they did not feel comfortable answering.

Data Gathering Procedures

At Rowan University, freshman engineering students are required to take the Freshman Engineering Clinic II course during their spring semester. Nine classes are taught by different teachers to accommodate the 200 students enrolled in the course. Visiting each class and administering the surveys in person was the best way to get the highest freshmen response rate. Before collecting data, however, an Institutional Research Board application (Appendix C) was completed and approved. Then I spoke with the faculty member in charge of the Freshmen Engineering Clinic II classes to get his approval for administering my survey. He approved the survey and gave me the contact list of teachers who taught the freshman clinic class so that I could get approval from them and set up a time and date to visit their class. With the contact list in hand, I emailed each teacher responsible for teaching a section of the Freshman Clinic II class and asked if I could take about 15 minutes of their class time to administer my survey. Every teacher granted me permission and we set up a time and day in February of 2012

for me to come to their class. Finally, the surveys were administered to each student, age 18 and up, who was present in class on the day of my visit.

As for the ELLC focus group, participants were selected and individually asked to meet on the last Tuesday in February of 2012 at 6:30 p.m. in their residence hall lounge. Participants signed a consent form before starting, and verbally consented to having the discussion recorded. To keep from disclosing anyone's identity in the recording, participants were given a letter and referred to each other and themselves by their letter. As the questions were asked, each participant was given a chance to answer. Notes were taken during the discussion and the conversation was later transcribed.

Data Analysis

The surveys were analyzed using descriptive statistics (frequencies, percentages, means, and standard deviations) and an independent samples *t*-test to compare the ELLC and non-ELLC students' transition to college, connectedness to campus, peer relationships, interactions with faculty, and their overall satisfaction with engineering and Rowan University. Each open-ended question was transcribed, color-coded, and analyzed, linking similar responses to show common themes, (Appendix E), (Sisco, 1981). Additionally, the focus group discussion was transcribed, analyzed, and color coded to connect similar answers and find patterns in their responses.

Chapter IV

Findings

Because this study used mixed methods, the findings were divided into two sections. The first section reveals the profile of the survey sample and lays out the data gathered from the ELLC sample group and the data gathered from the non-ELLC sample group. The two sample groups are then compared using data from an independent *t*-test, and analyzed. Next, the profile of the ELLC focus group is discussed, and the data gathered are presented using quotes and charts.

Profile of the Survey Sample

The subjects for this study were selected based on their enrollment in the freshmen engineering clinic, a requirement for all freshmen engineering students. Out of the 200 students enrolled in freshmen clinic, including the 25 ELLC members, 181 students completed the survey. Twenty-two of the 25 ELLC participants replied, yielding a response rate of 88%. Of that group, 17 (77%) were male students and five (23%) were female students, as shown in Table 4.1. There were 18 (82%) students who identified as Caucasian, two (9%) who identified as Asian/Pacific Islander, and two (9%) who identified as Hispanic/Latino. When asked about their high school GPA, six (27%) students reported having above a 4.0, 10 (46%) reported having a 3.5-4.0, and six (27) reported having a 3.0-3.5 GPA. Furthermore, seven (32%) students were in chemical engineering, six (27%) were in civil and environmental engineering, seven (32) were in electrical and computer engineering, and two (9%) were in mechanical engineering.

Table 4.1

ELLC Demographics (N=22)

Category	Sub-category	*f*	%
Gender	Male	17	77.3
	Female	5	22.7
Ethnicity	Caucasian	18	81.8
	Asian/Pacific Islander	2	9.1
	Hispanic/Latino	2	9.1
High School GPA	4.0 +	6	27.3
	3.5-4.0	10	45.5
	3.0-3.5	6	27.3
Engineering Major	Chemical	7	31.8
	Civil & Environmental	6	27.3
	Electrical & Computer	7	31.8
	Mechanical	2	9.1

Out of the 175 students not in the ELLC, 159 students responded, yielding a response rate of 91%. This group was comprised of 136 (85.5%) male students and 23 (14.5%) female students. There were 140 (88%) students who identified as Caucasian, seven (4%) who identified as Asian/Pacific Islander, four (3%) who identified as Black/African American, one (.6%) who identified as Native American, one (.6%) who identified as Hispanic/Latino, and six (4%) who identified as other. When asked about high school GPA, 39 (25%) students reported having above a 4.0, 81 (51%) reported having between a 3.5 and 4.0, 33 (21%) reported having between a 3.0 and 3.5, five (3%) reported having between a 2.5 and 3.0, and one student (.6%) reported having between a 2.0 and 2.5 GPA in high school. Additionally, as shown in Table 4.2, 40 (25%) students were in chemical engineering, 37 (23%) were in civil and environmental engineering, 46 (29%) were in electrical and computer engineering, and 36 (23%) were in mechanical engineering.

Table 4.2

Non-ELLC Demographics (N=159)

Category	Sub-category	*f*	%
Gender	Male	136	85.5
	Female	23	14.5
Ethnicity	Caucasian	140	88.1
	Asian/Pacific Islander	7	4.4
	Black/African American	4	2.5
	Native American	1	.6
	Hispanic/Latino	1	.6
	Other	6	3.8
High School GPA	4.0 +	39	24.5
	3.5-4.0	81	50.9
	3.0-3.5	33	20.8
	2.5-3.0	5	3.1
Engineering Major	Chemical	40	25.2
	Civil & Environmental	37	23.3
	Electrical & Computer	46	28.9
	Mechanical	36	22.6

Analysis of the Data

Research Question 1: How do ELLC members report their transition to college, connectedness to the university, peer interaction, student-faculty interaction, and their overall satisfaction at Rowan University and with the College of Engineering?

As shown in Table 4.3, 91% of ELLC members strongly agreed or agreed to the statement that they felt they were part of the engineering community. Furthermore, about 82% of ELLC members indicated that they strongly agreed or agreed that it was easy for them to adjust to college socially. About 77% of ELLC members reported that they strongly agreed or agreed that they felt included in the engineering department, that it was easy for them to adjust to college academically, and that the requirements for their major were clear and reasonable. In regards to familiarity with resources on campus, 73% of ELLC members reported that they strongly agreed or agreed that they knew how

to get involved in campus organizations, 67% indicated that they strongly agreed or agreed that tutoring services were readily available, 62% indicated that they strongly agreed or agreed that there were adequate services to help with career planning, and 59% reported that they strongly agreed or agreed that there were a sufficient number of weekend activities for students.

Table 4.3

ELLC Response to Transitioning to Rowan University
Strongly Agree=1, Agree=2, Neutral=3, Disagree=4, Strongly Disagree=5

Statement	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
	f	%	*f*	%	*f*	%	*f*	%	*f*	%
I feel like I am part of the engineering community. *N*=22, *M*=1.41, *SD*=.666	15	68.2	5	22.7	2	9.1				
It was easy for me to adjust to college socially. *N*=22, *M*=1.86, *SD*=.710	7	31.8	11	50.0	4	18.2				
I know how to get involved in campus organizations. *N*=22, *M*=1.86, *SD*=.834	9	40.9	7	31.8	6	27.3				
The requirements for my major are clear and reasonable. *N*=22, *M*=1.95, *SD*=.844	7	31.8	10	45.5	4	18.2	1	4.5		
I feel included in the engineering department. *N*=22, *M*=2.00,*SD*=.816	6	27.3	11	50.0	4	18.2	1	4.5		
It was easy for me to adjust to college academically. *N*=22, *M*=2.05, *SD*=.899	6	27.3	11	50.0	3	13.6	2	9.1		
There are adequate services to help me with career planning. *n*=21, *M*=2.24, *SD*=.831, missing=1	4	19.0	9	42.9	7	33.3	1	4.8		
Tutoring services are readily available. *n*=21, *M*=2.29, *SD*=1.007, missing=1	4	19.0	10	47.6	5	23.8	1	4.8	1	4.8
There are a sufficient number of weekend activities for students. *N*=22, *M*=2.32, *SD*=1.211	7	31.8	6	27.3	5	22.7	3	13.6	1	4.5

In addition to the quantitative data, the open-ended survey questions, shown in Table 4.4, revealed two themes regarding the ELLC members' transition from high school to college. The first theme, stated 15 times out of the 22 ELLC sample group, reported that their transition from high school to college was easy. The second theme, stated 7 times, indicated that some ELLC members had a harder time transitioning to the heavy workload, and felt that it was more time consuming than high school.

Table 4.4

Themes Describing ELLC Transition from High School to College

Theme	Frequency	Rank
Easily able to transition from high school to college	15 times stated	1
Harder, more time consuming work than high school	7 times stated	2

Table 4.5 shows ELLC members' responses regarding their connectedness to the university. About 86% reported that they strongly agreed or agreed that they felt a sense of belonging at Rowan University and that the students were made to feel welcomed on Rowan's campus. Ninety-six percent of ELLC members indicated that they strongly agreed or agreed that it is an enjoyable experience to be a student on Rowan's campus. About 67% of ELLC members reported that they strongly agreed or agreed that they felt a sense of pride about their campus. Lastly, about 59% indicated that they strongly agreed or agreed that they generally knew what was happening on campus, with about 36% reporting neutral on the topic.

Table 4.5

ELLC Response on Connectedness to Rowan University
Strongly Agree=1, Agree=2, Neutral=3, Disagree=4, Strongly Disagree=5

Statement	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
	f	%	*f*	%	*f*	%	*f*	%	*f*	%
It is an enjoyable experience to be a student on this campus. *N*=22, *M*=1.59, *SD*=.590	10	45.5	11	50.0	1	4.5				
I feel a sense of belonging at Rowan University. *N*=22, *M*=1.64, *SD*=.727	11	50.0	8	36.4	3	13.6				
Students are made to feel welcome on this campus. *N*=22, *M*=1.95, *SD*=.722	5	22.7	14	63.6	2	9.1	1	4.5		
I feel a sense of pride about my campus. *n*=21, *M*=2.24, *SD*=.768, missing=1	3	14.3	11	52.4	6	28.6	1	4.5		
I generally know what's happening on campus. *N*=22, *M*=2.27, *SD*=.827	4	18.2	9	40.9	8	36.4	1	4.5		

The qualitative data from the open-ended survey questions revealed four themes describing why ELLC members decided to get involved at Rowan University, shown in Table 4.6. The first theme that emerged, stated four times, was that they wanted something to do. The next two themes, stated three times, were that ELLC members wanted to make connections and that they wanted to be able to build their resume. The last theme, stated twice, was that ELLC members wanted to network and make friends.

Table 4.6

Themes Describing Why ELLC Members Decided to Get Involved

Theme	Frequency	Rank
Wanted something to do	4 times stated	1
To make connections	3 times stated	2
To build resume	3 times stated	2
To network and make friends	2 times stated	3

Regarding peer interaction, Table 4.7 shows that 100% of ELLC members indicated that they strongly agreed or agreed that they considered some students in their major to be their friends, that they built strong relationships with peers in the College of Engineering, and that it was easy for them to make friends with students in their major. About 96% of ELLC members reported that they strongly agreed or agreed that they spent time with classmates outside of class, that they were easily able to meet people and make friends, and that they had a network of supportive peers in their major. About 76% of ELLC members reported that they strongly agreed or agreed that they often studied with students in their major. Lastly, about 55% indicated that they strongly agreed or agreed that it was easy to make friends with students outside of their major, while 27% reported neutral and 18% reported that they disagreed or strongly disagreed to the statement.

Table 4.7

ELLC Response to Peer Interaction
Strongly Agree=1, Agree=2, Neutral=3, Disagree=4, Strongly Disagree=5

Statement	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
	f	%	*f*	%	*f*	%	*f*	%	*f*	%
I spend time with classmates outside of class. *N*=22, *M*=1.23, *SD*=.528,	18	81.8	3	13.6	1	4.5				
I consider some students in my major to be my friends. *N*=22, *M*=1.32, *SD*=.477	15	68.2	7	31.8						
I have built strong relationships with peers in the college of engineering. *N*=22, *M*=1.41, *SD*=.503	13	59.1	9	40.9						
I have a network of supportive peers in my major. *N*=22, *M*=1.41, *SD*=.590	14	63.6	7	31.8	1	4.5				
I often study with other students in my major. *n*=21, *M*=1.62, *SD*=.865, missing=1	13	61.9	3	14.3	5	23.8				

It is easy to make friends with students in my major. *N*=22, *M*=1.64, *SD*=.492	8	36.4	14	63.6						
I was easily able to meet people and make friends. *N*=22, *M*=1.77, *SD*=.528	6	27.3	15	68.2	1	4.5				
It is easy to make friends with students outside of my major. *N*=22, *M*=2.55, *SD*=1.184	4	18.2	8	36.4	6	27.3	2	9.1	2	9.1

Table 4.8 shows two emerging themes from the open-ended survey questions describing ELLC members' peer relationships within their major. Fifteen out of 22 ELLC members reported that they are all good friends, and nine out of 22 ELLC members stated that they all study together and ask each other questions.

Table 4.8

Themes Describing ELLC Peer Relationships within Their Major

Theme	Frequency	Rank
We are all good friends	15 times stated	1
We study together and can ask each other questions	9 times stated	2

In regards to student-faculty interaction, Table 4.9 shows that about 82% of ELLC students reported that they strongly agreed or agreed that faculty were usually available after class or during office hours. About 68% of ELLC members indicated that they strongly agreed or agreed that they felt comfortable speaking in class and 64% indicated that they strongly agreed or agreed that they felt comfortable asking questions in class. About 59% of ELLC members reported that they strongly agreed or agreed that faculty were fair and unbiased in their treatment of individual students. Fifty-two percent of ELLC members reported that they strongly agreed or agreed that they felt comfortable approaching their teachers outside of class, with 38% reporting neutral, and 9.5%

reporting that they disagreed. Fifty percent of ELLC members indicated that they strongly agreed or agreed that their teachers cared about them as individuals, with 36% reporting neutral. About 46% of ELLC members reported that they strongly agreed or agreed that the quality of instruction in most of their classes was excellent, with 32% reporting neutral, and 23% reporting that they disagreed. Forty-three percent of ELLC members indicated that they strongly agreed or agreed that faculty took student differences into consideration as they taught a course, with 38% reporting neutral, and 19% reporting that they disagreed. About 32% of ELLC members indicated that they strongly agreed or agreed that they interacted with teachers outside of the classroom, with 27% reporting neutral, and 41% reporting that they disagreed or strongly disagreed.

Table 4.9

ELLC Response to Faculty Interaction
Strongly Agree=1, Agree=2, Neutral=3, Disagree=4, Strongly Disagree=5

Statement	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
	f	%	*f*	%	*f*	%	*f*	%	*f*	%
Faculty are usually available after class and during office hours. *N*=22, *M*=2.00, *SD*=.617	4	18.2	14	63.6	4	18.2				
I feel comfortable speaking in class. *N*=22, *M*=2.14, *SD*=.990	6	27.3	9	40.9	6	27.3			1	4.5
I feel comfortable asking questions in class. *N*=22, *M*=2.18, *SD*=1.053	7	31.8	7	31.8	5	22.7	3	13.6		
I feel comfortable approaching my teachers outside of class. *n*=21, *M*=2.33, *SD*=.966, missing=1	5	23.8	6	28.6	8	38.1	2	9.5		
My teachers care about me as an individual. *N*=22, *M*=2.50, *SD*=1.058	4	18.2	7	31.8	8	36.4	2	9.1	1	4.5
Faculty take into consideration student differences as they teach a course. *n*=21, *M*=2.52, *SD*=1.078, missing=1	5	23.8	4	19.0	8	38.1	4	19.0		

The quality of instruction I receive in most of my classes is excellent. *N*=22, *M*=2.59, *SD*=1.054	4	18.2	6	27.3	7	31.8	5	22.7		
Faculty are fair and unbiased in their treatment of individual students. *N*=22, *M*=2.64, *SD*=1.255	3	13.6	10	45.5	4	18.2	2	9.1	3	13.6
I interact with my teachers outside of the classroom. *N*=22, *M*=3.05, *SD*=1.214	3	13.6	4	18.2	6	27.3	7	31.8	2	9.1

For the ELLC qualitative data, presented in Table 4.10, the first common theme describing how involvement within their major affects their relationship with their professors was that it had no effect at all. The second theme that emerged was the statement that involvement made it easier to get to know professors and build a relationship with them. Lastly, two ELLC students stated that involvement made it easier for them to ask professors for help.

Table 4.10

Themes Describing ELLC Response to How Involvement within Their Major Effects Relationships with Professors

Theme	Frequency	Rank
No effect on the relationship	7 times stated	1
Easier to get to know them and build relationships	6 times stated	2
Easier to ask for help	2 times stated	3

When it came to student satisfaction, Table 4.11 shows that 96% of ELLC members indicated that they strongly agreed or agreed that they are satisfied with their overall experience at Rowan. Eighty-six percent of ELLC members indicated that they strongly agreed or agreed that they were satisfied with their experience in engineering, and 91% reported that they strongly agreed or agreed that they were satisfied with their choice of major. Additionally, 100% of ELLC members reported that they strongly agreed or agreed that they intend to continue their education at Rowan University, and

96% reported that they strongly agreed or agreed that they intend to continue their education in engineering, with one student indicating that he/she strongly disagreed. Lastly, 82% of ELLC members indicated that they strongly agreed or agreed that they were confident in their ability to complete their degree.

Table 4.11

ELLC Response to Being Satisfied at Rowan University and with the College of Engineering
Strongly Agree=1, Agree=2, Neutral=3, Disagree=4, Strongly Disagree=5

Statement	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
	f	%	*f*	%	*f*	%	*f*	%	*f*	%
I intend to continue my education at Rowan University. *N*=22, *M*=1.32, *SD*=.477	15	68.2	7	31.8						
I intend to continue my education in engineering. *N*=22, *M*=1.45, *SD*=.912	15	68.2	6	27.3					1	4.5
Overall, I am satisfied with my experience at Rowan. *N*=22, *M*=1.55, *SD*=.596	11	50.0	10	45.5	1	4.5				
I am satisfied with my experience in engineering. *N*=22, *M*=1.59, *SD*=.734	12	54.5	7	31.8	3	13.6				
I am satisfied with my choice of major. *N*=22, *M*=1.59, *SD*=.796	12	54.5	8	36.4	1	4.5	1	4.5		
I am confident in my ability o complete my degree. *N*=22, *M*=1.68, *SD*=.894	12	54.5	6	27.3	3	13.6	1	4.5		

The open-ended survey questions displayed four major themes, shown in Table 4.12, regarding what ELLC members stated to be the most satisfying aspect of their experience at Rowan. The first theme was meeting people and making friends, which reoccurred in 8 out of the 22 ELLC responses. The second theme was "learning," which

was stated five times. Getting involved was the fourth theme, stated four times, and passing was the last theme, stated two times.

Table 4.12

Themes Regarding What ELLC Members Reported to be the Most Satisfying Aspect of Their Engineering Experience at Rowan

Theme	Frequency	Rank
Meeting people and making friends	8 times stated	1
Learning	5 times stated	2
Getting involved	4 times stated	3
Passing	2 times stated	4

Along with stating what was most satisfying, students were also asked to report what was least satisfying about their experience at Rowan. Four common themes emerged from this question, as shown in Table 4.13. The first two themes, stated seven times, were being unsatisfied with teachers and being unsatisfied with chemistry. The next theme, stated six times, was having a heavy workload. Lastly, one person noted that he/she was unsatisfied with the lack of friends outside of engineering, and another student stated that he/she was unsatisfied with his/her low grades.

Table 4.13

Themes Regarding What ELLC Members Reported to be the Least Satisfying Aspect of Their Engineering Experience at Rowan

Theme	Frequency	Rank
Teachers	7 times stated	1
Chemistry	7 times stated	1
Heavy workload	6 times stated	2
Lack of friends outside of engineering	1 time stated	3
Low grades	1 time stated	3

Research Question 2: How do non-ELLC members report their transition to college, connectedness to the university, peer interaction, student-faculty interaction, and their overall satisfaction at Rowan University and with the College of Engineering?

Table 4.14 shows how non-ELLC students reported their transition to Rowan University. About 75% indicated that they strongly agreed or agreed that it was easy for them to adjust to college socially. About 80% reported they strongly agreed or agreed that the requirements for their major were clear and reasonable, however, only about 55% of the non-ELLC students reported they strongly agreed or agreed that it was easy for them to adjust to college academically. About 68% reported they strongly agreed or agreed that they felt included in the engineering department, and about 66% indicated they strongly agreed or agreed that they felt like they were part of the engineering community. As far as familiarity with campus resources, about 66% of the non-ELLC students reported they strongly agreed or agreed that tutoring services were readily available and that they knew how to get involved in campus organizations. Furthermore, 50% reported they strongly agreed or agreed that there were adequate services to help with career planning, and 47% indicated they strongly agreed or agreed that there were a sufficient number of weekend activities for students, with 41% reporting neutral and 12% reporting that they disagreed or strongly disagreed to the statement.

Table 4.14

Non-ELLC Response to Transitioning to Rowan University
Strongly Agree=1, Agree=2, Neutral=3, Disagree=4, Strongly Disagree=5

Statement	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
	f	%	*f*	%	*f*	%	*f*	%	*f*	%
It was easy for me to adjust to college socially.										
N=159, *M*=2.00, *SD*=.834,	47	29.6	72	45.3	34	21.4	5	3.1	1	.6

The requirements for my major are clear and reasonable. *N*=159, *M*=2.06, *SD*=.777	32	20.1	95	59.7	23	14.5	8	5.0	1	.6
Tutoring services are readily available. *N*=159, *M*=2.17, *SD*=.843	35	22.0	70	44.0	48	30.2	4	2.5	2	1.3
I feel included in the engineering department. *N*=159, *M*=2.18, *SD*=.770	28	17.6	81	50.9	43	27.0	7	4.4		
I know how to get involved in campus organizations. *N*=150, *M*=2.21, *SD*=.843	32	20.1	73	45.9	43	27.0	11	6.9		
I feel like I am part of the engineering community. *N*=159, *M*=2.21, *SD*=.865	33	20.8	71	44.7	46	28.9	7	4.4	2	1.3
There are adequate services to help me with career planning. *N*=159, *M*=2.47, *SD*=.727	14	8.8	65	40.9	72	45.3	8	5.0		
There are a sufficient number of weekend activities for students. *N*=159, *M*=2.55, *SD*=.991	23	14.5	52	32.7	65	40.9	11	6.9	8	5.0
It was easy for me to adjust to college academically. *N*=159, *M*=2.50, *SD*=.934	20	12.6	68	42.8	44	27.7	26	16.4	1	.6

When asked about their transition from high school to college in the open-ended survey question, three common themes emerged, shown in Table 4.15. Out of the 159 non-ELLC students surveyed, 100 reported a common theme suggesting that their transition was easy. Sixty-five students suggested that their transition was difficult, many noting that they were not expecting the heavy workload and academic rigor involved with their major. Lastly, five students indicated that it was easy for them to transition socially, but harder academically.

Table 4.15

Themes Describing Non-ELLC Transition from High School to College

Theme	Frequency	Rank
Easily	100 times stated	1
Difficult	65 times stated	2

Easy socially, but difficult academically	5 times stated	3

Table 4.16 shows non-ELLC students' responses regarding connectedness to Rowan University. About 77% of the non-ELLC students indicated they strongly agreed or agreed that it was an enjoyable experience to be a student on campus, and about 75% reported they strongly agreed or agreed that they were made to feel welcome on campus. Additionally, about 73% of the non-ELLC students reported they strongly agreed or agreed that they felt a sense of belonging at Rowan University, but only about 59% indicated that they felt a sense of pride about their campus. Lastly, about 62% of non-ELLC students reported that they generally knew what was happening on campus.

Table 4.16

Non- ELLC Response on Connectedness to Rowan University
Strongly Agree=1, Agree=2, Neutral=3, Disagree=4, Strongly Disagree=5

Statement	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
	f	%	*f*	%	*f*	%	*f*	%	*f*	%
It is an enjoyable experience to be a student on this campus. *N*=159, *M*=2.01, *SD*=.775	41	25.8	82	51.6	30	18.9	6	3.8		
I feel a sense of belonging at Rowan University. *N*=159, *M*=2.05, *SD*=.926	48	30.2	68	42.8	33	20.8	7	4.4	3	1.9
Students are made to feel welcome on this campus. *N*=159, *M*=2.14, *SD*=.770	26	16.4	93	58.5	33	20.8	5	3.1	2	1.3
I feel a sense of pride about my campus. *N*=159, *M*=2.38, *SD*=.926	25	15.7	69	43.4	49	30.8	12	7.5	4	2.5
I generally know what's happening on campus. *N*=159, *M*=2.39, *SD*=.803	15	9.4	83	52.2	46	28.9	14	8.8	1	.6

Table 4.17 shows four common themes suggesting why non-ELLC students decided to get involved on campus. The first theme, repeated 37 times, was that non-

ELLC members wanted to meet people and make friends. Another common theme, stated 32 times, was because they wanted something fun to do. Thirdly, students reported that they wanted to be part of something. Lastly, some non-ELLC students got involved to play a sport.

Table 4.17

Themes Describing Why Non-ELLC Members Decided to get Involved

Theme	Frequency	Rank
Meet people and make friends	37 times stated	1
Have something fun to do	32 times stated	2
Wanted to be part of something	18 times stated	3
Wanted to play a sport	13 times stated	4

In terms of peer interaction, Table 4.18 shows that 90% of non-ELLC students indicated they strongly agreed or agreed that they considered some students in their major to be their friends. Also, about 81% indicated they strongly agreed or agreed that they spent time with classmates outside of class and 80% reported they strongly agreed or agreed that they were easily about to meet people and make friends. About 72% indicated they strongly agreed or agreed that they had a network of supportive peers in their major. Additionally, about 70% of non-ELLC students reported they strongly agreed or agreed it was easy to make friends with students in their major and with students outside of their major. About 62% of non-ELLC students indicated they strongly agreed or agreed that they had built strong relationships with peers in the college of engineering, and about 52% reported they strongly agreed or agreed that they often studied with other students in their major.

Table 4.18

Non-ELLC Response to Peer Interaction
Strongly Agree=1, Agree=2, Neutral=3, Disagree=4, Strongly Disagree=5

Statement	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
	f	%	*f*	%	*f*	%	*f*	%	*f*	%
I consider some students in my major to be my friends. *n*=157, *M*=1.64, *SD*=.726, missing=2	76	48.4	66	42.0	11	7.0	4	2.5		
I spend time with classmates outside of class. *N*=159, *M*=1.90, *SD*=.976	63	39.6	66	41.5	17	10.7	9	5.7	4	2.5
I was easily able to meet people and make friends. *N*=159, *M*=1.90, *SD*=.828	55	34.6	72	45.3	26	16.4	5	3.1	1	.6
It is easy to make friends with students in my major. *N*=159, *M*=2.13, *SD*=.862	38	23.9	73	45.9	40	25.2	6	3.8	2	1.3
It is easy to make friends with students outside of my major. *N*=159, *M*=2.13, *SD*=.877	38	23.9	74	46.5	39	24.5	5	3.1	3	1.9
I have a network of supportive peers in my major. *N*=159, *M*=2.14, *SD*=.860	35	22.0	80	50.3	32	20.1	11	6.9	1	.6
I have built strong relationships with peers in the college of engineering. *n*=158, *M*=2.23, *SD*=.957, missing=1	40	25.3	58	36.7	46	29.1	12	7.6	2	1.3
I often study with other students in my major. *N*=159, *M*=2.52, *SD*=1.237	42	26.4	41	25.8	37	23.3	29	18.2	10	6.3

The qualitative data regarding non-ELLC peer relationships in their major, presented in Table 4.19, shows three major themes. The first theme, reported 70 times, suggested that students' relationships with peers consisted of studying together, doing homework, and helping each other with class work. Next, 38 students reported that they have only a few friends, if any at all in their major. Lastly, 35 students reported that they have several good friends in their major.

Table 4.19

Themes Describing Non-ELLC Peer Relationships within Their Major

Theme	Frequency	Rank
We do homework/study/help each other with class work	70 times stated	1
I only have a few, if any, friends in my major	38 times stated	2
I have a lot of good friends in my major	35 times stated	3

Regarding student-faculty interaction, Table 4.20 shows that 80% of non-ELLC students indicated they strongly agreed or agreed that faculty are usually available after class and during office hours. About 75% indicated they strongly agreed or agreed that faculty are fair and unbiased in their treatment of individual students. Additionally, 69% of non-ELLC students indicated they strongly agreed or agreed that they felt comfortable speaking in class, about 68% indicated they strongly agreed or agreed that they felt comfortable asking questions in class, and about 66% indicated they strongly agreed or agreed that they felt comfortable approaching a teacher outside of class. About 67% of non-ELLC students reported they strongly agreed or agreed that the quality of instruction they received was excellent. Furthermore, about 47% reported they strongly agreed or agreed that teachers cared about them as individuals, and about 43% reported they strongly agreed or agreed that faculty take student differences into consideration with they teach a course. Lastly, about 22% of non-ELLC students reported they strongly agreed or agreed that they interact with teachers outside of class, with 40% reporting neutral, and 41% reporting they disagreed or strongly disagreed with the statement.

Table 4.20

Non-ELLC Response to Faculty Interaction
Strongly Agree=1, Agree=2, Neutral=3, Disagree=4, Strongly Disagree=5

Statement	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
	f	%	*f*	%	*f*	%	*f*	%	*f*	%
Faculty are usually available after class and during office hours. *N*=159, *M*=2.04, *SD*=.706	30	18.9	97	61.0	28	17.6	3	1.9	1	.6
Faculty are fair and unbiased in their treatment of individual students. *N*=159, *M*=2.11, *SD*=.779	30	18.9	89	56.0	34	21.4	4	2.5	2	1.3
I feel comfortable speaking in class. *N*=159, *M*=2.14, *SD*=.882	39	24.5	70	44.0	41	25.8	7	4.4	2	1.3
I feel comfortable asking questions in class. *N*=159, *M*=2.19, *SD*=.889	34	21.4	74	46.5	39	24.5	10	6.3	2	1.3
I feel comfortable approaching my teachers outside of class. *n*=157, *M*=2.32, *SD*=.948, missing=2	26	16.6	77	49.0	37	23.6	12	7.6	5	3.2
The quality of instruction I receive in most of my classes is excellent. *N*=159, *M*=2.33, *SD*=.815	17	10.7	89	56.0	39	24.5	12	7.5	2	1.3
My teachers care about me as an individual. *N*=159, *M*=2.48, *SD*=.770	17	10.7	58	36.5	76	47.8	7	4.4	1	.6
Faculty take into consideration student differences as they teach a course. *N*=159, *M*=2.66, *SD*=.833	10	6.3	58	36.5	70	44.0	18	11.3	3	1.9
I interact with my teachers outside of the classroom. *n*=158, *M*=3.29, *SD*=.960, missing=1	4	2.5	27	17.1	63	39.9	47	29.7	17	10.8

Three major themes emerged from the open-ended survey question that asked how involvement in engineering affects relationships with professors, shown in Table 4.21. Thirty-three non-ELLC students reported that their involvement has no effect on their relationship with professors. Some indicated that the more involved they were, the easier it was to get to know professors and build a relationship with them. Others reported that being involved made it easier to approach teachers and ask for help.

Table 4.21

Themes Describing Non-ELLC Response to How Involvement within Their Major Effects Relationships with Professors

Theme	Frequency	Rank
No effect on the relationship	33 times stated	1
Easier to get to know them and build relationships	28 times stated	2
Easier to ask for help	21 times stated	3

In regards to student satisfaction, Table 4.22 indicates that 86% of non-ELLC students strongly agreed or agreed to the statement that they were satisfied with their experience in engineering and 84% reported they strongly agreed or agreed that they were satisfied with their choice of major and with their experience at Rowan University overall. Furthermore, 91% of non-ELLC students reported they strongly agreed or agreed that they intend to continue their education in engineering and 89% reported they strongly agreed or agreed that they intend to continue their education at Rowan. Lastly, 87% reported they strongly agreed or agreed that they were confident in their ability to complete their degree.

Table 4.22

Non-ELLC Response to Being Satisfied at Rowan University and with the College of Engineering
Strongly Agree=1, Agree=2, Neutral=3, Disagree=4, Strongly Disagree=5

Statement	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
	f	%	*f*	%	*f*	%	*f*	%	*f*	%
I intend to continue my education in engineering. *N*=159, *M*=1.52, *SD*=.683	93	58.5	51	32.1	14	8.8	1	.6		
I intend to continue my education at Rowan University. *n*=158, *M*=1.62, *SD*=.719, missing=1	80	50.6	60	38.0	16	10.1	2	1.3		
I am confident in my ability o complete my degree. *N*=159, *M*=1.64, *SD*=.724	80	50.3	58	36.5	20	12.6	1	.6		

I am satisfied with my choice of major. *N*=159, *M*=1.79, *SD*=.814	66	41.5	67	42.1	21	13.2	4	2.5	1	.6
I am satisfied with my experience in engineering. *N*=159, *M*=1.82, *SD*=.734	55	34.6	81	50.9	19	11.9	4	2.5		
Overall, I am satisfied with my experience at Rowan. *N*=159, *M*=1.89, *SD*=.787	51	32.1	83	52.2	17	10.7	8	5.0		

The qualitative data collected from open-ended survey questions demonstrated several themes regarding non-ELLC students' most satisfying aspects of their engineering experience at Rowan, presented in Table 4.23. Getting hands-on experience seemed to be the top theme, repeated 72 times. Meeting people and making friends came in second, reoccurring 27 times. Next, 15 students indicated that they were satisfied with classes, 10 reported being satisfied that they passed, and seven reported being satisfied with teachers. Six students indicated that being involved in engineering was satisfying to them, and five reported that they were satisfied with being an engineer at Rowan.

Table 4.23

Themes Regarding What Non-ELLC Members Reported to be the Most Satisfying Aspect of Their Engineering Experience at Rowan

Theme	Frequency	Rank
Getting hands-on experience and applying what they learn	72 times stated	1
Meeting people and making friends	27 times stated	2
Classes	15 times stated	3
Passing	10 times stated	4
Teachers	7 times stated	5
Getting involved with engineering society or part-time job	6 times stated	6
Being an engineer at Rowan	5 times stated	7

In addition to satisfaction, students were also asked what was least satisfying about their experience in engineering at Rowan. Table 4.24 shows the six common

themes non-ELLC students stated for this question. One of the least satisfying aspects, repeated 64 times, was the heavy workload and difficulty of the work. Another theme was that non-ELLC members were not satisfied with teachers, reporting that many gave poor instructions. Classes and scheduling was another theme that students reported they were unsatisfied with; chemistry in particular being its own theme because of the frequency in which it was stated. Non-ELLC students also indicated that they were not satisfied with their classmates or with their lack of friends. Lastly, seven people reported that they were least satisfied with the fact that they were not passing.

Table 4.24

Themes Regarding What Non-ELLC Members Reported to be the Least Satisfying Aspect of Their Engineering Experience at Rowan

Theme	Frequency	Rank
Workload/difficulty of work	64 times stated	1
Poor instruction/teachers	28 times stated	2
Chemistry	21 times stated	3
Classes and schedule	19 times stated	4
Classmates/ability to make friends	11 times stated	5
Not passing	7 times stated	6

Research Question 3: Is there a significant difference in the way ELLC members responded to the survey questions regarding their freshman experience compared to how the non-ELLC members responded?

An independent-samples *t* test was conducted to determine significant difference in the way ELLC members responded to the survey statements compared to how non-ELLC members responded to the statements. Twelve of the 37 Likert scale survey statements showed a statistically significant difference. Table 4.25 shows the group statistics regarding each of the 12 significant statements, while Table 4.26 shows the

results of Levene's test for equality of variances. The first statement shows that ELLC students agreed more with the statement "I consider some students in my major to be my friends," with a mean being significantly lower for the ELLC members (*M*=1.32, *SD*=.48) than the non-ELLC (*M*=1.64, *SD*=.726) at the .05 level (*t*=-2.72, *df*=36.37). The ELLC also agreed more with the statements "I spend time with classmates outside of class," (ELLC *M*=1.23, *SD*=.53 compared to non-ELLC *M*=1.90, *SD*=.98), "I often study with other students in my major," (ELLC *M*=1.62, *SD*=.87 compared to non-ELLC *M*=2.52, *SD*=1.24), "I have build strong relationships with peers in the college of engineering," (ELLC *M*=1.41, *SD*=.50 compared to non-ELLC *M*=2.23, *SD*=.96), "It was easy to make friends with students in my major," (ELLC *M*=1.64, *SD*=.49 compared to non-ELLC *M*=2.13, *SD*=.86), and "I have a network of supportive peers in my major," (ELLC *M*=1.41, *SD*=.59 compared to non-ELLC *M*=2.14, *SD*=.86). Additionally, regarding transitioning to college, ELLC members agreed closer than non-ELLC students to the statements "It was easy for me to adjust to college academically," (ELLC *M*=2.05, *SD*=.90 compared to non-ELLC *M*=2.50, *SD*=.93), and "I feel like I am part of the engineering community," (ELLC *M*=1.41, *SD*=.666 compared to non-ELLC *M*=2.21, *SD*=.87). In regards to feeling connected to Rowan University, ELLC members agreed more than non-ELLC students with the statements "I feel a sense of belonging at Rowan University," (ELLC *M*=1.64, *SD*=.73 compared to non-ELLC *M*=2.05, *SD*=.93), "It is an enjoyable experience to be a student on this campus," (ELLC *M*=1.59, *SD*=.59 compared to non-ELLC *M*=2.01, *SD*=.78), and "I intend to continue my education at Rowan University," (ELLC *M*=1.32, *SD*=.48 compared to non-ELLC *M*=1.62, *SD*=.72). Lastly, regarding student-faculty relationships, non-ELLC students agreed more than ELLC

members with the statement “My teachers care about me as an individual,” (ELLC *M*=2.50, *SD*=1.06 compared to non-ELLC *M*=2.48, *SD*=.77).

Table 4.25

Significant Differences in ELLC Responses vs. Non-ELLC Responses
Strongly Agree=1, Agree=2, Neutral=3, Disagree=4, Strongly Disagree=5

Statement	I am a participant of the ELC	N	Mean	Std. Deviation	Std. Error Mean
I consider some students in my major to be my friends.	yes	22	1.32	.477	.102
	no	157	1.64	.726	.058
I spend time with classmates outside of class.	yes	22	1.23	.528	.113
	no	159	1.90	.976	.077
It was easy for me to adjust to college academically.	yes	22	2.05	.899	.192
	no	159	2.50	.934	.074
I feel a sense of belonging at Rowan University.	yes	22	1.64	.727	.155
	no	159	2.05	.926	.073
I often study with other students in my major.	yes	21	1.62	.865	.189
	No	159	2.52	1.237	.098
I intend to continue my education at Rowan University.	yes	22	1.32	.477	.102
	no	158	1.62	.719	.057
I have built strong relationships with peers in the college of engineering.	yes	22	1.41	.503	.107
	no	158	2.23	.957	.076
My teachers care about me as an individual.	yes	22	2.50	1.058	.226
	no	159	2.48	.770	.061
It is easy to make friends with students in my major.	yes	22	1.64	.492	.105
	no	159	2.13	.862	.068
It is an enjoyable experience to be a student on this campus.	yes	22	1.59	.590	.126
	no	159	2.01	.775	.061
I have a network of supportive peers in my major.	yes	22	1.41	.590	.126
	no	159	2.14	.860	.068

I feel like I am part of the engineering community.	yes	22	1.41	.666	.142
	no	159	2.21	.865	.069

Table 4.26

Independent Samples t-Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
Statement		F	Sig.	t	df	Sig. (2-tailed)	Mean Diff	Std. Error Diff	Lower	Upper
I consider some students in my major to be my friends	Equal variances not assumed	4.911	.028	-2.724	36.367	.010	-.319	.117	-.556	-.082
I spend time with classmates outside of class	Equal variances not assumed	5.546	.020	-4.918	44.176	.000	-.672	.137	-.948	-.397
It was easy for me to adjust to college academically	Equal variances assumed	2.703	.102	-2.135	179	.034	-.451	.211	-.869	-.034
I feel a sense of belonging at Rowan University	Equal variances assumed	.089	.766	-2.010	179	.046	-.414	.206	-.820	-.008
I often study with other students in my major	Equal variances not assumed	5.086	.025	-4.246	31.974	.000	-.903	.213	-1.336	-.470
I intend to continue my education at Rowan University	Equal variances not assumed	6.645	.011	-2.590	35.937	.014	-.302	.117	-.539	-.066
I have built strong relationships with peers in the college of engineering	Equal variances not assumed	7.032	.009	-6.223	45.919	.000	-.819	.132	-1.084	-.554
My teachers care about me as an individual	Equal variances not assumed	4.486	.036	.094	24.174	.926	.022	.234	-.460	.504
It is easy to make friends with students in my major	Equal variances assumed	2.522	.114	-2.600	179	.010	-.489	.188	-.861	-.118

It is an enjoyable experience to be a student on this campus	Equal variances assumed	.009	.924	-2.415	179	.017	-.415	.172	-.755	-.076
I have a network of supportive peers in my major	Equal variances assumed	.934	.335	-3.848	179	.000	-.729	.190	-1.103	-.355
I feel like I am part of the engineering community	Equal variances assumed	1.256	.264	-4.160	179	.000	-.798	.192	-1.177	-.420

Profile of the Focus Group Sample

The participants in the focus group were purposively selected to represent diversity within the ELLC group. As a requirement of the ELLC, all participants were freshmen engineering students who lived on the same floor of the same residence hall, and all were enrolled in four shared classes. Of the five students selected, four were male and one was female. Three students identified as Caucasian, one identified as Asian, and one identified as Hispanic/Latino. Three students were in electrical and computer engineering, one student was in civil and environmental engineering, and one student was in mechanical engineering. Three students claimed to have at least one parent who is an engineer, while the other two participants did not have parents in engineering. Furthermore, two students reported having above a 4.0 GPA in high school, and three students reported having between a 3.5 and 4.0 GPA in high school. At the time of the interview, one student reported having between a 3.5 and 4.0 GPA at Rowan, two reported having between a 3.0 and 3.5 GPA, one claimed to have between a 2.5 and 3.0 GPA, and one reported having between a 2.0 and 2.5 GPA.

Analysis of the Focus Group

Research Question 4: What were the most satisfying and least satisfying aspects of participating in the ELLC?

All five ELLC focus group participants stated that overall they were very satisfied or satisfied with their experience in the ELLC. The most common theme that emerged regarding their satisfaction, shown in Table 4.27, was their ability to make friends. One student said that "making that many friends in such a short period of time would nearly be impossible without the ELLC, especially for engineers." Another student said, "If I had not been in the ELLC, it would have been much harder to make friends." One student added:

> During that first week, when everyone is just trying to grab on to a friend, any friend as long as they have a pulse,…we had 24 other people that we didn't even have to grab on to because we lived with them; we were stuck with them for the better, luckily.

When asked about making friends with people outside of the ELLC, participants said that others would join their group, or a group member would introduce new friends to the group, and friendships would keep multiplying. One student said, "When you have a group of people this close, it attracts other people." The rest of the group agreed, but reported that they still mostly just interact with each other. One participant said he was able to find his own group of friends, and that he finds himself moving away from the ELLC group to hang out with his other friends more. Most participants, however, said that they are comfortable just being with the ELLC.

Table 4.27

Most Satisfying Aspects of the ELLC

Theme	Subtheme	Frequency	Rank
Making friends	Forced to know people Automatically knew people ELLC made it easier People joined us	12	1

Academic	Studied together Could ask for help Same classes Improved classroom atmosphere Got along with faculty	12	1
Living together	Can walk down hall and get help Like family Spent lots of time in the lounge together	11	2
Activities	Kickball Rain Garden Diversity workshop	7	3

Although everyone seemed satisfied with the social aspect of the ELLC, the one female in the focus group suggested that there should be more women in the ELLC. She said that there were just too many guys. Another focus group participant noted that the ELLC should also have a better balance of engineering disciplines. For example, there could be six people representing each of the four engineering majors.

In addition to social benefits, participants reported that they were satisfied with the academic support they received in the ELLC group. One student said, "Having the same classes together, and being able to ask each other questions was probably one of the best things that the ELLC did for us." Several participants said that because they were in some of the same classes, they were all able to study together. A few noted that they liked being able to walk down the hall and ask someone a homework question. They said that they would study together in the hallways or in the residence hall lounge and they would help each other with lab reports even if they weren't lab partners. Additionally, one student noted that if their professor gave one student advice, that student would share the advice with the rest of the group, and everyone would indirectly get the same advice from their professor.

The academic benefits, however, also had a down side. One student said that the freshman clinic class was taught each semester by different professors in civil engineering. She wished it had been taught by professors from different disciplines, and she was upset that she did not have the option to switch classes because she was in the ELLC. Another negative academic aspect that was reported was the fact that some students did not pull their weight in group assignments. Since the ELLC members had classes together and studied together, they quickly figured out who the good students were and who the procrastinators were. Soon, no one wanted to work with the procrastinators, and this created discrepancies between the group members.

On another note, the focus group seemed satisfied, for the most part, with the fact that they all lived together. Several participants referred to the ELLC as a big family. They liked that they could walk to class together or to the cafeteria together. They also liked that they could ask each other for help at any time of the night; there was always someone from their class around. One student said he was lucky to have an ELLC roommate who was also in the same major as him. Another student noted that it would not make sense to have a learning community if they did not all live together on the same floor in the same building.

However, living together and seeing each other all the time also created some conflict, according to the focus group. Students noted that sometimes they were "too close for comfort," and that if there was a dispute, it was difficult to get away. Yet, they also agreed that disputes were resolved quicker because they were not able to avoid each other. One student said, "We are not always going to have the same beliefs or the same morals as each other, so we're going to butt heads, but we still have to live with each

other." Another student added, "[We're] like family. We can hate each other one day, but we still have to live with each other." Everyone agreed and one student noted that with the benefits of being together, also comes a down side that is not always avoidable.

Lastly, the focus group seemed satisfied with some of the ELLC activities; although they admitted that they had a few suggestions for improvement. Three students agreed that they liked helping in the rain garden, three liked the kickball activity, and one student liked the diversity workshop. Some participants, however, did not like having meetings/activities every Friday, which was noted in Table 4.28 as something they were least satisfied with. As part of the ELLC requirement, they have a zero-credit, 90 minute class on Fridays, which reserves a time for them to have educational, social, and service-learning programs. A few focus group participants suggested they meet every other Friday, or once a month, since they see each other all the time anyway. They also suggested choosing their own activities, or being given a list of activities that they can choose from, instead of having the RAs or the advisor choose for them. Another student said that meetings and programs should be conducted in the residence hall instead of having to walk to the engineering building.

Table 4.28

Least Satisfying Aspects of the ELLC

Theme	Subtheme	Frequency	Rank
Living together	Too close for comfort Having non-ELLC roommates Being split into two different halls Not able to get away	15	1
Lack of diversity	Need more girls Better balance of engineering majors	5	2
Activities	Meeting every Friday Meeting in Rowan Hall Not having a say in programming	5	2

Freshmen engineering clinic	Both civil engineering	1	3
Working together	Some people procrastinate	1	3

To sum up the ELLC experience, the students were asked to reply yes or no to seven closing statements, shown in Table 4.29. When asked if the ELLC helped them transition from high school to college, all five focus group participants said yes. They also agreed that the ELLC improved their interest in continuing their education at Rowan and that it improved the quality of their overall experiences at Rowan. Four students agreed that the ELLC improved their sense of social support at Rowan, and their awareness of resources on campus. Three students agreed that the ELLC improved their opportunities to become more involved in community activities, and two participants agreed that the ELLC improved their connections to other clubs and university activities.

Table 4.29

The Impact of the ELLC on Students' Transition to College

Statement "My participation in the ELLC…"	Frequency	Rank
Helped me transition from high school and adjust to being a college student.	5	1
Improved my interest in continuing my education at Rowan University.	5	1
Improved the quality of my overall experiences at Rowan University.	5	1
Improved my sense of social support at Rowan.	4	2
Improved my awareness of resources on campus.	4	2
Improved my opportunities to become more involved in community activities.	3	3
Improved my connections to other clubs and university activities.	2	4

Chapter V

Summary, Discussion, Conclusions, and Recommendations

Summary of the Study

This study evaluated the impact of a living-learning community on freshmen engineering students by comparing participants' experience with that of non-ELLC freshmen engineering students and by measuring the level of satisfaction ELLC students had with the program. It was conducted at Rowan University in Glassboro, New Jersey, during the spring semester of 2012. The survey sample population consisted of freshmen engineering students enrolled in the required Freshman Engineering Clinic II class, including both ELLC members and non-ELLC students. The focus group participants were freshman engineering students in the ELLC.

With permission from professors, surveys were distributed and collected in each of the nine Freshman Engineering Clinic II classes during February of 2012. Out of the 200 students enrolled in the clinic II course, 181 surveys were collected, which included responses from 22 out of 25 ELLC students and 159 out of 175 non-ELLC students. The survey consisted of demographic questions, Likert scale items, and open-ended questions.

Demographic questions and Likert scale items were analyzed using SPSS to find the frequency in responses, percentage, mean, and standard deviation. Data were split into two groups, ELLC and non-ELLC, for review of responses. SPSS were also used to conduct an independent samples *t*-test which suggested significant differences between ELLC and non-ELLC student responses. Lastly, open-ended survey questions were

grouped based on ELLC or non-ELLC responses, color-coded, and then arranged into similar themes to show patterns in each groups' responses.

Additionally, five ELLC members were purposively selected to participate in a focus group. It took place in the students' residence hall lounge on the last Tuesday in February 2012 at 6:30 p.m. The discussion was guided by questions regarding the students' level of satisfaction in the ELLC, their likes and dislikes about the program, and future suggestions. The conversation was recorded and later transcribed for analysis. Key words and phrases were color-coded and arranged into similar themes to reveal patterns in the students' responses.

Discussion of the Findings

According to Tinto's (1988) theory on student departure, when students have begun to socialize and have established a sense of community at college, like the ELLC students have done, then they are considered to be fully integrated into the university. First-year students who are easily able to transition from high school to college are more likely to stay at the institution and graduate, positively impacting retention rates.

From the analysis of the surveys, it seems that ELLC students had a smooth transition from high school to college. About 82% reported that it was easy for them to adjust to college socially, compared to 75% of non-ELLC students, and about 77% agreed that it was easy for them to adjust to college academically, compared to only 55% of non-ELLC students agreeing to that statement. About 91% of the ELLC sample also agreed that they felt like part of the engineering community, compared to 66% of non-ELLC students who agreed to that statement, and 77% of the ELLC sample reported that they felt included in the engineering department, compared to 68% of non-ELLC

students. Additionally, 15 out of the 22 ELLC sample group indicated in the open-ended questions that it was easy for them to transition, with 7 people indicating that the workload was harder and more time consuming than high school.

The focus group participants all agreed that they were easily able to transition socially. They said that they instantly had friends in the first week of school, while other people were desperately trying to find someone to cling on to. Participants noted that the ELLC was like a big family that lived, ate, went to classes, and studied together. Based on Tinto's (1988) theory, the ELLC participants seemed to have successfully transitioned from high school and fully integrated into college.

Along with transitioning, when students feel connected to the university, both socially and academically, they are more likely to stay at that institution and graduate (Stassen, 2003; Tinto, 1993; Tinto, 1996). Survey data indicated that ELLC students felt connected to their campus. About 96% of the ELLC sample group agreed that it was an enjoyable experience to be a student at Rowan, compared to 77% of non-ELLC students, and 86% agreed that they felt a sense of belonging and were made to feel welcome at Rowan, compared to 73% and 75% of the non-ELLC sample group, respectively. Also, about 67% of the ELLC sample group agreed that they felt a sense of pride about their campus, compared to 59% of non-ELLC students.

Part of feeling connected to campus is getting involved. Astin's (1999) student involvement theory suggests that students who are involved in social and academic activities on campus are more likely to stay at the institution and graduate. According to the focus group, ELLC members were all encouraged to participate in Friday activities, planned by either the RA or the program advisor. They seemed to enjoy most of the

activities, indicating that they were engaged and involved. The focus group also reported that ELLC students studied together and walked to classes together, indicating that they were academically connected to the university. Furthermore, the ELLC group socialized and hung out together, indicating that they felt socially connected to the university.

When looking at the data on peer relationships within the ELLC, it indicates that the entire sample group agreed that they consider some people in their major to be their friends and that they have built strong relationships with peers in the college of engineering. Furthermore, about 96% agreed that they spend time with classmates outside of class, and that they had a network of supportive peers. About 76% also agreed that they studied with student in their major. Everyone in the focus group agreed that they study with people in the ELLC, and they were happy with the fact that they were able to go across the hall to ask someone in their class a question. Literature suggests that peer interaction increases student involvement and participation, which is positively linked to retention (Schroeder, Mable, & Associates, 1994).

Interaction with students outside of the college of engineering, however, seemed to be less common among ELLC students. About 55% of the ELLC sample group agreed that it was easy to make friends with students outside of their major, compared to 70% of non-ELLC students. When the focus group was asked about making friends outside of the ELLC, they said it was not really a concern of theirs. Most seemed content with their circle of peers in the ELLC, while one participant said that he often hung out with a group of friends outside the ELLC. One ELLC member said that if he wanted to make friends outside of the ELLC, it would not be a problem; he just chooses not to do so.

Though ELLC students reported that they studied with peers and sought help on homework from one another, few seemed to have an increased relationship with faculty. In fact, only about 52% of the ELLC sample group agreed that they felt comfortable approaching their teachers outside of class and only 32% agreed that they interacted with teachers outside of the classroom. When compared to non-ELLC students, about 66% of the non-ELLC sample group agreed that they felt comfortable approaching their teachers outside of class, but only 22% agreed that they actually interacted with teachers outside of the classroom.

These findings contrast with those in Zobel's (2011) study. About 88% of the ELLC participants in her research indicated that they had formed a strong relationship with the engineering faculty, while only 25% of non-ELLC students indicated they had formed a strong relationship with the engineering faculty. Perhaps the results for this study would have been different if I had worded my survey the same way she did. Nevertheless, Zobel's study states that ELLC programs were hosted by different engineering faculty members, unlike the ELLC program in this study, with simply one engineering faculty member in charge of programming. This slight difference could explain why the students in Zobel's study had more interaction with engineering faculty.

Two participants in the focus group for this study said that they did not really interact with the engineering faculty because they did not have a reason to do so. They saw the ELLC advisor, a civil engineering faculty member, during activities and meetings, and they would wave to him on campus, but that was the extent of it. One participant, however, said that the group increased his interaction with faculty. Since he was a civil engineering major, he had more reasons to meet with the advisor, and he said

he felt completely comfortable talking to him. Another participant noted that he did not have much reason to meet with professors because he could get help from peers, or because if one peer met with a professor, they would all get the same information when they studied together.

Overall, 96% of the ELLC sample group agreed that they were satisfied with their experience at Rowan, 91% agreed that they were satisfied with their choice of major, and 86% agreed that they were satisfied with their experience in engineering. Everyone agreed that they intended to continue their education at Rowan, while 96% agreed that they would continue their education in engineering. Additionally, open-ended survey questions indicated that ELLC members were satisfied with their ability to make friends, learning new things, getting involved in clubs and sports, and passing. This goes hand-in-hand with Astin's (1993) theory on student satisfaction which suggests that students who are satisfied with their social interactions, academics, and their overall college experience are more likely to re-enroll.

Yet, non-ELLC students also seemed to be satisfied with their college experience, with 84% agreeing that they were satisfied with their experience at Rowan overall and with their choice of major. Furthermore, 86% of non-ELLC students agreed that they were satisfied with their experience in engineering. About 89% agreed that they intend to continue their education at Rowan, and 91% agreed that they intend to continue their education in engineering. Additionally, the open-ended questions suggest that non-ELLC students were satisfied with getting hands-on experience in the classroom, meeting new people, classes, teachers, getting involved, and with being an engineer at Rowan.

ELLC members and non-ELLC students both reported to be least satisfied with the amount of work required in engineering, having to take chemistry, and with some of the teachers in the program. These aspects, however, are probably to be expected in a rigorous engineering program.

Conclusions

The results of this study suggest that participation in the ELLC positively impacted students' transition from high school to college, connectedness to college, peer relationships, and overall satisfaction with the university. Other studies indicate that strong peer relationships influence student involvement and student satisfaction, which positively impacts feeling connected to campus (Astin, 1993; Astin, 1999; Tinto, 1988). Students who feel connected to their campus tend to have an easier time transitioning to college, and those who are able to fully transition are more likely to stay at the university and graduate (Tinto, 1988). When students stay at the university, retention rates increase, along with the reputation of the school.

With that said, it cannot be concluded by this study that ELLC members were more likely to have a smoother transition to college than non-ELLC students. The data simply suggest that the ELLC students were able to form a close community of friends and supportive peers, increasing their sense of connectedness to campus and their overall satisfaction, and making for a smooth transition. When compared to the non-ELLC students, the data imply that ELLC students spend more time with classmates outside of class, that they study more with students in their major, and that they reported to have more supportive peers than the non-ELLC students. Additionally, compared to non-

ELLC students, more ELLC students agreed that they feel a sense of belonging at Rowan and that they enjoy being a student on campus.

The study does not, however, suggest a strong student-faculty relationship among ELLC students, as indicated in other studies, nor is it strong among non-ELLC students. According to Zhoa and Kuh (2004) learning communities are strengthened when faculty choose to actively participate. Without faculty initiating relationships, student-faculty bonds are less likely to occur. Lack of student-faculty relationships could possibly lead to a decrease in student satisfaction with academics, which could result in a lack of satisfaction with the major or with school in general. Yet, the focus group implied that they were not bothered by the lack of interaction with teachers outside of class because they had a strong support group of peers and classmates they could turn to for help.

Recommendations for Practice

Based on the findings and conclusions of the study, the following suggestions are presented:

1. Living-learning communities should select different faculty members to get involved with LLC programs and activities so that students can get to know faculty in an informal setting.
2. LLC participants should be able to choose their activities and programs from a list provided at the beginning of the year.
3. LLC members should all live on the same hall of the same floor in the same residence hall, without any students being left out.
4. Participation in the LLC should be voluntary.
5. LLCs should contain no more than 25 participants.

Recommendations for Further Research

Based on the findings and conclusions of the study, the following suggestions are presented:

1. Additional focus groups with ELLC members and non-ELLC members should be conducted to better compare the experiences.
2. Future ELLC programs at Rowan University should be evaluated and compared to this study to find patterns in the research.
3. Freshmen engineering students should be surveyed in the first semester to get a better account of how they feel during the critical transition period; then compare the experience of ELLC participants to that of non-ELLC students.
4. All freshman engineering students' GPAs should be collected at the end of the first year to compare academic achievement of ELLC students to non-ELLC students.
5. ELLC participants should be tracked and monitored throughout their four years at Rowan to measure retention.
6. Similar studies should be conducted at other mid-sized institutions to compare data and find patterns in the research.

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APPENDIX A

Freshman Engineering Survey

Freshman Engineering Survey Spring Semester 2012

This survey is being administered as part of a graduate course research project at Rowan University. While your participation is voluntary and you are not required to answer any of the questions herein, your cooperation and participation are important to the success of the project and are greatly appreciated. If you choose to participate, please understand that all responses are strictly anonymous and no personally identifiable information is being requested. Moreover, whether you agree to participate or not, your decision will have no effect on your grades or your standing in class.
For questions, contact Maggie Flynn at flynnm50@students.rowan.edu or the thesis advisor, Dr. Burton Sisco at sisco@rowan.edu.

To preserve anonymity, your name is not required. This survey will take about 10 minutes to complete. Your thoughtful and honest responses to these questions are very important. Thank you for participating.

Please circle, check, or fill in the blanks of those that apply to you.

1. I am: Male ___ Female___

2. **Ethnic background:**
_____Black/African American
_____Native American
_____Asian/Pacific Islander
_____White/Caucasian
_____Hispanic or Latino
_____Other:_____

3. **Highest level of Mother's education:**
a) Elementary
b) Some high school/no diploma
c) High school diploma/equivalent
d) Some college/no degree
e) Associate's degree (2 yr degree)
f) Bachelor's degree (4 yr degree)
g) Master's degree
h) Doctoral degree

4. **Highest level of father's education:**
a) Elementary
b) Some high school/no diploma
c) High school diploma/equivalent
d) Some college/no degree
e) Associate's degree (2 yr degree)
f) Bachelor's degree (4 yr degree)
g) Master's degree
h) Doctoral degree

5. **The level of education I hope to complete is:**
a) 4 year college degree (Bachelor's)
b) Master's degree
c) Doctoral degree

6. **My GPA in high school was:**
a) 4.0 +
b) 3.5-4.0
c) 3.0-3.5
d) 2.5-3.0
e) 2.0-2.5
f) 1.5-2.0

7. **I am currently a**
_____ Freshman _____ Sophomore

8. **My engineering major is:**
___Chemical
___Civil & Environmental
___Electrical & Computer
___Mechanical

9. **I have at least one parent who is an engineer:**
____Yes ____No

10. **I am a participant of the Engineering Living-Learning Community (ELC)**
____ Yes ____ No

Please indicate your level of agreement with the statements by circling the number in the box you feel is most accurate.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
11. I feel included in the engineering department.	1	2	3	4	5
12. I consider some students in my major to be my friends.	1	2	3	4	5
13. I spend time with classmates outside of class.	1	2	3	4	5
14. It was easy for me to adjust to college academically.	1	2	3	4	5
15. It was easy for me to adjust to college socially.	1	2	3	4	5
16. I was easily able to meet people and make friends.	1	2	3	4	5
17. I feel a sense of belonging at Rowan University.	1	2	3	4	5
18. I often study with other students in my major.	1	2	3	4	5
19. I interact with my teachers outside of the classroom.	1	2	3	4	5
20. I feel comfortable approaching my teachers outside of class.	1	2	3	4	5
21. I feel comfortable asking questions in class.	1	2	3	4	5
22. I feel comfortable speaking in class.	1	2	3	4	5
23. I intend to continue my education at Rowan University.	1	2	3	4	5
24. I intend to continue my education in engineering.	1	2	3	4	5
25. I am confident in my ability to complete my degree.	1	2	3	4	5
26. I have built strong relationships with peers in the College of Engineering.	1	2	3	4	5
27. My teachers care about me as an individual.	1	2	3	4	5
28. It is easy to make friends with students in my major.	1	2	3	4	5
29. It is easy to make friends with students outside of my major.	1	2	3	4	5
30. Faculty are fair and unbiased in their treatment of individual students.	1	2	3	4	5
31. It is an enjoyable experience to be a student on this campus.	1	2	3	4	5
32. Tutoring services are readily available.	1	2	3	4	5
33. I feel a sense of pride about my campus.	1	2	3	4	5
34. There are a sufficient number of weekend activities for students.	1	2	3	4	5
35. Students are made to feel welcome on this campus.	1	2	3	4	5
36. I know how to get involved in campus organizations.	1	2	3	4	5
37. There are adequate services to help me with career planning.	1	2	3	4	5
38. Faculty take into consideration student differences as they teach a course.	1	2	3	4	5
39. The requirements for my major are clear and reasonable.	1	2	3	4	5
40. The quality of instruction I receive in most of my classes is excellent.	1	2	3	4	5
41. I generally know what's happening on campus.	1	2	3	4	5
42. Faculty are usually available after class and during office hours.	1	2	3	4	5
43. Overall, I am satisfied with my experience at Rowan.	1	2	3	4	5
44. I am satisfied with my experience in engineering.	1	2	3	4	5
45. I am satisfied with my choice of major.	1	2	3	4	5
46. I have a network of supportive peers in my major.	1	2	3	4	5
47. I feel like I am part of the engineering community.	1	2	3	4	5

Freshman Engineering Survey Spring Semester 2012

Please write a short response to the following questions.

48. What has been the most satisfying aspect of your College of Engineering experience at Rowan University?

49. What has been the most disappointing aspect of your Rowan University College of Engineering experience?

50. Describe your transition from high school to college (i.e. your overall readiness, level of difficulty, comfort in your major, etc.)

51. Are you involved on campus (i.e. events, clubs, organizations)?
____Yes
____No

52. If yes, what were the reasons you decided to get involved on-campus?

53. Do you feel like you have support from peers in your major?
___Yes
___No

54. Describe your peer-to-peer relationships within the major.

55. In what ways does your involvement within your major effect your relationships with your professors?

Thank you for participating in this important survey.
Please contact Maggie Flynn for questions or concerns: 267-325-1033 or flynnm50@students.rowan.edu
Or the thesis advisor, Dr. Burton Sisco: 856-256-4500 x 3717 or sisco@rowan.edu

APPENDIX B

Focus Group Interview Questions

ELC Focus Group Spring 2012

Focus Group Interview Questions

ELLC Experience

1. (A) Describe your overall satisfaction with the Engineering Living and Learning Community (ELLC) experience.

   (B) How could your overall satisfaction with the ELLC be improved?

2. (A) Describe your overall satisfaction with the social activities in the Engineering Living and Learning Community.

   (B) How could your overall satisfaction with the social activities be improved?

3. What was the most satisfying aspect of your experience with the ELLC?

4. What was the most disappointing aspect of your experience with the ELLC?

University Experience

5. Describe how your participation in the ELLC improved or *did not improve* your overall sense of belonging at Rowan University.

6. Describe how your participation in the ELLC improved or *did not improve* your opportunities to interact with Rowan Engineering faculty and staff.

7. Describe how your participation in the ELLC improved or *did not improve* your relationships with other ELLC participants.

8. Describe how your participation in the ELLC improved or *did not improve* your connection with non-ELLC engineering peers.

Please answer YES or NO for the following questions:

9. My participation in the ELLC improved my sense of social support at Rowan. YES / NO
10. My participation in the ELLC improved my interest in continuing my education at RU. YES/ NO
11. My participation in the ELLC improved the quality of my overall experiences at RU. YES/NO
12. My participation in the ELLC improved my connections to other clubs and university activities. YES/NO
13. My participation in the ELLC improved my awareness of resources on-campus. YES/NO
14. My participation in the ELLC improved my opportunities to become more involved in community activities. YES/NO
15. My participation in the ELLC helped me transition from high school and adjust to being a college student. YES/NO

ELC Focus Group Spring 2012

Demographic Information

Please circle, check, or fill in the blanks of those that apply to you.

1. **I am:** Male___ Female___

2. **Ethnic background:**
_____Black/African American
_____Native American
_____Asian/Pacific Islander
_____White/Caucasian
_____Hispanic or Latino
_____Other:_____

3. **Highest level of Mother's education:**
a) Elementary
b) Some high school/no diploma
c) High school diploma/equivalent
d) Some college/no degree
e) Associate's degree (2 yr degree)
f) Bachelor's degree (4 yr degree)
g) Master's degree
h) Doctoral degree

4. **Highest level of father's education:**
a) Elementary
b) Some high school/no diploma
c) High school diploma/equivalent
d) Some college/no degree
e) Associate's degree (2 yr degree)
f) Bachelor's degree (4 yr degree)
g) Master's degree
h) Doctoral degree

5. **The level of education I hope to complete is:**
a) 4 yr college degree (Bachelor's)
b) Master's degree
c) Doctoral degree

6. **My GPA in high school was:**
a) 4.0 +
b) 3.5-4.0
c) 3.0-3.5
d) 2.5-3.0
e) 2.0-2.5
f) 1.5-2.0

7. **My GPA now is:**_____

8. **My engineering major is:**
___Chemical
___Civil & Environmental
___Electrical & Computer
___Mechanical

9. **I have at least one parent who is an engineer:**
____Yes ____No

APPENDIX C

Focus Group Consent Form

Freshmen Engineering Focus Group Spring Semester 2012

Participant Consent Form

I agree to participate in a study entitled "Engineering Residential Learning Communities: Evaluating the Impact on Freshmen Engineering Students," which is being conducted by Margaret Flynn, an education student at Rowan University.

The purpose of this study is to evaluate the engineering living learning community and to measure the impact of the program on participants. The data collected in this study will be used in a graduate course thesis.

I understand that I will be required to answer questions honestly and to the best of my ability. My participation in the study should not exceed one hour.

I understand that my responses will be kept confidential. I agree that any information obtained from this study may be used in any way thought best for publication or education provided that I am in no way identified and my name is not used.

I understand that there are no physical or psychological risks involved in this study, and that I am free to withdraw my participation at any time without penalty.

I understand that my participation does not imply employment with the state of New Jersey, Rowan University, the principal investigator, or any other project facilitator.

If I have any questions or problems concerning my participation in this study, I may contact Maggie Flynn at 267-325-1033 or her faculty advisor, Dr.Burt Sisco, sisco@rowan.edu.

_____

(Signature of Participant) (Date)

_____

(Signature of Investigator) (Date)

APPENDIX D

Institutional Review Board Approval Letter

Rowan University

December 14, 2011

Margaret Flynn
1320 W. Somerville Ave
Philadelphia, PA 19141

Dear Margaret Flynn:

In accordance with the University's IRB policies and 45 CFR 46, the Federal Policy for the Protection of Human Subjects, I am pleased to inform you that the Rowan University Institutional Review Board (IRB) has approved your project:

IRB application number: 2012-132

Project Title: Engineering Residential Learning Communities: Evaluating the Impact on Freshman Engineering Students

In accordance with federal law, this approval is effective for **one calendar year** from the date of this letter. If your research project extends beyond that date or if you need to make significant modifications to your study, you must notify the IRB immediately. Please reference the above-cited IRB application number in any future communications with our office regarding this research.

Please retain copies of consent forms for this research for three years after completion of the research.

If, during your research, you encounter any unanticipated problems involving risks to subjects, you must report this immediately to Dr. Harriet Hartman (hartman@rowan.edu or call 856-256-4500, ext. 3787) or contact Dr. Shreekanth Mandayam, Associate Provost for Research (shreek@rowan.edu or call 856-256-5150).

If you have any administrative questions, please contact Karen Heiser (heiser@rowan.edu or 856-256-5150).

Sincerely,

Harriet Hartman

Harriet Hartman, Ph.D.
Chair, Rowan University IRB

c: Burton Sisco, Educational Services, Administration and Higher Education, Education Hall

Office of Research
Bole Hall
201 Mullica Hill Road
Glassboro, NJ 08028-1701

856-256-5150
856-256-4425 fax

APPENDIX E

Rules and Procedures for Logical Analysis of Written Data

RULES AND PROCEDURES FOR LOGICAL

ANALYSIS OF WRITTEN DATA

The following decisions were made regarding what was to be the unit of data analysis (Sisco, 1981):

1. A phrase or clause will be the basic unit of analysis.
2. Verbiage not considered essential to the phrase or clause will be edited out—e.g., articles of speech, possessives, some adjectives, elaborative examples.
3. Where there is a violation of convention syntax in the data, it will be corrected.
4. Where there are compound thoughts in a phrase or clause, each unit of thought will be represented separately (unless one was an elaboration of the other).
5. Where information seems important to add to the statement in order to clarify it in a context, this information will be added to the unit by using parentheses.

The following decisions were made regarding the procedures for categorization of content units:

1. After several units are listed on a sheet of paper, they will be scanned in order to determine differences and similarities.
2. From this tentative analysis, logical categories will derive for the units.
3. When additional units of data suggest further categories, they will be added to the classification scheme.
4. After all the units from a particular question responses are thus classified, the categories are further reduced to broader clusters (collapsing of categories).
5. Frequencies of units in each cluster category are determined and further analysis steps are undertaken, depending on the nature of the data—i.e., ranking of categories with verbatim quotes which represent the range of ideas or opinions. (p. 177).