

THESIS

THE IMPACT OF LIVING ENVIRONMENTS
ON ENGINEERING STUDENTS

Submitted by

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ABSTRACT OF THESIS
THE IMPACT OF LIVING ENVIRONMENTS
ON ENGINEERING STUDENTS

The purpose of this study was to compare and contrast three groups of engineering students at Colorado State University on academic achievement, and specific items of satisfaction and awareness to determine if measurable differences do exist. The three groups consisted of those engineering students living in the engineering residential academic unit, in other residence halls, and off-campus.

The sample for this study consisted of 397 engineering students. The engineering questionnaire was administered to the sample while 1975 grade point averages were obtained. The hypotheses under consideration were tested by use of the F test.

Findings indicated that there were statistically significant differences for the two groups of freshmen and the three groups of non-freshmen on certain items of satisfaction and awareness. It was concluded from the data that residential academic units have a positive impact on students.

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CHAPTER I

INTRODUCTION

A decade ago, Harold C. Riker wrote in College Housing as Learning Centers, ". . . In the future, housing units will be incorporated into the academic community so that the informal learning will have purpose and direction consistent with the objectives and curriculum of the institution" (p. 5). "A student's residence should be something other than a place to eat and study" is a statement of philosophy that one finds repeated at nearly every institution of higher education across the country. It has been well documented that college and university residence halls are a vital part of the learning process (Mueller, 1961; Riker, 1965; Adams, 1968). Studies such as these support the educational philosophy of housing that strives for the "promotion of academic learning" and "personal development." In order to achieve these goals, college student personnel administrators have experimented with a number of residence hall programs ranging from residential colleges to special program residence halls where students of the same academic major are grouped together.

One such program which seems worthy of more intensive examination is the residence hall that is especially designed, equipped and programmed for students majoring in the same field of study. A commonly held notion seems to be that the special

residential academic unit has a positive effect on scholarly orientation (Morishima, 1966). On the other end of the continuum one might assume that such groupings of students may have negative effects socially and culturally. Little appears to be known about the differences between a group of students living in a residential academic unit compared to students living in mixed major residence halls and off-campus.

Colorado State University offers a good opportunity to study such groups of students. In 1969, the Office of Housing and Residence Education, in cooperation with a small group of students and a faculty department head, began the first of a series of residential academic units. Since that time, programs have been developed for students majoring in languages, agriculture, performing arts, veterinary medicine, forestry and natural resources, and engineering. The size of these programs has been designed 1) to be large enough to encourage students in the same major fields to learn from one another and, 2) to increase the practicality and efficiency of special facilities, equipment and programming.

The Office of Housing and Residence Education, in cooperation with the College of Engineering, has developed a special program for Engineering students at CSU. Both men and women students participating in this program live in Allison Hall, the residence hall nearest the Engineering Building. Some highlights of the Engineering Program are:

- 1) A study area with engineering reference books;
- 2) Electronic calculators;
- 3) Key punch machines for computer programming work;
- 4) Tutors, available on a regular schedule, to assist engineering students;
- 5) User terminals providing direct access to the University's computer center; and
- 6) A cable to Educational Media which makes it possible to view, in your room or in the study area, videotaped lectures of some engineering courses.

The Engineering Program at Allison Hall, in its fourth year, is becoming increasingly popular. Freshman applications and upper-classmen renewals for the program have risen each year. Allison Hall houses approximately 200 women and 200 men. Forty-five percent of the total population are engineering students while over 75 percent of the mens population are engineering students.

The ten other residence halls at CSU house a large percentage of the total engineering student population and offer many programs in such areas as student government, intramural sports, cultural events, and educational and social activities. While it is true that a large number of engineering students reside in off-campus living accommodations, more engineering students are returning to the residence halls each year, and more engineering students are

returning and signing up for Allison Hall; this situation presents many facets that are worthy of study.

The purpose of this study, then, is to compare and contrast three groups of engineering students (those in the residential academic unit, those in other residence halls, and those living off-campus) at Colorado State University on academic achievement, satisfaction, and awareness to determine if measurable differences do exist.

The Problem

Statement of the Problem

The problem of this study is:

1. To what extent do freshmen engineering students living in the engineering residential academic unit and other residence halls differ as to academic achievement?
2. To what extent do non-freshmen engineering students living in the engineering residential academic unit, other residence halls, and off-campus differ as to academic achievement?
3. To what extent do freshmen engineering students living in the engineering residential academic unit and other residence halls differ in the following areas:

- a. Satisfaction with the opportunities to talk to engineering professors outside of the classroom
- b. Satisfaction with the academic curriculum established by the College of Engineering
- c. Satisfaction with group spirit and rapport among engineering students
- d. Satisfaction with opportunities for engineering students to participate in policy-making decisions involving the College of Engineering
- e. Satisfaction with the affiliation (feeling of belonging) with the College of Engineering
- f. Satisfaction with the study atmosphere of their present living environment
- g. Satisfaction with the comfort of their present living environment
- h. Satisfaction with the special facilities provided by the university to aid in their classwork (i. e., computer terminal, computer card punches, calculators, etc.)
- i. Satisfaction with the academic assistance and help from classmates
- j. Satisfaction with the opportunities for extra-curricular involvement (i. e., intramural athletics, student government, social activities, etc.)
- k. Satisfaction with the overall classroom education I am receiving at Colorado State University
- l. Awareness of the variety of majors in the College of Engineering
- m. Awareness of the variety of professional societies in engineering

- n. Awareness of the opportunity to gain assistance from special tutors provided by the College of Engineering
 - o. Awareness of current trends and issues in the field of engineering
 - p. Awareness of opportunities for employment in the field of engineering
4. To what extent do non-freshmen engineering students living in the engineering residential academic unit, other residence halls, and off-campus differ in the following areas:
- a. Satisfaction with the opportunities to talk to engineering professors outside of the classroom
 - b. Satisfaction with the academic curriculum established by the College of Engineering
 - c. Satisfaction with group spirit and rapport among engineering students
 - d. Satisfaction with opportunities for engineering students to participate in policy-making decisions involving the College of Engineering
 - e. Satisfaction with the affiliation (feeling of belonging) with the College of Engineering
 - f. Satisfaction with the study atmosphere of their present living environment
 - g. Satisfaction with the comfort of their present living environment
 - h. Satisfaction with the special facilities provided by the university to aid in their classwork (i. e., computer terminal, computer card punches, calculators, etc.)

- i. Satisfaction with the academic assistance and help from classmates
- j. Satisfaction with the opportunities for extra-curricular involvement (i. e. , intramural athletics, student government, social activities, etc.)
- k. Satisfaction with the overall classroom education I am receiving at Colorado State University
- l. Awareness of the variety of majors in the College of Engineering
- m. Awareness of the variety of professional societies in engineering
- n. Awareness of the opportunity to gain assistance from special tutors provided by the College of Engineering
- o. Awareness of current trends and issues in the field of engineering
- p. Awareness of opportunities for employment in the field of engineering

Statement of the Hypothesis

The questions posed in the statement of the problem can be stated in the following series of null hypotheses:

1. There is no significant difference in academic achievement for freshmen engineering students living in the engineering residential academic unit and other residence halls.
2. There is no significant difference in academic achievement for non-freshmen engineering students

living in the engineering residential academic unit, other residence halls, and off-campus.

3. There is no significant difference for freshmen engineering students living in the engineering residential academic unit and other residence halls in the following areas:

- a. Satisfaction with the opportunities to talk to engineering professors outside of the classroom
- b. Satisfaction with the academic curriculum established by the College of Engineering
- c. Satisfaction with group spirit and rapport among engineering students
- d. Satisfaction with opportunities for engineering students to participate in policy-making decisions involving the College of Engineering
- e. Satisfaction with the affiliation (feeling of belonging) with the College of Engineering
- f. Satisfaction with the study atmosphere of their present living environment
- g. Satisfaction with the comfort of their present living environment
- h. Satisfaction with the special facilities provided by the university to aid in their classwork (i. e., computer terminal, computer card punches, calculators, etc.)
- i. Satisfaction with the academic assistance and help from classmates
- j. Satisfaction with the opportunities for extracurricular involvement (i. e., intramural athletics, student government, social activities, etc.)

- k. Satisfaction with the overall classroom education I am receiving at Colorado State University
 - l. Awareness of the variety of majors in the College of Engineering
 - m. Awareness of the variety of professional societies in engineering
 - n. Awareness of the opportunity to gain assistance from special tutors provided by the College of Engineering
 - o. Awareness of current trends and issues in the field of engineering
 - p. Awareness of opportunities for employment in the field of engineering
4. There is no significant difference for non-freshmen engineering students living in the engineering residential academic unit, other residence halls, and off-campus in the following areas:
- a. Satisfaction with the opportunities to talk to engineering professors outside of the classroom
 - b. Satisfaction with the academic curriculum established by the College of Engineering
 - c. Satisfaction with group spirit and rapport among engineering students
 - d. Satisfaction with opportunities for engineering students to participate in policy-making decisions involving the College of Engineering
 - e. Satisfaction with the affiliation (feeling of belonging) with the College of Engineering

- f. Satisfaction with the study atmosphere of their present living environment
- g. Satisfaction with the comfort of their present living environment
- h. Satisfaction with the special facilities provided by the university to aid in their class-work (i. e., computer terminal, computer card punches, calculators, etc.)
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- k. Satisfaction with the overall classroom education I am receiving at Colorado State University
- l. Awareness of the variety of majors in the College of Engineering
- m. Awareness of the variety of professional societies in engineering
- n. Awareness of the opportunity to gain assistance from special tutors provided by the College of Engineering
- o. Awareness of current trends and issues in the field of engineering
- p. Awareness of opportunities for employment in the field of engineering

Significance of the Study

The findings of this study will supplement the growing body of knowledge concerning engineering students at Colorado State

University, and more significantly clarify information concerning engineering students living in the residential academic unit, other residence halls, and off-campus. Further, this study is designed to add to knowledge concerning certain attributes and attitudes these groups of engineering students may have.

Limitations of the Study

Conclusions formulated from this study would pertain specifically to engineering students at Colorado State University. The actual comparison of any group of engineering students with the groups used in this study would necessitate the establishment of the similarities and differences in the nature of the groups being compared in order to prevent faulty generalizations from such comparisons.

Definition of Terms

Engineering Students: Full-time undergraduate students attending Colorado State University, enrolled in the College of Engineering for the 1975-76 academic year.

Engineering Students Living in the Engineering Residential Academic Unit: Engineering students living in Allison Hall for the 1975-76 academic year.

Engineering Students Living in Other Residence Halls: Engineering students living in all of the residence halls at Colorado State University with the exception of Allison Hall.

Engineering Students Living Off-Campus: Engineering students living in residences other than residence halls.

Freshmen: Those students that were officially classified by CSU as being freshman, having completed no more than 28 semester hours.

Non-freshmen: Those students that were officially classified by CSU as sophomores, juniors, or seniors, having completed at least 29 semester hours.

Null Hypothesis: This hypothesis holds that two or more samples have come from statistically identical populations and that any observed difference between such samples is therefore a chance variation.

Statistically Significant: When a statistical test led to the rejection of a null hypothesis, the probability is called the level of significance and the observed difference is termed statistically significant. For the purpose of this study, the level of significance for all statistical tests was defined to be .05.

Analysis of Variance: A method used in this study for determining whether the differences found in a dependent variable, when it is exposed to one or more experimental variables, exceed what may be expected by chance (English and English, 1958).

F ratio: A value used in determining whether the difference between two variances is statistically significant (English and English, 1958).

F test: A statistic used in estimating the chance probability of equaling or exceeding a given difference between the variance of two or more samples (English and English, 1958).

Satisfaction: For the purposes of this study satisfaction was defined as the degree to which sample members expressed a positive or negative feeling on the satisfaction section of the engineering questionnaire (see Appendix D).

Awareness: For the purposes of this study awareness was defined as the degree to which sample members expressed a positive or negative feeling on the awareness section of the engineering questionnaire (see Appendix D).

CHAPTER II

REVIEW OF THE LITERATURE

A review of the literature relative to residential academic units and their impact on students revealed a lack of published work concerning these two areas. The available research to be reviewed related to: 1) research dealing with residence halls, 2) studies involving residence hall and non-residence hall students, and 3) studies involving the special grouping of students.

Research Dealing with Residence Halls

Many years ago, Nicholas Murray Butler (1922), then president of Columbia University, said ". . . the provision of residence halls is quite as important and essential a part of the work of the University as is the provision of libraries, laboratories, and classrooms" (p. 8). Years later, in a manuscript prepared for the American Council on Education, Strozier et al. (1950) stated:

. . . Student housing at the collegiate level is something much more than a necessary and neglected sideline of higher education; it should be recognized as an opportunity for educational achievement . . . (p. 1)

. . . The idea that all learning involves emotion, that one learns only through the participation of the total personality, and that everything learned influences, in turn, the development of the whole person. . . it delineates sharply the waste involved when the teaching carried on in

courses is completely separated from the life which students live in the social groups created by college housing. (p. 2)

Whether we like it or not, the student gets a large part of his education from the group and from the surroundings in which he lives . . .
(p. 3)

Riker (1965) contends that the case for housing as an educational facility rests on three fundamental assumptions: 1) the environment influences behavior, 2) enrichment of the environment enhances intellectual activity, and 3) learning is a total process. Riker continues by stating:

Informal and comfortable association with persons having similar interests is another factor. Since housing units provide opportunities for such association, they can be profitably used to contribute to the learning process. This use implies activities that encourage discussion and stimulate the further examination of ideas. (p. 6)

Recently, Littlefield and Spencer (1973) discussing living-learning environments maintain that the ultimate aim of any living-learning option within a university seems to be the gaining of student realization that learning occurs all during life. They go on to say that learning is not limited to structured conditions of certain times, but is an ongoing process that should occur as long as a person uses his time well and takes advantage of the opportunities presented.

While a number of institutions have developed residential academic units, very few have assessed their impact on college students. Brown (1967), commenting on the residence hall environment, stated:

A situation which throws people together in a university but provides little shared intellectual experience will quite naturally lead the students to seek ways of interacting that are not necessarily congruent with the purpose of the university.

Therefore, the university should consider new ways of grouping students in the curriculum, in the residential arrangements and in scheduling so that large numbers will have some common shared life which will serve as a foundation for intellectual and social interaction. (p. 92)

Newcomb (1967) found that a student's interpersonal environment has much to do with what he learns and how well he learns it. He contends that academically, a student in a large university is a stranger, since little or no overlap exists between his group of friends and the group of students who attend his various classes. In an earlier study, Newcomb (1962) suggested that homogeneity and common interest among students would reinforce each individual's expectation of success or failure toward a common goal.

Centra (1968), in a study of student perceptions of residence hall environments found that students in living-learning units did not perceive their residence hall environment as more intellectual than did students in conventional units. On the other hand, living-learning units, in spite of their size, were viewed by students as being as friendly and cohesive as smaller conventional units.

Snead and Caple (1971), in a study of students grouped by personality types, found that there seemed to be a positive environmental effect upon the realistic male student's academic achievement. The

findings of this study provided some support for placing students in a living-learning environment that has communality in interest and personality patterns.

Boyer's (1965) study added another dimension to the phenomenon of environmental influence on residence hall students. He found that the student's need for affiliation helped determine the degree to which his behavior and grades would be affected by fellow students in six-man residential suites.

Crew and Giblette (1965) found that roommates enrolled in the same class earned significantly higher grades than the general freshman population at the same college.

Studies Involving Residence Hall and Non-Residence Hall Students

Lindahl (1967) attempted to study the impact of living arrangements on student environmental perceptions. The study compared the college environmental perceptions of commuter and resident students attending two state colleges in the same system. The findings indicated significant differences between resident and commuter responses. The residents reported over twice as much emphasis as the commuters on loyalty, friendliness, and a feeling of togetherness, with just the opposite being true for the qualities of politeness and consideration. The findings also indicated that the greater the proportion of residents, the more likely the students were to describe their college environment as being characterized by

practicality and community and a lack of emphasis on awareness and scholarship.

Baker (1966), in a study of the relationship between student residence and perception of environmental press found significant differences between dormitory residents, boarding home residents, and students who live with their own families. Boarding and dormitory residents seemed to be less aware of the college environment as compared with those that reside with their families. Boarding and dormitory residents were found to be more dependent upon the university for their need satisfactions than are family residents who are members of a community and in a better position to have their needs satisfied.

Studies Involving the Special Grouping of Students

Because student housing research is conspicuous by its scarcity, two major assumptions, according to Elton and Bate (1966), have received wide spread acceptance:

1. Students have been housed together because of similar educational goals. This practice may be defended by assuming that common academic interests hasten the friendship process, that students with similar educational interests will share some classes in common, and that learning will be promoted because of the reciprocal influences of similar educational interests and common classes.

2. It is believed that roommates contribute to each others academic achievement. Implicit in this assumption is the notion that a seriously dedicated student will stimulate his roommates devotion to study. (p. 73)

Assuming that students can and do educate one another, then it logically follows that the interaction with others in the students living environment should influence grades in a measurable way.

Elton and Bate's 1966 study turned up evidence contrary to these two major assumptions. Their results indicated that "the housing of students according to similarity of educational major does not influence first semester college achievement . . . There appears to be little justification for reserving floors for students enrolled in specific college units, e. g. engineering."

DeCoster (1966), in a study at the University of Florida, attempted to define a more desirable living arrangement for high ability students than that provided through random assignments. DeCoster suggested that random assignment in a residence hall could place a student in a living situation that was not only uncomfortable but actually a hindrance to satisfactory performance. In his tentative findings DeCoster contends that high ability students seem to have better academic success when living in close proximity with other high ability students.

In a follow-up study (DeCoster, 1968) it was found that those high ability students who lived in close proximity again had a higher degree of academic success, more frequently reported their living environments as conducive to study, more often felt that informal discussions were educational, and felt their living accommodations were more desirable.

In related studies, Kaplan et al. (1964) found that residents of special units for honor students at the University of Michigan viewed their environment as stimulating and academically oriented. Davison (1965) reported improved achievement test performance by language majors and education majors assigned together.

Morishima (1966) used two experimental groups and one control group to assess the effects of assigning students to residence halls on the basis of academic major. The two experimental groups, of 24 students each, were assigned to rooms in one wing or floor of a hall. These two groups were comprised of students with the same major courses of study. The control was scattered throughout the hall. The results indicated that both experimental groups displayed greater positive change over a span of two years in "scholarly orientation," as measured by certain scales of the Omnibus Personality Inventory. There were no significant differences found on other attitudinal scales, and there were no significant differences found in scholastic achievement.

Furthermore, Madson, Kuder, Hartanov and McKelfresh (1975) in an evaluation of a residential academic unit found that Forestry students living in a residential academic unit at Colorado State University were more satisfied and more aware when compared with randomly assigned and non-residence hall forestry students.

Taylor and Hanson (1970) in their study of the impact of an experimental living situation on achievement and study habits found that cumulative achievement was significantly better for engineering students living in a homogeneous residence hall situation when compared with randomly assigned and non-residence hall engineering students. They suggest that the influence of peers with common interests and common courses had a strong effect on achievement. The results of this study suggest that homogeneous housing and tutoring is one way to influence achievement positively.

Focusing on immediate problems, Taylor (1969) and Taylor, Cartwright and Hanson (1970) concluded that tutoring students had a positive effect on grades. Taylor, Roth and Hanson (1971) in their study of the effect of an experimental residence hall tutoring program on Institute of Technology freshmen from differing socio-economic backgrounds at the University of Minnesota found that:

1. In terms of differences between actual and predicted grade point averages, an achievement advantage was identified for middle socio-economic students living in the experimental units.

2. The most clear consistent advantage was evident for students of high socio-economic background who lived in the experimental units. (p. 277)

Summary of the Review of the Literature

In reviewing the literature, it has been necessary to look at three areas of research which pertain to the impact of living environments on students. The first area considered generalized research, contending that college and university residence halls are a vital part of the learning process. Additionally, this research maintained that the residence hall environment has a positive impact on the students' attitudes and academic achievement.

The second area considered studies dealing with residence and non-residence hall students. Findings of these studies indicated some measurable differences between these two groups on friendliness, feeling of togetherness and loyalty.

A number of studies involving the special grouping of students were reported in the literature. Results on academic achievement were mixed and conflicting. While some studies showed that the housing of students according to similarity of major does influence academic achievement, the majority of studies indicated that academic achievement was not significantly influenced. Results on satisfaction

and awareness indicated that special groupings of students tend to be more satisfied and more aware than randomly assigned students or students living off-campus.

The findings of this review of the literature relative to the impact of living environments on engineering students would appear to have some implications for this present study. It would seem that the two groups of freshmen engineering students and the three groups of non-freshmen engineering students under investigation might well have measurable differences in the areas of satisfaction and awareness, and possibly in the area of academic achievement. From this review it might be tentatively concluded that some of these differences could be attributed to the effects of the students' living environment.

CHAPTER III

METHODOLOGY

For this study, the subjects were freshmen engineering students residing in the residential academic unit and other residence halls, and non-freshmen engineering students residing in the residential academic unit, other residence halls, and off-campus at Colorado State University.

Criteria for Sample Selection

Since this study is concerned with the impact of living environments on engineering students, three groups (residence hall, off-campus, and residential academic unit) were established. To be eligible for selection, the student:

1. Must have been enrolled in the College of Engineering.
2. Must have attended CSU the semester prior to the study.
3. Must have been an undergraduate at the time of the study.
4. Must have been a full-time student at the time of the study.

Selection of Samples

1. Through the use of official university records it was determined that 159 engineering students live in Allison Hall (80 freshmen and 79 non-freshmen).
2. The entire population of the residential academic unit was separated into two groups; 80 freshmen and 79 non-freshmen.
3. From the population of engineering students living in other residence halls, 80 freshmen and 79 non-freshmen were randomly selected, stratified by class corresponding to the class stratification from the residential academic unit.
4. From the population of engineering students living off-campus, 79 non-freshmen were randomly selected, stratified by class corresponding to the class stratification from the residential academic unit.
5. No freshmen were chosen from the off-campus population since all freshmen are required to live on-campus.
6. Graduate students were not included in the sample.

Sources of Data

There were two main sources of data for use in this study:

1. From the official university records at Colorado State University the students names, local addresses and Fall Semester 1975 college grade point averages were made available.
2. The engineering questionnaire (see Appendices C and D): designed to gain biographical data and attitudinal information about engineering students.

Instrument Development

The development of the instrument for this study involved a variety of individuals. Initially, Housing Central Staff, engineering faculty and engineering students were consulted concerning their goals for the residential academic unit. From the goals of these three groups, questions were developed to determine whether or not such goals were being achieved. A member of the Housing Central Staff, a professor from the College of Engineering, the hall director at Allison Hall, and a small group of engineering students were asked to respond to a pre-administration of the instrument to check for clarity and accuracy. The instrument in final form utilized a Likert type scale for responses to questions pertaining to satisfaction and awareness.

Collection of Data

The procedures used to collect data for this study can be stated as follows:

1. The 1975 Fall Semester college grade point average was obtained from each sample member's permanent file.
2. The questionnaire was sent through the mail to the entire sample with the exception of the engineering students residing in the residential academic unit, where the questionnaire was administered by the student assistant on their floor section.
3. The instructions to the participants were included in the cover letter and questionnaire (see Appendices A, B, C, and D).
4. Follow-up on the administration of the questionnaire was carried out in the same manner; a second questionnaire was sent to those students that did not respond through the mail, while students not responding from the residential academic unit were given a second questionnaire by their student assistant.

Data Analysis

Once the data for use in this study had been collected the following steps were undertaken for analysis of the results:

1. Upon completion of the administration of the questionnaire, the answer sheets were sent to the CSU Computer Center for tabulation. Tabulation involved transferral of the data on the answer sheets to IBM cards. That data was then analyzed for significant differences by the CDC 6400 Computer.
2. In this study the statistical analysis for the two groups of freshmen engineering students and the three groups of non-freshmen engineering students involved the testing of hypotheses by using the F test.

CHAPTER IV

ANALYSIS AND RESULTS

This chapter presents the results and a discussion of the results of the analyses of the four hypotheses. In order to test the validity of the hypotheses, the differences among means were tested by use of the F test -- a statistical means to determine whether a difference between the means of two or more variables meets statistical criteria of reliability (see Appendix E). This chapter also presents other demographic data obtained from the samples response to the engineering residential academic unit.

Findings Related to the First Hypothesis

In testing the hypothesis of no difference in academic achievement for freshmen engineering students living in the engineering residential academic unit and other residence halls, the F test was used. While it was found that no significant difference existed between the two groups (see Table 1), it was found that freshmen engineering students living in the engineering residential academic unit had a higher academic achievement score. The hypothesis of no difference between the two groups on the variable of academic achievement was accepted at the 5 percent level of confidence.

Findings Related to the Second Hypothesis

In testing the hypothesis of no difference in academic achievement for non-freshmen engineering students living in the engineering residential academic unit, other residence halls and off-campus, the F test was used. It was found that no significant difference existed between the three groups (see Table 2). The hypothesis of no difference between the three groups on the variable of academic achievement was accepted at the 5 percent level of confidence.

Findings Related to the Third Hypothesis

In testing the hypothesis of no difference in the two sample groups of freshmen engineering students' response to the 16 items covered by the Engineering Questionnaire, the F test was applied to the results of each item. The results of this analysis are presented below:

- a. Satisfaction with the opportunities to talk to engineering professors outside of the classroom. Table 3 presents the findings of this analysis. As no significant differences were found, the hypothesis of no difference between the two groups on this item of satisfaction with the opportunities to talk to engineering professors was accepted at the 5 percent level of confidence.
- b. Satisfaction with the academic curriculum established by the College of Engineering. The findings of this analysis

are presented in Table 4. No significant differences were found on this item and the hypothesis of no difference between the two groups on this item of satisfaction with the academic curriculum established by the College of Engineering was accepted.

- c. Satisfaction with group spirit and rapport among engineering students. Analysis of this item revealed a significant difference between the two sample groups at the 5 percent level with freshmen engineering students living in the engineering residential academic unit expressing greater satisfaction. The hypothesis of no difference between the two groups on the item of satisfaction with group spirit and rapport among engineering students was rejected.

Table 5 presents the findings of this analysis.

- d. Satisfaction with opportunities for engineering students to participate in policy making decisions involving the College of Engineering. Results of the analysis of this item revealed no significant differences between the two groups. The hypothesis of no difference between the two groups on the item of satisfaction with opportunities for engineering students to participate in policy making decisions involving the College of Engineering was accepted. Table 6 presents the findings of the analysis in this area.

- e. Satisfaction with the affiliation (feeling of belonging) with the College of Engineering. Analysis of this item revealed a significant difference between the two sample groups at the 5 percent level with freshmen engineering students living in the engineering residential academic unit expressing greater satisfaction. The hypothesis of no difference between the two groups on the item of satisfaction with the affiliation (feeling of belonging) with the College of Engineering was rejected. Table 7 presents the findings of this analysis.
- f. Satisfaction with the study atmosphere of their present living environment. The findings of the analysis on the item of satisfaction with the study atmosphere of their present living environment revealed a significant difference between the two sample groups at the 5 percent level. Freshmen engineering students living in the engineering residential academic unit expressed greater satisfaction. The hypothesis of no difference between the two groups on this item was rejected. Table 8 presents the findings of this analysis.
- g. Satisfaction with the comfort of their present living environment. Results of the analysis on the item revealed no significant differences between the two groups. The

hypothesis of no difference between the two groups on the item of satisfaction with the comfort of their present living environment was accepted. Table 9 presents the findings of the analysis in this area.

- h. Satisfaction with the special facilities provided by the university to aid in their classwork (i. e., computer terminal, computer card punches, calculators, etc.).

The findings of the analysis of this item revealed a significant difference between the two sample groups at the 1 percent level with freshmen engineering students living in the engineering residential academic unit expressing greater satisfaction. The hypothesis of no difference between the two groups on the item of satisfaction with the special facilities provided by the university to aid in their classwork was rejected. Table 10 presents the findings of this analysis.

- i. Satisfaction with the academic assistance and help from classmates. The results of the analysis of this item revealed a significant difference between the two sample groups at the 1 percent level with freshmen engineering students living in the engineering residential academic unit expressing greater satisfaction. The hypothesis of no difference between the two groups on the item of

satisfaction with academic assistance and help from classmates was rejected. Table 11 presents the findings of this analysis.

- j. Satisfaction with the opportunities for extra-curricular involvement (i. e., intramural athletics, student government, social activities, etc.). Results of the analysis of this item revealed no significant differences between the two groups. The hypothesis of no difference between the two groups on the item of satisfaction with the opportunities for extra-curricular involvement was accepted. Table 12 presents the findings of the analysis in this area.
- k. Satisfaction with the overall classroom education I am receiving at CSU. Results of the analysis of this item revealed no significant differences between the two groups. The hypothesis of no difference between the two groups on the item of satisfaction with the overall classroom education received at CSU was accepted. Table 13 presents the findings of this analysis.
- l. Awareness of variety of majors in the College of Engineering. The findings of the analysis on this item revealed no significant differences between the two groups. The hypothesis of no difference between the two groups on the item of awareness of variety of majors in the College

of Engineering was accepted. Table 14 presents the findings of this analysis.

- m. Awareness of the variety of professional societies in engineering. The results of the analysis on this item revealed no significant differences between the two groups. The hypothesis of no difference between the two groups on the item of awareness of the variety of professional societies in engineering was accepted. Table 15 presents the findings of this analysis.
- n. Awareness of the opportunity to gain assistance from special tutors provided by the College of Engineering. The findings of the analysis on this item revealed a significant difference between the two sample groups at the 1 percent level with freshmen engineering students living in the engineering residential unit expressing greater awareness. The hypothesis of no difference between the two groups on the item of awareness of the opportunity to gain assistance from special tutors provided by the College of Engineering was rejected. Table 16 presents the findings of this analysis.
- o. Awareness of current trends and issues in the field of engineering. The results of the analysis on this item revealed no significant differences between the two groups.

The hypothesis of no difference between the two groups on the item of awareness of current trends and issues in the field of engineering was accepted. Table 17 presents the findings of this analysis.

- p. Awareness of opportunities for employment in the field of engineering. The results of the analysis on this item revealed no significant differences between the two groups. The hypothesis of no difference between the two groups on the item of awareness of opportunities for employment in the field of engineering was accepted. Table 18 presents the findings of this analysis.

Findings Related to the Fourth Hypothesis

In testing the hypothesis of no difference in the three sample groups of non-freshmen engineering students' response to the 16 items covered by the Engineering Questionnaire, the F test was applied to the results of each item. The results of this analysis are presented below:

- a. Satisfaction with the opportunities to talk to engineering professors outside the classroom. The results of the analysis on this item revealed no significant differences between the three groups. The hypothesis of no difference between the three groups on the item of satisfaction with the opportunities to talk to engineering

professors outside the classroom was accepted. Table 19 presents the findings of this analysis.

- b. Satisfaction with the academic curriculum established by the College of Engineering. The findings of the analysis in this area revealed no significant differences between the three groups on the item of satisfaction with the academic curriculum established by the College of Engineering. The hypothesis of no difference between the three groups on this item was accepted. Table 20 presents the findings of this analysis.
- c. Satisfaction with group spirit and rapport among engineering students. The results of the analysis on this item revealed no significant differences between the three groups. The hypothesis of no difference between the three groups on the item of satisfaction with group spirit and rapport among engineering students was accepted. Table 21 presents the findings of this analysis.
- d. Satisfaction with opportunities for engineering students to participate in policy-making decisions involving the College of Engineering. The findings of the analysis on this item revealed no significant differences between the three groups. The hypothesis of no difference between the three groups on the item of satisfaction with

opportunities for engineering students to participate in policy-making decisions involving the College of Engineering was accepted. Table 22 presents the findings of this analysis.

- e. Satisfaction with the affiliation (feeling of belonging) with the College of Engineering. Analysis on this item revealed a significant difference between the three sample groups at the 5 percent level with non-freshmen engineering students living in the residential academic unit and other residence halls expressing greater satisfaction. The hypothesis of no difference between the three groups on the item of satisfaction with the affiliation (feeling of belonging) with the College of Engineering was rejected. Table 23 presents the findings of this analysis.
- f. Satisfaction with the study atmosphere of their present living environment. Analysis on this item revealed a significant difference between the three sample groups at the 1 percent level with non-freshmen engineering students living off-campus expressing greater satisfaction. The hypothesis of no difference between the three groups on the item of satisfaction with the study atmosphere of the present living environment was rejected. Table 24 presents the findings of this analysis.

- g. Satisfaction with the comfort of their present living environment. Analysis on this item revealed a significant difference between the three sample groups at the 1 percent level with non-freshmen engineering students living off-campus expressing greater satisfaction. The hypothesis of no difference between the three groups on the item of satisfaction with the comfort of their present living environment was rejected. Table 25 presents the findings of this analysis.
- h. Satisfaction with the special facilities provided by the university to aid in their classwork (i. e., computer terminal, computer card punches, calculators, etc.). The results of the analysis on this item revealed no significant differences between the three groups. The hypothesis of no difference between the three groups on the item of satisfaction with the special facilities provided by the university to aid in their classwork was accepted. Table 26 presents the findings of this analysis.
- i. Satisfaction with the academic assistance and help from classmates. Analysis on the item revealed a significant difference between the three sample groups at the 1 percent level with non-freshmen engineering students living in the engineering residential academic unit

expressing greater satisfaction. The hypothesis of no difference between the three groups on the item of satisfaction with the academic assistance and help from classmates was rejected. Table 27 presents the findings of this analysis.

- j. Satisfaction with the opportunities for extra-curricular involvement. Analysis on this item revealed a significant difference between the three sample groups at the 5 percent level with non-freshmen engineering students living in the engineering residential academic unit expressing greater satisfaction. The significant difference was with engineering students living off-campus. The hypothesis of no difference between the three groups on the item of satisfaction with the opportunities for extra-curricular involvement was rejected. Table 28 presents the findings of this analysis.
- k. Satisfaction with the overall classroom education I am receiving at CSU. The results of the analysis of this item revealed no significant differences between the three groups. The hypothesis of no difference between the three groups on the item of satisfaction with the overall classroom education I am receiving at CSU was accepted. Table 29 presents the findings of this analysis.

- l. Awareness of the variety of majors in the College of Engineering. The findings of the analysis on this item revealed no significant differences between the three groups. The hypothesis of no difference between the three groups on the item of awareness of the variety of majors in the College of Engineering was accepted. Table 30 presents the findings of this analysis.
- m. Awareness of the variety of professional societies in engineering. The findings of the analysis on this item revealed no significant differences between the three groups. The hypothesis of no difference between the three groups on the item of awareness of the variety of professional societies in engineering was accepted. Table 31 presents the findings of this analysis.
- n. Awareness of the opportunity to gain assistance from special tutors provided by the College of Engineering. Analysis on this item revealed a significant difference between the three sample groups at the 1 percent level with non-freshmen engineering students living in the engineering residential academic unit expressing greater awareness. The hypothesis of no difference between the three groups on the item of awareness of the opportunity to gain assistance from special tutors provided by the

College of Engineering was rejected. Table 32 presents the findings of this analysis.

- o. Awareness of current trends and issues in the field of engineering. The results of the analysis on this item revealed no significant differences between the three groups. The hypothesis of no difference between the three groups on the item of awareness of current trends and issues in the field of engineering was accepted. Table 33 presents the findings of this analysis.
- p. Awareness of opportunities for employment in the field of engineering. The findings of the analysis on this item revealed no significant differences between the three groups. The hypothesis of no difference between the three groups on the item of awareness of opportunities for employment in the field of engineering was accepted. Table 34 presents the findings of this analysis.

Summary of Results

Freshmen engineering students living in the engineering residential academic unit were compared to freshmen engineering students living in other residence halls on 17 variables. Statistical analysis revealed significantly higher scores for freshmen engineering students living in the engineering residential academic unit on the

following items of satisfaction: group spirit and rapport among engineering students, affiliation (feeling of belonging) with the College of Engineering, the study atmosphere of their present living environment, the special facilities provided by the university to aid in their classwork, and academic assistance and help from classmates.

Statistical analysis also revealed that freshmen engineering students living in the engineering residential academic unit had a significantly higher score on the item of awareness of the opportunity to gain assistance from special tutors provided by the College of Engineering.

Statistical analysis for these two groups of freshmen engineering students revealed no significant differences on the variable of academic achievement, and no significant differences on the following areas of satisfaction: opportunities to talk to engineering professors outside the classroom, the academic curriculum established by the College of Engineering, opportunities for engineering students to participate in policy-making decisions involving the College of Engineering, the comfort of their present living environment, opportunities for extra-curricular involvement, and the overall classroom education received at Colorado State University. Additionally, no significant differences were revealed on the following areas of awareness: variety of majors in the College of Engineering, current trends and issues in the field of engineering, the variety of professional societies in engineering, and opportunities for employment in the field of engineering.

Non-freshmen engineering students living in the engineering residential academic unit, other residence halls, and off-campus were all compared on 17 variables. Non-freshmen engineering students living in the engineering residential academic unit had significantly higher scores on the following items of satisfaction: academic assistance and help from classmates, and opportunities for extra-curricular involvement (only significantly higher than engineering students living off-campus). Non-freshmen engineering students living in the engineering residential academic unit and other residence halls had significantly higher scores on the item of satisfaction with affiliation (feeling of belonging) with the College of Engineering.

Non-freshmen engineering students residing off-campus had significantly higher scores on the following items of satisfaction: study atmosphere of the present living environment, and comfort of their present living environment.

Non-freshmen engineering students living in the engineering residential academic unit had a significantly higher score on the item of awareness of the opportunity to gain assistance from special tutors provided by the College of Engineering.

Statistical analysis revealed no significant difference between the three groups on the variable of academic achievement and the following items of satisfaction: opportunities to talk to engineering

professors outside the classroom, the academic curriculum established by the College of Engineering, group spirit and rapport among engineering students, opportunities for engineering students to participate in policy-making decisions involving the College of Engineering, special facilities provided by the university to aid their classwork, and the overall classroom education received at Colorado State University.

No significant differences between the three groups were revealed on the following items of awareness: the variety of majors in the College of Engineering, the variety of professional societies in engineering, current trends and issues in the field of engineering, and opportunities for employment in the field of engineering.

Table 1. Summary data for the F test of the mean difference between freshmen engineering students living in the engineering residential academic unit and other residence halls on academic achievement.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|-------|---------|-------------------|
| Residential Academic Unit | 79 | 2.9056 | .6402 | 3.199 | .076 ^a |
| Other Residence Halls | 72 | 2.7083 | .7149 | | |

^aNon-significant.

Table 2. Summary data for the F test of the mean difference between non-freshmen engineering students living the engineering residential academic unit, other residence halls, and off-campus on academic achievement.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|-------|---------|-------------------|
| Residential Academic Unit | 73 | 2.7760 | .7826 | .571 | .566 ^a |
| Other Residence Halls | 74 | 2.6416 | .7280 | | |
| Off Campus | 66 | 2.7159 | .7825 | | |

^aNon-significant.

Table 3. Summary data for the F test of the mean difference between freshmen engineering students living in the engineering residential academic unit and other residence halls on the variable of satisfaction with the opportunities to talk to engineering professors outside the classroom.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|--------|---------|-------------------|
| Residential Academic Unit | 63 | 3.4921 | .9311 | .345 | .558 ^a |
| Other Residence Halls | 57 | 3.3860 | 1.0480 | | |

^aNon-significant.

Table 4. Summary data for the F test of the mean difference between freshmen engineering students living in the engineering residential academic unit and other residence halls on the variable of satisfaction with the academic curriculum established by the College of Engineering.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|-------|---------|-------------------|
| Residential Academic Unit | 63 | 3.5079 | .7378 | 2.244 | .137 ^a |
| Other Residence Halls | 57 | 3.2807 | .9211 | | |

^aNon-significant.

Table 5. Summary data for the F test of the mean difference between freshmen engineering students living in the engineering residential academic unit and other residence halls on the variable of satisfaction with group spirit and rapport among engineering students.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|-------|---------|-------------------|
| Residential Academic Unit | 63 | 3.5238 | .9308 | 6.372 | .013 ^a |
| Other Residence Halls | 57 | 3.1053 | .8800 | | |

^aSignificant.

Table 6. Summary data for the F test of the mean difference between freshmen engineering students living in the engineering residential academic unit and other residence halls on the variable of satisfaction with opportunities for engineering students to participate in policy-making decisions involving the College of Engineering.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|-------|---------|-------------------|
| Residential Academic Unit | 63 | 2.5556 | .6904 | 1.075 | .302 ^a |
| Other Residence Halls | 57 | 2.4211 | .7306 | | |

^aNon-significant.

Table 7. Summary data for the F test of the mean difference between freshmen engineering students living in the engineering residential academic unit and other residence halls on the variable of satisfaction with the affiliation (feeling of belonging) with the College of Engineering.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|--------|---------|-------------------|
| Residential Academic Unit | 63 | 3.3810 | .8506 | 4.110 | .045 ^a |
| Other Residence Halls | 57 | 3.0351 | 1.0171 | | |

^aSignificant.

Table 8. Summary data for the F test of the mean difference between freshmen engineering students living in the engineering residential academic unit and other residence halls on the variable of satisfaction with study atmosphere of their present living environment.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|--------|---------|-------------------|
| Residential Academic Unit | 63 | 3.5556 | 1.0592 | 6.188 | .014 ^a |
| Other Residence Halls | 56 | 3.0357 | 1.2205 | | |

^aSignificant.

Table 9. Summary data for the F test of the mean difference between freshmen engineering students living in the engineering residential academic unit and other residence halls on the variable of satisfaction with the comfort of their present living environment.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|--------|---------|-------------------|
| Residential Academic Unit | 63 | 3.5238 | 1.1196 | .062 | .804 ^a |
| Other Residence Halls | 57 | 3.4737 | 1.0874 | | |

^aNon-significant.

Table 10. Summary data for the F test of the mean difference between freshmen engineering students living in the engineering residential academic unit and other residence halls on the variable of satisfaction with the special facilities provided by the university to aid in their classwork.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|--------|---------|-------------------|
| Residential Academic Unit | 63 | 3.7778 | .9910 | 14.659 | .000 ^a |
| Other Residence Halls | 57 | 3.0702 | 1.0327 | | |

^aSignificant.

Table 11. Summary data for the F test of the mean difference between freshmen engineering students living in the engineering residential academic unit and other residence halls on the variable of satisfaction with academic assistance and help from classmates.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|-------|---------|-------------------|
| Residential Academic Unit | 62 | 3.9677 | .8678 | 10.137 | .002 ^a |
| Other Residence Halls | 57 | 3.4386 | .9452 | | |

^aSignificant.

Table 12. Summary data for the F test of the mean difference between freshmen engineering students living in the engineering residential academic unit and other residence halls on the variable of satisfaction with the opportunities for extra-curricular involvement.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|-------|---------|-------------------|
| Residential Academic Unit | 63 | 4.000 | .8032 | .121 | .729 ^a |
| Other Residence Halls | 57 | 3.9474 | .8540 | | |

^aNon-significant.

Table 13. Summary data for the F test of the mean difference between freshmen engineering students living in the engineering residential academic unit and other residence halls on the variable of satisfaction with the overall classroom education received at CSU.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|-------|---------|-------------------|
| Residential Academic Unit | 62 | 3.5323 | .8630 | .211 | .647 ^a |
| Other Residence Halls | 56 | 3.6071 | .9081 | | |

^aNon-significant.

Table 14. Summary data for the F test of the mean difference between freshmen engineering students living in the engineering residential academic unit and other residence halls on the variable of awareness of the variety of majors in the College of Engineering.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|-------|---------|-------------------|
| Residential Academic Unit | 63 | 3.8254 | .8714 | 2.307 | .131 ^a |
| Other Residence Halls | 57 | 3.5789 | .9053 | | |

^aNon-significant.

Table 15. Summary data for the F test of the mean difference between freshmen engineering students living in the engineering residential academic unit and other residence halls on the variable of awareness of the variety of professional societies in engineering.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|--------|---------|-------------------|
| Residential Academic Unit | 63 | 2.6984 | 1.0102 | .070 | .792 ^a |
| Other Residence Halls | 57 | 2.6491 | 1.0263 | | |

^aNon-significant.

Table 16. Summary data for the F test of the mean difference between freshmen engineering students living in the engineering residential academic unit and other residence halls on the variable of awareness of the opportunity to gain assistance from special tutors provided by the College of Engineering.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|--------|---------|-------------------|
| Residential Academic Unit | 63 | 3.2540 | 1.0468 | 30.299 | .000 ^a |
| Other Residence Hall | 57 | 2.2546 | .9502 | | |

^aSignificant.

Table 17. Summary data for the F test of the mean difference between freshmen engineering students living in the engineering residential academic unit and other residence halls on the variable of awareness of current trends and issues in the field of engineering.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|-------|---------|-------------------|
| Residential Academic Unit | 63 | 2.4444 | .9635 | .275 | .601 ^a |
| Other Residence Hall | 57 | 2.3509 | .9909 | | |

^aNon-significant.

Table 18. Summary data for the F test of the mean difference between freshmen engineering students living in the engineering residential academic unit and other residence halls on the variable of awareness of opportunities for employment in the field of engineering.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|--------|---------|-------------------|
| Residential Academic Unit | 63 | 3.0159 | 1.1569 | .108 | .743 ^a |
| Other Residence Hall | 57 | 2.9474 | 1.1247 | | |

^aNon-significant.

Table 19. Summary data for F test of the mean difference between non-freshmen engineering students living in the engineering residential academic unit, other residence halls and off-campus on the variable of satisfaction with opportunities to talk with engineering professors outside the classroom.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|--------|---------|-------------------|
| Residential Academic Unit | 56 | 3.4286 | 1.0763 | | |
| Other Residence Halls | 64 | 3.4219 | .9563 | .661 | .518 ^a |
| Off-Campus | 57 | 3.2281 | 1.1652 | | |

^aNon-significant.

Table 20. Summary data for F test of the mean difference between non-freshmen engineering students living in the engineering residential academic unit, other residence halls and off-campus on the variable of satisfaction with the academic curriculum established by the College of Engineering.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|-------|---------|-------------------|
| Residential Academic Unit | 56 | 3.3571 | .9230 | | |
| Other Residence Halls | 64 | 3.5156 | .8543 | 1.534 | .219 ^a |
| Off-Campus | 56 | 3.2321 | .8942 | | |

^aNon-significant.

Table 21. Summary data for F test of the mean difference between non-freshmen engineering students living in the engineering residential academic unit, other residence halls and off-campus on the variable of satisfaction with group spirit and rapport among engineering students.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|--------|---------|-------------------|
| Residential Academic Unit | 56 | 3.7143 | 1.0739 | | |
| Other Residence Halls | 64 | 3.4063 | .9548 | 1.759 | .175 ^a |
| Off-Campus | 57 | 3.4561 | .8033 | | |

^aNon-significant.

Table 22. Summary data for F test of the mean difference between non-freshmen engineering students living in the residential academic unit, other residence halls and off-campus on the variable of satisfaction with opportunities for engineering students to participate in policy making decisions involving the College of Engineering.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|-------|---------|-------------------|
| Residential Academic Unit | 56 | 2.7679 | .8737 | | |
| Other Residence Halls | 63 | 2.7460 | .7613 | .019 | .981 ^a |
| Off-Campus | 57 | 2.7719 | .7075 | | |

^aNon-significant.

Table 23. Summary data for F test of the mean difference between non-freshmen engineering students living in the engineering residential academic unit, other residence halls, and off-campus on the variable of satisfaction with the affiliation (feeling of belonging) with the College of Engineering.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|--------|---------|-------------------|
| Residential Academic Unit | 56 | 3.6607 | .6948 | | |
| Other Residence Halls | 64 | 3.5938 | .9036 | 3.297 | .039 ^a |
| Off-Campus | 57 | 3.2632 | 1.0269 | | |

^aSignificant

Table 24. Summary data for F test of the mean difference between non-freshmen engineering students living in the engineering residential academic unit, other residence halls and off-campus on the variable of satisfaction with the study atmosphere of their present living environment.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|--------|---------|-------------------|
| Residential Academic Unit | 56 | 3.3036 | .9519 | | |
| Other Residence Halls | 64 | 2.9688 | 1.1543 | 7.134 | .001 ^a |
| Off-Campus | 57 | 3.7193 | 1.1457 | | |

^aSignificant

Table 25. Summary data for F test of the mean difference between non-freshmen engineering students living in the engineering residential academic unit, other residence halls and off-campus on the variable of satisfaction with the comfort of their present living environment.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|--------|---------|-------------------|
| Residential Academic Unit | 55 | 3.3091 | .9204 | | |
| Other Residence Halls | 64 | 3.4688 | 1.1404 | 20.118 | .000 ^a |
| Off-Campus | 57 | 4.3509 | .6941 | | |

^aSignificant.

Table 26. Summary data for F test of the mean difference between non-freshmen engineering students living in the engineering residential academic unit, other residence halls, and off-campus on the variable of satisfaction with the special facilities provided by the university to aid in their classwork.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|-------|---------|-------------------|
| Residential Academic Unit | 56 | 3.9821 | .8840 | | |
| Other Residence Halls | 64 | 3.5938 | .9036 | 2.766 | .066 ^a |
| Off-Campus | 56 | 3.6964 | .9894 | | |

^aNon-significant.

Table 27. Summary data for F test of the mean difference between non-freshmen engineering students living in the engineering residential academic unit, other residence halls and off-campus on the variable of satisfaction with the academic assistance and help from classmates.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|-------|---------|-------------------|
| Residential Academic Unit | 56 | 4.1607 | .8040 | | |
| Other Residence Halls | 64 | 3.5781 | .8874 | 9.840 | .000 ^a |
| Off-Campus | 57 | 3.5088 | .8889 | | |

^aSignificant.

Table 28. Summary data for F test of the mean difference between non-freshmen engineering students living in the engineering residential academic unit, other residence halls and off-campus on the variable of satisfaction with the opportunities for extra-curricular involvement.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|-------|---------|-------------------|
| Residential Academic Unit | 55 | 3.8545 | .8696 | | |
| Other Residence Halls | 64 | 3.7344 | .9635 | 3.085 | .048 ^a |
| Off-Campus | 57 | 3.4386 | .9067 | | |

^aSignificant.

Table 29. Summary data for F test of the mean difference between non-freshmen engineering students living in the engineering residential academic unit, other residence halls, and off-campus on the variable of satisfaction with the overall classroom education received at CSU.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|-------|---------|-------------------|
| Residential Academic Unit | 55 | 3.6545 | .8437 | | |
| Other Residence Halls | 64 | 3.7969 | .7385 | .689 | .504 ^a |
| Off-Campus | 57 | 3.6491 | .7904 | | |

^aNon-significant.

Table 30. Summary data for F test of the difference between non-freshmen engineering students living in the engineering residential academic unit, other residence halls, and off-campus on the variable of awareness of the variety of majors in the College of Engineering.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|--------|---------|-------------------|
| Residential Academic Unit | 56 | 4.0714 | .8281 | | |
| Other Residence Halls | 64 | 3.8125 | .7943 | 1.352 | .261 ^a |
| Off-Campus | 57 | 3.8596 | 1.0763 | | |

^aNon-significant.

Table 31. Summary data for F test of the mean difference between non-freshmen engineering students living in the engineering residential academic unit, other residence halls and off-campus on the variable of awareness of the variety of professional societies in engineering.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|--------|---------|-------------------|
| Residential Academic Unit | 56 | 3.5357 | .9335 | | |
| Other Residence Halls | 64 | 3.3281 | 1.0699 | .912 | .404 ^a |
| Off-Campus | 57 | 3.2807 | 1.1916 | | |

^aNon-significant.

Table 32. Summary data for F test of the mean difference between non-freshmen engineering students living in the engineering residential academic unit, other residence halls and off-campus on the variable of awareness of the opportunity to gain assistance from special tutors provided by the College of Engineering.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|--------|---------|-------------------|
| Residential Academic Unit | 56 | 3.5536 | 1.1269 | | |
| Other Residence Halls | 64 | 2.7969 | 1.0864 | 8.441 | .000 ^a |
| Off-Campus | 57 | 2.8246 | 1.1514 | | |

^aSignificant.

Table 33. Summary data for F test of the mean difference between non-freshmen engineering students living in the engineering residential academic unit, other residence halls and off-campus on the variable of awareness of current trends and issues in the field of engineering.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|--------|---------|-------------------|
| Residential Academic Unit | 56 | 3.000 | 1.0787 | | |
| Other Residence Halls | 64 | 2.8750 | 1.0313 | 1.084 | .341 ^a |
| Off-Campus | 57 | 3.1754 | 1.2553 | | |

^aNon-significant.

Table 34. Summary data for F test of the mean difference between non-freshmen engineering students living in the engineering residential academic unit, other residence halls and off-campus on the variable of awareness of opportunities for employment in the field of engineering.

| Group | N | Mean | SD | F Ratio | F Prob. |
|---------------------------|----|--------|--------|---------|-------------------|
| Residential Academic Unit | 56 | 3.4464 | 1.0076 | | |
| Other Residence Halls | 64 | 3.2500 | 1.1127 | .489 | .614 ^a |
| Off-Campus | 57 | 3.2982 | 1.2242 | | |

^aNon-significant.

Table 35 presents a summary pertaining to the acceptance or rejection of 17 null hypotheses under study for freshmen engineering students.

Table 35. Summary table pertaining to the retention or rejection of null hypotheses for freshmen engineering students.

| Variable | Corresponding Hypothesis |
|--|--------------------------|
| Academic achievement | Accepted |
| a. Satisfaction with the opportunities to talk to engineering professors outside of the class-room | Accepted |
| b. Satisfaction with the academic curriculum established by the College of Engineering | Accepted |
| c. Satisfaction with group spirit and rapport among engineering students | Rejected |
| d. Satisfaction with opportunities for engineering students to participate in policy-making decisions involving the College of Engineering | Accepted |
| e. Satisfaction with the affiliation (feeling of belonging) with the College of Engineering | Rejected |
| f. Satisfaction with the study atmosphere of their present living environment | Rejected |
| g. Satisfaction with the comfort of their present living environment | Accepted |
| h. Satisfaction with the special facilities provided by the university to aid in their class-work (i. e., computer terminal, computer card punches, calculators, etc.) | Rejected |
| i. Satisfaction with the academic assistance and help from classmates | Rejected |
| j. Satisfaction with the opportunities for extra-curricular involvement (i. e., intramural athletics, student government, social activities, etc.) | Accepted |
| k. Satisfaction with the overall classroom education I am receiving at Colorado State University | Accepted |
| l. Awareness of the variety of majors in the College of Engineering | Accepted |

Table 35. Continued.

| Variable | Corresponding Hypothesis |
|---|--------------------------|
| m. Awareness of the variety of professional societies in engineering | Accepted |
| n. Awareness of the opportunity to gain assistance from special tutors provided by the College of Engineering | Rejected |
| o. Awareness of current trends and issues in the field of engineering | Accepted |
| p. Awareness of opportunities for employment in the field of engineering | Accepted |

Table 36 presents a summary pertaining to the acceptance or rejection of 17 null hypotheses under study for non-freshmen engineering students.

Table 36. Summary table pertaining to the retention or rejection of the null hypotheses for non-freshmen engineering students.

| Variable | Corresponding Hypothesis |
|---|--------------------------|
| Academic achievement | Accepted |
| a. Satisfaction with the opportunities to talk to engineering professors outside of the classroom | Accepted |
| b. Satisfaction with the academic curriculum established by the College of Engineering | Accepted |
| c. Satisfaction with group spirit and rapport among engineering students | Accepted |
| d. Satisfaction with opportunities for engineering students to participate in policy-making decisions involving the College of Engineering | Accepted |
| e. Satisfaction with the affiliation (feeling of belonging) with the College of Engineering | Rejected |
| f. Satisfaction with the study atmosphere of their present living environment | Rejected |
| g. Satisfaction with the comfort of their present living environment | Rejected |
| h. Satisfaction with the special facilities provided by the university to aid in their classwork (i. e., computer terminal, computer card punches, calculators, etc.) | Accepted |
| i. Satisfaction with the academic assistance and help from classmates | Rejected |
| j. Satisfaction with the opportunities for extra-curricular involvement (i. e., intramural athletics, student government, social activities, etc.) | Rejected |
| k. Satisfaction with the overall classroom education I am receiving at Colorado State University | Accepted |
| l. Awareness of the variety of majors in the College of Engineering | Accepted |

Table 36. Continued.

| Variable | Corresponding Hypothesis |
|---|--------------------------|
| m. Awareness of the variety of professional societies in engineering | Accepted |
| n. Awareness of the opportunity to gain assistance from special tutors provided by the College of Engineering | Rejected |
| o. Awareness of current trends and issues in the field of engineering | Accepted |
| p. Awareness of opportunities for employment in the field of engineering. | Accepted |

Demographic Data

In addition to sampling students' attitudes and opinions on the 16 items already covered in this chapter, the engineering questionnaire also provides demographic data on the total sample.

Sex: Table 37 presents a summary of the data pertaining to sex of the total sample.

Table 37. Summary of data pertaining to the sex of the total sample of engineering students at Colorado State University--1975-76.

| Sex | N | % |
|--------|-----------|------------|
| Male | 269 | 90.6 |
| Female | <u>28</u> | <u>9.4</u> |
| Total | 297 | 100% |

Marital Status: Table 38 presents a summary of the data pertaining to the marital status of the total sample.

Table 38. Summary of data pertaining to the marital status of the total sample of engineering students at Colorado State University--1975-76.

| Marital Status | N | % |
|----------------|-----------|------------|
| Single | 284 | 95.9 |
| Married | <u>12</u> | <u>4.1</u> |
| Total | 296 | 100% |

Range of Age: Table 39 presents a summary of the data pertaining to range of age for the total sample.

Table 39. The range of ages of the total sample of engineering students at Colorado State University--1975-76.

| Age | N | % |
|-------|-----------|------------|
| 18 | 79 | 26.7 |
| 19 | 81 | 27.4 |
| 20 | 74 | 25.0 |
| 21 | 33 | 11.1 |
| 22+ | <u>29</u> | <u>9.8</u> |
| Total | 296 | 100% |

Class: Table 40 presents a summary of the data pertaining to class for the total sample.

Table 40. Summary of data pertaining to the classes of the total sample of engineering students at Colorado State University--1975-76.

| Class | N | % |
|-----------|-----------|------------|
| Freshman | 120 | 40.4 |
| Sophomore | 107 | 36.0 |
| Junior | 42 | 14.1 |
| Senior | <u>28</u> | <u>9.4</u> |
| Total | 297 | 100% |

Major: Table 41 presents a summary of the data pertaining to the majors of the total sample.

Table 41. Summary of data pertaining to the majors of the total sample of engineering students at Colorado State University--1975-76.

| Major | N | % |
|--------------------------|-----------|------------|
| Civil Engineering | 92 | 31.0 |
| Mechanical Engineering | 66 | 22.2 |
| Electrical Engineering | 72 | 24.2 |
| Agricultural Engineering | 19 | 6.4 |
| Engineering Science | 24 | 8.1 |
| Undecided | <u>24</u> | <u>8.1</u> |
| Total | 297 | 100% |

Living Situation: Table 42 presents a summary of the data pertaining to the living situations of the total sample.

Table 42. Summary of data pertaining to the living situations of the total sample of engineering students at Colorado State University--1975-76.

| Living Situation | N | % |
|------------------|-----------|-------------|
| Residence Hall | 240 | 80.8 |
| Off-Campus | <u>57</u> | <u>19.2</u> |
| Total | 297 | 100% |

Residence Hall: Table 43 presents a summary of the data pertaining to the residence halls in which the total residence hall sample lived.

Table 43. Summary of data pertaining to the residence halls in which the total residence hall sample of engineering students lived at Colorado State University--1975-76.

| Residence Hall | N | % |
|----------------|-----------|-------------|
| Allison | 119 | 40.1 |
| Braiden | 11 | 3.7 |
| Corbett | 25 | 8.4 |
| Durward | 14 | 4.7 |
| Ellis | 4 | 1.3 |
| Edwards | 6 | 2.0 |
| Green | 23 | 7.7 |
| Ingersoll | 7 | 2.4 |
| Newson | 13 | 4.4 |
| Parmelee | 15 | 5.1 |
| Westfall | 3 | 1.0 |
| Blank | <u>57</u> | <u>19.2</u> |
| Total | 297 | 100% |

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The primary purpose of this study was to compare and contrast three groups of engineering students (those in the engineering residential academic unit, those in other residence halls, and those living off-campus) at Colorado State University on academic achievement, and specific items of satisfaction and awareness to determine if measurable differences did exist.

The sample for this study consisted of all the engineering students residing in the engineering residential academic unit, a random selection of freshmen engineering students residing in other residence halls, and a random selection of non-freshmen engineering students residing in other residence halls and off-campus. All sample members had to have been full-time, undergraduate students enrolled in the College of Engineering at the time of the study. Furthermore, all sample members must have attended Colorado State University the semester prior to the study. Included in the sample were 159 engineering students living in the engineering residential academic (80 freshmen and 79 non-freshmen), 159 engineering students living in other

residence halls (80 freshmen and 79 non-freshmen), and 79 non-freshmen engineering students living off-campus.

After the samples had been selected, data, in the form of 1975 Fall Semester college grade point averages, were obtained from the official university records. Statistical analysis was conducted between the two groups of freshmen and the three groups of non-freshmen on the variable of academic achievement.

The engineering questionnaire was then administered to the sample groups, resulting in a 75 percent return from the engineering residential academic unit (119 sample members), a 76 percent return from other residence halls (121 sample members), and a 72 percent return from off-campus (57 sample members). The questionnaires were then sent to the CSU Computer Center for tabulation.

Upon return of the data from the CSU Computer Center, the hypotheses under consideration were tested by the use of the F test. Findings indicated that there were statistically significant differences for the two groups of freshmen and the three groups of non-freshmen on certain items of satisfaction and awareness (see Tables 35 and 36).

Conclusions

From the results of this study, the following conclusions were drawn.

1. As supported by some of the literature and the results of this study, it can be concluded that there were significant differences

between the two groups of freshmen engineering students and significant differences between the three groups of non-freshmen engineering students at Colorado State University.

2. It can be concluded that while many similarities existed among the two groups of freshmen in their attitudes and opinions, there were certain significant differences which distinguished the two groups from one another. Of the two groups under study, the group of freshmen engineering students living in the engineering residential academic unit was significantly more satisfied with the group spirit and rapport among engineering students, the affiliation (feeling of belonging) with the College of Engineering, the study atmosphere of their present living environment, the special facilities provided by the university to aid in their classwork, and the academic assistance and help from classmates. Additionally, the group of freshmen engineering students living in the engineering residential academic unit was significantly more aware of the opportunity to gain assistance from special tutors provided by the College of Engineering.

3. It can be concluded that while many similarities existed among the three groups of non-freshmen in their attitudes and opinions, there were significant differences which distinguished the three groups from one another. Of the three groups under study, the group of non-freshmen engineering students living in the engineering residential academic unit was significantly more satisfied with the academic assistance and help from classmates, and significantly more

satisfied than the group of non-freshmen living off-campus with the opportunities for extra-curricular involvement. Non-freshmen engineering students living in the engineering residential academic unit and other residence halls were significantly more satisfied with the affiliation (feeling of belonging) with the College of Engineering. Non-freshmen engineering students residing off-campus were significantly more satisfied with the study atmosphere and comfort of their present living environment. Non-freshmen engineering students living in the engineering residential academic unit were significantly more aware of the opportunity to gain assistance from special tutors provided by the College of Engineering.

4. Although it must be concluded that there were no statistically significant differences in academic achievement between the two groups of freshmen engineering students at Colorado State University, it is a fact that there was a numerical difference between these two groups in favor of freshmen engineering students living in the engineering residential academic unit.

5. It can be concluded that there were no significant differences in academic achievement between those non-freshmen living in the engineering residential academic unit, those non-freshmen living off-campus, and those non-freshmen living in other residence halls at Colorado State University. This conclusion is also supported by some of the literature.

6. Finally, the data supports the contention that residential academic units do have a positive impact on students.

Recommendations

The findings and conclusions drawn from the data that has been presented are the bases for the following recommendations.

1. It is recommended that this residential academic unit continue with the support of the Office of Housing and Residence Education and the College of Engineering.

2. It is recommended that research on the impact of living environments on students be continued and extended.

3. It is recommended that a follow-up study be conducted with regard to the employment and job satisfaction of these particular engineering students.

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APPENDIX

APPENDIX A

Dear Engineering Student:

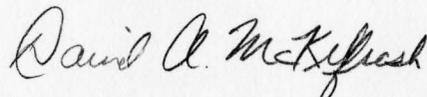
The following questionnaire is designed to help us understand the impact of living environments on engineering students at Colorado State University. The study is supported by the Office of Housing and Residence Education and the College of Engineering.

Questionnaires have been sent to a selected sample of engineering students. It is important that you complete and return your questionnaire in the enclosed pre-addressed envelope as soon as possible.

Please be assured that your responses will remain anonymous and confidential, we are only interested in group totals. The success of this study is contingent upon your open and honest opinions.

Thank you for your cooperation in making this study complete and useful.

Sincerely,



David A. McKelfresh
Graduate Student
College Student Personnel
Administration
Department of Education

APPENDIX B



Office of Housing and
Residence Education

Colorado State University
Fort Collins, Colorado
80523

March 9, 1976

Dear Engineering Student:

You recently received a survey designed to help us determine the impact of living environments on engineering students. Your name was one of the select few chosen to respond to this questionnaire and this makes your response vital to the success of the study.

In case you have misplaced the questionnaire, I have enclosed another copy. It is very important that you complete this copy and return it to the Office of Housing and Residence Education. If you have already returned your first questionnaire, then please ignore this copy.

Thank you for your cooperation in making this study complete and useful.

Sincerely,

A handwritten signature in cursive script that reads "David A. McKelfresh".

David A. McKelfresh
Graduate Student

DAM:ek

Enclosure

APPENDIX D

Please put an "X" in the appropriate box which corresponds most accurately with your level of satisfaction ranging from: 1-very dissatisfied, 2-dissatisfied, 3-neutral, 4-satisfied, 5-very satisfied.

| <u>SATISFACTION</u> | vd 1 | d 2 | n 3 | s 4 | vs 5 |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1. Opportunities to talk with engineering professors outside the classroom. | <input type="checkbox"/> |
| 2. The special facilities provided by the University to aid in my classwork (i.e., computer terminal, computer card punches, calculators, etc.) | <input type="checkbox"/> |
| 3. The study atmosphere of my living environment. | <input type="checkbox"/> |
| 4. Opportunities for extra-curricular involvement (i.e., intramural athletics, student government, social activities, etc.). | <input type="checkbox"/> |
| 5. Group spirit and rapport among engineering students. | <input type="checkbox"/> |
| 6. The academic curriculum established by the College of Engineering. | <input type="checkbox"/> |
| 7. Affiliation (feeling of belonging) with the College of Engineering. | <input type="checkbox"/> |
| 8. Comfort of my present living environment. | <input type="checkbox"/> |
| 9. Opportunities for engineering students to participate in policy-making decisions involving the College of Engineering. | <input type="checkbox"/> |
| 10. Academic assistance and help from classmates. | <input type="checkbox"/> |
| 11. The overall classroom education I am receiving at CSU. | <input type="checkbox"/> |

Please put an "X" in the appropriate box which corresponds most accurately with your level of awareness ranging from: 1-very unaware, 2-unaware, 3-neutral, 4-aware, 5-very aware.

| <u>AWARENESS</u> | vu 1 | u 2 | n 3 | a 4 | va 5 |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1. Variety of majors in the College of Engineering. | <input type="checkbox"/> |
| 2. Variety of professional societies in engineering. | <input type="checkbox"/> |
| 3. The opportunity to gain assistance from special tutors provided by the College of Engineering. | <input type="checkbox"/> |
| 4. Current trends and issues in the field of engineering. | <input type="checkbox"/> |
| 5. Opportunities for employment in the field of engineering. | <input type="checkbox"/> |

APPENDIX E

$$F = \frac{MS_b}{MS_w} = \frac{SS_b/df_b}{SS_w/df_w}$$