

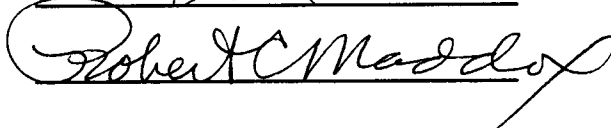
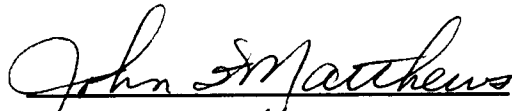
To the Graduate Council:

I am submitting herewith a dissertation written by William Eddie Richardson entitled "The Impact of Higher Education: Perceptions of University of Tennessee Alumni." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Education.



Gregory C. Petty, Major Professor

We have read this dissertation
and recommend its acceptance:



Accepted for the Council:



Associate Vice Chancellor
and Dean of the Graduate School

THE IMPACT OF HIGHER EDUCATION: PERCEPTIONS OF
UNIVERSITY OF TENNESSEE ALUMNI

A Dissertation

Presented for the

Doctor of Philosophy

Degree

The University of Tennessee, Knoxville

William Eddie Richardson

August, 1992

DEDICATION

To

Mom and Dad

ACKNOWLEDGEMENTS

No person achieves a goal by his or her own self. I am no exception. Many people during the course of my recent educational experience have encouraged, supported, listened, and gently corrected my efforts. Among the most influential of these guides have been my committee members. My sincerest thanks go to Dr. Robert Maddox, Dr. John Matthews, Dr. John Peters, and Dr. Gerald Ubben. Also, I extend my appreciation to Dr. Carol Kasworm, Dr. Grady Bogue, Dr. Alice Thomas, Dr. Don Goss of THEC, and Mrs. Myra Robinson also of THEC for their willingness to listen, guide, and help in the conduct of this study.

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Finally, I wish to acknowledge and thank my family for the sacrifices they made during this pursuit. To my children, Jack and Anna, and to my wife Dee who gave it all up for me.

ABSTRACT

The purpose of this study was to compare the responses of alumni with different academic majors, and from institutions of different enrollment size in The University of Tennessee system on the dimensions of growth and development from questions in the "Your Education and Its Impact" section of the Alumni Satisfaction Survey. Comparisons were made by institution size, by academic major, and by institution size and academic major.

The rationale for conducting this study was the inconclusiveness of research findings relative to relating alumni academic major and/or institutional size to the impact of a college education. The recent proliferation of state mandated outcomes assessment requirements is indicative of a sentiment of accountability for higher education. Further, the Performance Funding initiative causes Tennessee to be regularly under scrutiny for effectiveness of evaluating educational systems. This study demonstrates the perceptions of alumni from the only state employing a performance based incentive for funding.

Three research questions were asked in this study. They were; (1) Do alumni from institutions of different enrollment size differ in their responses to the questions in the "Your Education and Its Impact" section of the Alumni Satisfaction Survey? (2) Do alumni with different academic majors differ in their responses to the "Your Education and Its Impact" section of the Alumni Satisfaction Survey? and (3) Do alumni from institutions of different enrollment size, and with different academic majors differ in their

responses to the questions in the "Your Education and Its Impact" section of the Alumni Satisfaction Survey?

The population for this study included all 1986 and 1988 alumni (graduates of the baccalaureate degree programs) from The University of Tennessee--Knoxville, Chattanooga, and Martin. Data were collected by each institution using the uniformly adopted Alumni Satisfaction Survey. The data were reported in a consistent manner to the Tennessee Higher Education Commission (THEC) to be considered for eligibility for performance based funding. The Data were procured from the division of Assessment and Program Review at THEC.

The data were classified according to institution size, academic major, and growth and development factor (personal/social, quantitative, verbal, and cultural understanding). Frequencies were calculated and data were analyzed using Likelihood-Ratio Chi-Square and Log-Linear analysis. The ratio of log-linear parameter estimate to its standard error was calculated to determine the interaction effect of the variables (multivariate test).

All of the research questions could be answered in the affirmative for a significant difference in responses by alumni based upon institution size, academic major, and institution size and academic major at the $p < .05$ level.

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CHAPTER I

INTRODUCTION

This chapter provides an introduction to alumni research. A statement of the problem, the purpose of the study, the research questions, assumptions used, limitations identified, and operational definitions of terms are also presented.

Introduction to Alumni Research

Research studies in higher education cannot conclusively account for the impact of college upon students (Alexander and Eckland, 1977; Pascarella, Smart, Ethington, and Nettles, 1987; Pascarella & Terenzini, 1991; Stoecker and Pascarella, 1988; Stoecker, Pascarella, & Wolfe, 1988). Many research efforts which have attempted to isolate the effect of specific educational experiences from external influences, such as student background or maturation have produced conflicting results (Pascarella & Terenzini, 1991). According to Ewell (1990), "once viewed primarily as a provided 'public service' whose chief concerns were equitable access and operational efficiency, public higher education is increasingly being viewed as a strategic investment" (p. 5). This sentiment has served as a motivating force for growth in state-wide assessment programs. In response to this call for accountability, many states have undertaken outcomes assessment initiatives. Marchese (1990) states that, "since 1985, almost forty states have prompted their public institutions to undertake the assessment of student learning outcomes" (p. 371). To the frustration of many legislators, these assessment

activities have produced volumes of data resulting in "masses of uninterpreted statistics" (Ewell, 1990, p. 4).

In Tennessee, performance funding for higher education has served as an initiative for institutions to collect outcomes assessment data. Much of these data, however, remain uninterpreted in terms of the impact of the educational process upon students. Unlike the assessment initiatives in other states, Tennessee's is the only state-wide assessment program in the United States which financially rewards institutions of higher education for performing evaluation activities. The guidelines for data collection, reporting, and amount of financial incentives based upon gains reported are contained in the Tennessee Performance Funding Standards.

An integral component of the Performance Funding Standards (Standard IV) is the Alumni Satisfaction Survey. The purpose of the Survey is to "reward institutions for the quality of their educational programs as measured by the level of satisfaction expressed by alumni on a standard survey as compared to national or other norms" (Performance Funding Standards for Public Colleges and Universities, 1989, p. 24). Institutions in Tennessee conduct a survey of all undergraduate alumni two years post graduation. The surveys are administered on an every other year basis, beginning with the first year of the Performance Funding program five-year cycle.

In 1987, a uniform statewide survey was adopted by a group of college and university representatives and Tennessee Higher Education Commission staff for use by all state institutions beginning in 1988. Two such surveys have been conducted since that time (for 1986 graduates conducted in 1988, and 1988 graduates conducted in 1990), and

results have been reported to the Tennessee Higher Education Commission (THEC).

The responses to those surveys collected by The University of Tennessee system (U.T. Chattanooga, U.T. Knoxville, and U.T. Martin) form the data base from which this study was conducted.

Statement of the Problem

Research findings relating student academic major and/or institutional size to the impact of a college education are inconclusive. No attempts have been made to consolidate and evaluate the Tennessee Alumni Satisfaction Survey to ascertain the impact of education upon graduates from University of Tennessee institutions.

Purpose of the Study

The purpose of this study is to compare the responses of alumni with different academic majors and from institutions of different enrollment size in The University of Tennessee system on the dimensions of growth and development from questions in the "Your Education and Its Impact" section of the Alumni Satisfaction Survey. Comparisons were made by institution size, by academic major, and by institution size and academic major.

Research Questions

This study compared the collegiate institutions in The University of Tennessee system and student academic majors with the alumni's perceptions of his/her "overall experience" and "degree to which your education added to your skills" (Alumni Satisfaction Survey). More specifically, the study answered the following questions:

Research Question 1: Do alumni from institutions of different enrollment size in the University of Tennessee system (U.T. Knoxville and, U.T. Chattanooga/U.T. Martin) differ in their responses to the dimensions of growth and development questions in the "Your Education and Its Impact" section of the Alumni Satisfaction Survey?

Research Question 2: Do alumni with different academic majors differ in their responses to the dimensions of growth and development questions in the "Your Education and Its Impact" section of the Alumni Satisfaction Survey?

Research Question 3: Do alumni from institutions of different enrollment size in The University of Tennessee system (U.T. Knoxville and, U.T. Chattanooga/U.T. Martin), and with different academic majors differ in their responses to the dimensions of growth and development questions in the "Your Education and Its Impact" section of the Alumni Satisfaction Survey?

Significance of the Study

Research pertaining to the influence of institutional size upon students is "inconsistent and at times contradictory" (Pascarella & Terenzini, 1991, p. 378). Similarly, evidence pertaining to the influence of academic major is "mixed." This study will add to the body of literature regarding the influence of institution size and academic major upon alumni perceptions of educational impact.

An express concern of the authors of Performance Funding in Tennessee, and higher education administrators, is the formative aspect of assessment (that is, improvement of an institution based upon the data collected in the Alumni Survey). This

study will address perceptions of institutional and curricular strengths and weaknesses for The University of Tennessee system.

The presently adopted Alumni Survey is under consideration for revision by the Tennessee Higher Education Commission for future five-year cycles. The results of this study may aid the Survey reviewers in determining the validity of the present instrument. Finally, as a leader in the performance funding initiative, The University of Tennessee is regularly under scrutiny by academicians, administrators, and legislators in states interested in assessment. This study will demonstrate the perceptions of alumni from the only state employing a performance based incentive in funding.

Assumptions

1. Alumni are reliable sources for establishing the value of undergraduate education (Pace, 1990).
2. The Tennessee Alumni Survey questionnaire is a reliable and valid instrument for establishing alumni perceptions (Pike, 1991).
3. Academic major and institution size are valid delimiters for establishing differences in educational experience (Pascarella & Terenzini, 1991; Weidman, 1989).
4. Dimensions of growth and development as determined by Pike (1990) are valid measures of the impact of college education.
5. Dimensions of growth and development as determined by Pike (1990) are consistent measures between institutions in The University of Tennessee system and academic majors.

Limitations

1. Findings for this study are limited to University of Tennessee alumni only. No attempt was made to generalize the findings to other post-secondary institutions.
2. The population for this study was limited to those graduates of baccalaureate degree programs at The University of Tennessee for the years 1986 and 1988.
3. Perceptions by alumni (pertaining to the degree to which their education added to their "skills") were measured by the Tennessee Alumni Survey only.

Definitions

The following is a list of terms operationally defined for purposes of this study.

Academic major--a categorization of academic courses of study at Tennessee postsecondary institutions and recognized by the Tennessee Higher Education Commission. These courses are summarized in the Academic Inventory Taxonomy.

Dimensions of growth and development--four factors comprised of (1) personal/social development; (2) growth in math/science (quantitative) skills; (3) growth in communication (verbal) skills; and (4) growth in cultural understanding (Pike, 1990).

Impact--"environmental or sociological origins of student change" (Pascarella & Terenzini, 1991, p. 17). "Variables that are presumed to exert an influence on one or more aspects of student change" (p. 17).

University of Tennessee system--The University of Tennessee at Chattanooga, The University of Tennessee at Knoxville, and The University of Tennessee at Martin.

CHAPTER II

REVIEW OF RELATED LITERATURE AND RESEARCH

The following is a review of literature and research studies germane to the issues of institution size, academic major, and perceptions of educational impact. The theoretical context for educational impact research is presented first.

Introduction

Alumni research has long been a widely accepted mechanism for stimulating financial support and enhancing an institution's academic image through promoting the accomplishments of its graduates. The recognition of the value of alumni surveys as an assessment instrument however, is becoming more prominent as researchers, institutions, and legislatures seek to evaluate educational performance.

According to Melchiori (1988) "alumni research should permeate all institutional operations--academic affairs, student services, financial operations, and development--and its findings should then move into the mainstream of academic policymaking, planning, evaluating, and budgeting" (p. 11).

Alumni outcomes assessments were conducted as early as the 1930's by Pace and Tunis (Petit, 1991). An alumni follow-up study of education majors at Bowling Green State University, conducted by Pigge (1987) collected data relative to preparation for classroom teaching and is among the more recent notable studies. Likewise, Schnieder (1987) conducted a follow-up study of graduates of a high-school vocational education

program to determine their satisfaction with the training they received.

Alumni research to assess educational impact however, is characterized by a variety of complexities. "How much time can elapse between an educational event and measurement of its outcome" (Pace, 1985, p. 7)? What outcomes will we choose to assess, and what are their relationships to specific educational events? What is the role of college in shaping "the dimensions of character that one might expect of educated adults" (Pace, 1985, p. 8)? Despite the difficulties in answering these questions and inherent obstacles in conducting studies, alumni research can provide a rich insight into the educational experience.

Theoretical Context for Educational Impact Research

One of the expected outcomes of a college education is that some change will be affected upon the student. Change in this sense "refers to alterations that occur over time in students' internal cognitive or affective characteristics" (Pascarella & Terenzini, 1991, p. 16). Many theories attempt to explain change (sometimes referred to as development) in terms of individual growth and maturation. The most commonly accepted of these theories, referred to as psychosocial, propose various psychological stages "through which individuals pass in a presumably invariant and hierarchical sequence" (1991, p. 17). Researchers such as Perry, Chickering, and Kohlberg have made the more popularly recognized contributions in this field.

A second general classification of change theories proposed by Pascarella & Terenzini includes the "college impact" theories (1991). These models focus more on

the sociological/environmental aspects of individual development and less on the intra-personal influences. Some suggested variables for testing these theories have been institution size, student services, and academic rigor, as well as others.

Among the research conducted in the "college impact" paradigm is Astin's work in student involvement in the educational process (1985), Tinto's theory of institutional departure (1987), and Pace's work in institutional environment (1984).

In recent research studies, Weidman (1989) has suggested that both psychological and sociological influences account for student change. Although largely based upon his own work, Weidman's model integrates aspects of the works of Chickering, Tinto, and Astin. He hypothesizes that students bring with them to the educational experience "background characteristics" such as socioeconomic status, aptitude, career preferences, aspirations, and values (Weidman, 1989). The "collegiate experience" provides the student with "normative contexts" (divided into academic and social components based upon Tinto's 1975 and 1987 work) which dictate behavior acceptable for a particular group. Conformity to these "norms" then largely influences the socialization process for the student.

The elements of the "collegiate experience", such as institutional size, major departments, etc. are based upon Chickering's (1969) "dimensions of college life that influence student development: (1) clarity and consistency of institutional objectives; (2) institutional size; (3) curriculum, teaching, and evaluation; (4) residence hall arrangements; (5) faculty and administration interaction with students; and (6) friends, groups, and student culture" (Weidman, 1989, p. 300). Weidman (1989) also identifies

other environments, such as "non-college reference groups" or "parental socialization" to explain those variables exogenous to the collegiate environment which influence student socialization (p. 299). The end product of this process, as suggested by Weidman (1989), are the "socialization outcomes" (p. 299). Weidman (1989) uses Brim's (1966) definition of socialization: "the process by which persons acquire the knowledge, skill, and dispositions that make them more or less effective members of their society" (p. 3). Socialization outcomes therefore, are those skills "that are important both for adult life following college and for their potential contribution to societal well-being" (Weidman, 1989, p. 312-313). The outcomes identified for this study, development of verbal skills, development of quantitative skills, growth in knowledge about the humanities (cultural understanding), and personal/social development are not intended to be a fully exhaustive list, but rather a few important ones (Pike, 1991).

Institution Size

A component of Weidman's (1989) theory involves institution size. This is based, in part, upon Chickering's theory of redundancy and institutional size and Taylor's (1964) postulate that "people tend to disappear when huddled together in large numbers" (Chickering, 1969, p. 186). Chickering (1969) defines redundancy as "when increases in the number of inhabitants of a setting lead to decreasing opportunities for participation and satisfaction for each individual" (p.186). Weidman allows for institutional size as a social, normative context for influencing socialization outcomes. Chickering (1969) hypothesizes that "under conditions of redundancy, less development of competence

occurs" (p. 192-193) Perceptions of educational impact, therefore, may be effected by institutional size.

In studies of educational attainment and institution size conducted by Stoecker and Pascarella (1988), and Stoecker, Pascarella, & Wolfe (1988), findings reveal that no significant direct relationship between size and educational attainment exists for alumni nine years after initial college enrollment. In the study, "family social status, secondary school academic and social achievement, precollege educational and career aspirations, institutional selectivity, percentage women, college major, college grades, college social involvement, and marital status" were held statistically constant (Pascarella & Terenzini, 1991, p. 379). The research did reveal, however, that institution size indirectly has a statistically significant negative effect upon the educational attainment of respondents while in college because of interference with social involvement. This finding supports, in part, effects of institution size suggested by Chickering (1969).

He hypothesizes that;

as the number of persons increases in relation to a given task or setting six things occur: (1) A smaller proportion of the total inhabitants actively participate. (2) The activities and responsibilities of those who do participate become less varied and more specialized. (3) Persons with marginal ability are left out, deprived of changes to develop further the skills they lack. (4) Evaluation shifts from how well a person's abilities fit the requirements of a given position, to how good one person is compared to another; distinctions are made on an increasingly fine basis. (5) A hierarchy of prestige and power develops. (6) Rules and conduct

considered appropriate become formalized and rigid. (Chickering, 1969, p. 188)

Supported by research conducted by Barker and Gump (1964), where students in small schools reported a greater sense of satisfaction in developing competence, becoming engaged in important activities, and being challenged than students from large schools, their study suggests that a negative correlation exists between institution size and educational attainment (and a less positive educational impact is a result).

Adding confusion to the aforementioned findings is a study published in 1971. Kamens (1971) reported that institutions with an enrollment of greater than 5,000 students had a positive influence upon educational attainment through a lower drop out rate. In studies conducted by Ethington and Smart (1986), findings show that institution size positively affects educational attainment. Findings from Stoecker and Pascarella (1988) reveal that institution size has a statistically significant negative effect on social involvement and consequently a positive effect upon educational attainment.

In a recent study by Haugen (1988) she reports that alumni respondents "from schools under 1300 in size, males, and graduates out less than a year were the groups who most consistently perceived greater contribution from the college experience in personal growth" (p. 69).

Other studies by Stoecker, Pascarella, & Wolfe, (1988) reveal no such significant relationship between institution size, educational attainment, or personal growth.

Academic Major

Weidman (1989) suggests that the norms and mores unique to individual academic departments influence socialization outcomes. These influences, manifest through faculty behavior and expectations as well as performance in courses and social interaction, may effect the perceptions of alumni about the impact of their education.

All students, in their collegiate experience, will choose to affiliate with at least one academic department in order to meet degree requirements. According to Vreeland and Bidwell (1966), an academic department has "relatively well-defined goals and expectations for students, and commands powerful normative and utilitarian sanctions" (p.238). The faculty in a department, therefore, can exert considerable influence over students through imposing both social and academic conformity to the norms of the group.

Studies pertaining to the effect of academic major upon outcomes such as educational attainment and socialization are equally as confusing as those regarding institution size. In studies conducted by Thomas and Gordon (1983), academic majors of students in the hard sciences "had a statistically significant positive effect on educational attainment" (Pascarella & Terenzini, 1991, p. 397). A study conducted by Sharp (1970) confirmed those findings by stating that students with academic majors in the humanities and sciences were "more likely to attend graduate or professional school than their counterparts who majored in such fields as business, education, and health" (Pascarella & Terenzini, 1991, p. 397).

Studies by Alexander and Eckland (1977) and Pascarella, Smart, Ethington, and Nettles (1987) failed to support the aforementioned findings. In each study, their findings showed there was no statistically significant relationship between academic major and educational attainment. Pascarella and Terenzini (1991) suggest that an "explanation for the inconsistent findings may simply be that the influence of academic major on educational aspirations and attainment is complex and multidimensional" (p. 398).

In addition to the previously cited findings about educational attainment and academic major, Haugen (1988) reports a significant association between satisfaction with educational preparation, and alumni with academic majors in health.

Perceptions of Educational Impact

Although opinion questionnaires are considered a reliable method of obtaining data relative to educational experiences (Van Liere & Lyons, 1986), a variety of factors influence the perceptions of alumni about their collegiate experience. According to Smith and Thomas (unpublished), satisfaction with collegiate experience is negatively influenced by the number of hours per week the student worked while in school. Conversely, the number of hours spent studying per week positively influenced perceived satisfaction. Other positive correlations included frequency of involvement in intramurals, and personal relationships with faculty members.

In retention and attrition studies by Lenning, Beal, and Sauer (1980) research revealed that the relationship and interaction between the institution and the student can influence student satisfaction, personal growth, and academic achievement.

According to Pace (1984) the "students that are most satisfied with college put the most into it and get the most out of it" (p. 52). Generalized in another way, he states that "when students are making progress in the development of their intellectual powers, and when their experience in the environment is characterized by friendly and supportive relationships with other students, they are very satisfied with college" (Pace, 1984, p.52-53).

What contributes to the desire of a student to invest time and energy in academics and thus perceive college as a positive experience? Aside from the obvious such as intellectual curiosity, or motivation for vocational success, Pace (1990) conjectures that students quickly learn what is required of them from professors and other students. They then perform to that level of expectation. According to Pace (1990) in the larger universities these expectations may be limited to a particular academic department or student group rather than the university as a whole; whereas on a smaller campus the expectations may represent the ethos of the entire college or student body.

Unfortunately, longitudinal studies alone will not reveal the full range of experiences and stimuli which contribute to the perceptions of alumni about their collegiate experience. Little is known, or is likely to be learned, about the effect of occurrences such as losing the big football game, or media reports of improprieties in handling research funds as they contribute to perceptions of an alma mater.

CHAPTER III

METHODS AND PROCEDURES

Introduction

This chapter outlines the research design for the study, the instrument used, the variables under consideration, the procedures used, and statistical methods employed. The population and sample for the study is presented first.

Population and Sample

The population for the study is all 1986 and 1988 alumni (graduates) of the baccalaureate degree programs from The University of Tennessee--Chattanooga and Martin (Medium), and The University of Tennessee--Knoxville (Large). For this study, data from the Tennessee Board of Regents for institutions under its governance were not made available. The year 1986 is defined as the academic terms beginning summer 1985 through spring 1986. The year 1988 is defined as the academic terms beginning summer 1987 through spring 1988. (For purposes of reporting to the Tennessee Higher Education Commission, the institutions reported the 1986 questionnaire responses in the 1988 Performance Funding Report, and the 1988 questionnaire responses in the 1990 Performance Funding Report.) Acceptable response rates for this population wide survey were determined in accordance with Performance Funding guidelines. If a random sample of the population had been conducted, responses required for a 95% confidence

interval would have been 341 for Medium and 361 for Large. Total instruments mailed and responses received are summarized in Table 1 for each classification of institution by year.

Table 1
Alumni Survey Mailings and Responses
1986 and 1988

	MEDIUM UT CHATT/MARTIN	LARGE UT KNOXVILLE
1986 NO. MAILED	745/595	2849
1986 NO. RESPONSES	253/297	1453
1986 % RESPONSES	33.9/49.9	51.0
1988 NO. MAILED	817/701	3368
1988 NO. RESPONSES	364/323	1501
1988 % RESPONSES	44.6/46.1	44.6

Design

The design of the study undertaken is ex post-facto. Data analysis is secondary upon intact data sets. The researcher is relying upon groups which already exist to perform analysis upon the variables. This pre-experimental design type is appropriate for testing groups subsequent to the occurrence of an event or treatment.

Instrument

The instrument used to collect the data is the Tennessee Alumni Satisfaction Survey. The questions used for this research study were questions 11, "Your Education and Its Impact" and question 12, "What was your major?" (Table 2)

Validation Methodology

Studies of the alumni survey instrument were conducted by Pike (1991) to establish the construct validity of the instrument and the dimensions of growth and development present in the questions. The following is a discussion of the methods and findings of the research undertaken by Pike.

Context and Criteria

The Tennessee Alumni Satisfaction Survey was developed in response to the Performance Funding requirement that institutions collect data from alumni relative to their level of satisfaction with the academic program, and plan modifications to the general education programs based upon those findings. In 1979, The University of Tennessee established a Coordinating Committee on General Education to establish goals for the general education curriculum. The 1981 report of this committee identified three categories of goals: (1) basic skills such as verbal communication, computation, foreign language, computer skills, and problem solving; (2) knowledge, including aesthetics, the scientific basis for life, technology, history, foreign culture, economics, and the social sciences; and (3) judgments and attitudes which included values, political and social dynamics, personal wholeness, life-long learning, and experience in learning (Pike, 1991).

Table 2

Your Education and Its Impact

Question 11. In answering the question in this section, please think of your overall experience at (name of institution), and any effect it may have had on each item. Please indicate the degree to which your education at (name of institution) added to your skills in each of the following areas.

	Very Little	Somewhat	Very Much
1. Practical skills necessary to obtain employment in your field.	1	2	3
2. Getting along with people of different races and ethnic groups.	1	2	3
3. Ability to grow and learn as a person.	1	2	3
4. Ability to lead or guide others.	1	2	3
5. Ability to adjust to new job demands.	1	2	3
6. Self-confidence in expressing your ideas.	1	2	3
7. Appreciation of different cultures.	1	2	3
8. Planning and carrying out projects.	1	2	3
9. Speaking effectively.	1	2	3
10. Writing effectively.	1	2	3
11. Understanding written information.	1	2	3
12. Understanding graphic information.	1	2	3
13. Learning on your own.	1	2	3
14. Defining and solving problems.	1	2	3
15. Working cooperatively in a group.	1	2	3
16. Ability to understand mathematical concepts.	1	2	3
17. Understanding the interaction between people and the environment.	1	2	3
18. Understanding and appreciating the arts.	1	2	3
19. Understanding and applying scientific principles and methods.	1	2	3
20. Understanding different philosophies and cultures.	1	2	3
21. Ability to use mathematics in everyday life.	1	2	3

Questions 12. (first part only) What was your major?

Pike's first step in validating the alumni survey was to identify "the construct the instrument is intended to measure" (1991, p. 3). He employed Loevinger's (1957) model which identifies three components of construct validity; (1) the substantive component--instrument content, (2) the structural component--the dimensionality and internal consistency of a measure, and (3) the external component--the comparison of empirical relationships to the theory of the construct (Pike, 1991).

Validation Methods

The subjects for the validation study were alumni from The University of Tennessee--Knoxville that graduated in 1986 or 1988, and responded to the alumni survey. The total number of respondents was 2,952 for a response rate of just over 50%.

Question 11 from the "Your Education and Its Impact" section of the survey asks alumni to rate the degree to which their college education added skills in 15 areas. Many of the questions in this section were taken from a survey developed by the American College Testing Program (1981). The twenty-one questions in the section were classified according to the general education goals established by the Coordinating Committee. Each of the questions was coded to represent one goal only, despite the interrelatedness of the goals. Table 3 presents the number of questions which represented each general education goal.

A confirmatory factor analysis revealed a modified four-factor model as providing the best explanation for the data. This method of analysis was used because of the appropriateness for assessing the "congruence between a hypothetical model and

Table 3**Number of Questions Representing Each General Education Goal**

General Education Goal	Number of Questions
Basic Skills	7
Verbal communication	3
Computational skills	3
Foreign language skills	0
Computer skills	0
Problem solving	1
Knowledge	6
Aesthetics	1
Science for life	2
Technology	0
Western history	0
Foreign culture	3
Economics	0
Social Sciences	0
Judgments and Attitudes	8
Values	0
Political and social dynamics	0
Personal wholeness	6
Life-long learning	2
Experience in learning	0

empirical data" (Pike, 1991, p. 5) The responses to these questions produced four areas of growth and development: (1) personal/social development; (2) growth in math/science (quantitative); (3) growth in communication skills (verbal); and (4) growth in cultural understanding. In Table 4 the weighted least squares estimates for the factor loadings, uniqueness, inter-factor correlations, and squared multiple correlations (R^2) are given. All factors were found to be invariant across the samples reported in 1988 and 1990. Both weighted least squares estimates and inter-factor correlations were statistically significant at $p < .001$ (Pike, 1991).

The response selections to the Survey questions 11, "Your Education and It's Impact" are on a Likert-type scale. The responses are "Very Little," "Somewhat," and "Very Much." Because of the range of selections and the response type, the data are considered ordinal. The data are discrete and are quantitative. The data were aggregated using frequency of response to each of the four factors of growth and development. Because multiple questions comprise each of the four factors, the total number of observations may exceed the total number of respondents.

Variables

The dependent variables under consideration are the dimensions of growth and development from question 11, "Your Education and Its Impact." They are; personal/social, quantitative, verbal, and cultural understanding. The independent variables are question 12, "What was your major?" and the size of the University of Tennessee institution from which the respondent graduated (Medium or Large).

Table 4

**Weighted Least Squares Estimates for Question 11
Your Education and It's Impact**

Questions	Verbal	Quant.	Cultural	Pers./ Social	Unique	R ²
Employment in field				0.488	0.762	0.238
Get along w/ people			0.724		0.476	0.524
Grow and learn				0.749	0.438	0.562
Lead or guide others				0.722	0.479	0.521
New job demands				0.654	0.572	0.428
Self-confidence				0.684	0.533	0.467
Apprec. of cultures			0.792		0.372	0.628
Planning projects				0.738	0.456	0.544
Speak effectively	0.730				0.467	0.533
Write effectively	0.715				0.489	0.511
Understand written	0.922				0.150	0.850
Understand graphic	0.428	0.418			0.540	0.460
Learn on own				0.715	0.489	0.511
Solving problems		0.295		0.615	0.367	0.633
Work cooperatively				0.651	0.576	0.424
Math concepts		0.874			0.237	0.763
People & environ.			0.732		0.464	0.536
Understand arts			0.585		0.658	0.342
Understand science		0.687			0.527	0.473
Understand cultures			0.697		0.515	0.485
Use math everyday		0.931			0.133	0.867

All factor loadings are significant at the $p < .001$ level (used with permission)

Procedures

Alumni survey instruments were mailed to all baccalaureate degree graduates by each of the institutions in The University of Tennessee system with a cover letter explaining the purpose of the survey and an assurance of confidentiality (Appendix A). The instruments were coded with a number denoting academic major of the alumnus and individual identifying number to permit follow-up. A follow-up request was mailed to non-respondents approximately two weeks after the initial mailing. A second follow-up request was mailed approximately two-weeks after the first follow-up request.

When a response was received by the institution, the encoded number was marked off the follow-up list to prevent future mailings. The academic major code was written on the front of the survey and the individual identifying number was removed. A record number reflecting the order of receipt of the survey was written on the front along with the academic major code.

Data from each survey was entered into the computer system twice to insure accuracy. The data were entered according to a format provided by the Tennessee Higher Education Commission, and were recorded on either a 1600 BPI or 6250 BPI tape in EBCDIC format. The tape was labeled with the institution name, governing system, and tape characteristics.

Responses to the 1988 and 1990 Alumni Satisfaction Survey were submitted by all University of Tennessee institutions to the Tennessee Higher Education Commission located in Nashville, Tennessee. The data were submitted in a consistent manner as prescribed by THEC for use in evaluating funding eligibility.

Permission was requested and obtained (Appendix B) from Dr. Arliss L. Roaden, Executive Director of THEC, and President Joseph Johnson of The University of Tennessee to use the data to answer the aforementioned research questions. Data were procured from the division of Assessment and Program Review at THEC. The data from the 1986 and 1988 surveys were aggregated (based upon Pike's 1991 finding of invariance across the two years) and were classified according to institution of origin, academic major, and growth and development factor. Questionnaires with missing responses for question 11 or 12 were dropped from the analysis. Frequencies were calculated and tabulated, and were analyzed using the BMDP4F statistical software. Comparisons were made on each of the four factors of growth and development, classification of academic major, and classification of institution size.

The classification of academic major is according to the "ten-digit code of the Academic Inventory taxonomy of major areas found in the listing 'Academic Inventory of Programs in Public Institutions,' as published by the Tennessee Higher Education Commission" (Performance Funding Alumni Survey). The classification of academic majors was collapsed into categories consistent with the academic college from which the major was granted to facilitate reporting. These categories are; agriculture, architecture, business, communications, education, engineering, human ecology, humanities, science, social science, and nursing.

The classification of institution size in The University of Tennessee system is according to the average enrollment. During the period under consideration, The University of Tennessee--Knoxville had an average enrollment of 26,739. The

University of Tennessee--Chattanooga and The University of Tennessee--Martin had average enrollments of 7,616 and 5,527 respectively. These enrollment figures, based upon the years 1982, 1983, and 1984, are a cross-sectional average enrollment for years in which the alumni surveyed would be attending The University of Tennessee. (Carnegie Foundation, 1987) For purposes of statistical analysis, responses from The University of Tennessee--Chattanooga and The University of Tennessee--Martin were consolidated under the category of medium size institution (Haugen, 1988 and Carnegie Foundation Classification of Comprehensive Universities and Colleges I--enrolling at least 2,500 students). Responses from The University of Tennessee--Knoxville were categorized as large size institution (Haugen, 1988 and Carnegie Foundation Classification of Research University I).

Statistical Analysis

Because of the large number of responses received for each year and institution, the f scores produced in Chi-square analysis closely approximate Z scores (typical in normally distributed parametric statistical analysis) Therefore, we may assume a 95% confidence interval to be achieved and the findings to be generalizable to the population of all 1986 and 1988 alumni of University of Tennessee institutions.

The following statistical tests were performed upon the data:

Research Question 1:	Chi-Square
Research Question 2:	Chi-Square
Research Question 3:	Log-Linear Analysis

The Maximum Likelihood-Ratio (LR) Chi-square test is applied for statistical tests of difference (asymmetrical) for two or more unrelated groups when frequency counts are the unit of measure. The Maximum Likelihood-Ratio Chi-Square uses natural logarithms which possess the property of multiplicity and is more desirable in log-linear analysis (Kennedy, 1992). In practice, both the Pearsonian Chi-square and the Likelihood-Ratio Chi-square are asymptotically equivalent as sample sizes become increasingly large. Therefore, "both statistics lead to essentially the same conclusions relative to goodness-of-fit" (Kennedy, 1992, p. 59). The Log-Linear analysis is considered an appropriate multivariate test for non-parametric analysis between groups because of its blending of the conventional ANOVA, the regression ANOVA, and the chi-square goodness-of-fit model (Kennedy, 1992). A 95% level of significance was used to establish a statistically significant relationship for all tests.

Variables for the Log-linear analysis were coded A (growth and development factor), M (academic major), and S (institution size). The four models appropriate for the statistical analysis were: (1) A,MS (2) MS,AM (3) AM,AS,MS (4) AMS.

The ratio of log-linear parameter estimate to its standard error (approximated Z score due to large sample size) was used to determine interaction effect for the Log-linear analysis of institution size, academic major, and growth and development factor.

CHAPTER IV

FINDINGS

The purpose of this study was to compare the responses of alumni from institutions of different enrollment size in The University of Tennessee system on the dimensions of growth and development from questions in the "Your Education and It's Impact" section of the Alumni Satisfaction Survey. Comparisons were made by institution size, by academic major, and by institution size and academic major. This chapter presents the response rate and amounts, and findings of the data analysis for each of research questions posed.

Responses

Of the 9075 questionnaires mailed by all institutions, the total usable responses for this study were 2,881 for The University of Tennessee-Knoxville, and 1,187 for The University of Tennessee--Chattanooga and Martin for a total usable response rate of 44.8%.

Research Question 1

Research question 1 addresses whether or not alumni from institutions of different enrollment size in The University of Tennessee system differ in their responses to the dimensions of growth and development questions in the "Your Education and It's Impact" section of the Alumni Satisfaction Survey.

The instructions for completing this question were; "In answering the questions in this section, please think of your overall experience at (name of institution), and any effect it may have had on each item. Please indicate the degree to which your education at (name of institution) added to your skills in each of the following areas." The response options were; Very Little, Somewhat, and Very Much.

Data were analyzed for each of the four factors of growth and development; personal/social, quantitative, verbal, and cultural understanding, and by institution size; large and medium. In the following tables both Pearson Chi-Square values and Likelihood-Ratio Chi-Square values are presented for comparison purposes. Phi values are presented as an approximation of the variance (Φ^2 approximately equal to R^2).

For the factor personal/social by institution sizes large and medium, the Likelihood-Ratio Chi-Square test produced a value of 21.625 with 2 degrees of freedom for a $p < .0000$ (Table 5). Evaluation of the approximated Z score produced by the ratio of log-linear parameter estimate to its standard error revealed that respondents from The University of Tennessee--Knoxville (Large) answered Very Little more frequently and Very Much less frequently than expected ($p < .05$). Respondents from The University of Tennessee--Chattanooga and Martin (Medium) answered Very Little less frequently and Very Much more frequently than expected ($p < .05$). (Table 6)

Table 5

**Chi-Square Test for Significance
Personal/Social by Size**

Statistic	Value	D.F.	Prob.
Pearson Chi-Square	21.516	2	0.0000
Likelihood-Ratio Chi-Square	21.625	2	0.0000
Phi	0.026		

calculated value to 4 decimal places

Table 6

**Expected/Observed Frequency and Percent Table
Personal/Social by Size**

Size		Response		
	VLittle	Somewhat	VMuch	Total
LARGE				
Expected	1973.8	9261.3	11812.9	23048
Observed	2043*	9368	11637*-	23048
Difference	69.2	106.7	175.9	0
Obs. %	8.9%	40.6%	50.5%	100.0%
MEDIUM				
Expected	813.2	3815.7	4867.0	9496
Observed	744*-	3709	5043*	9496
Difference	69.2	106.7	176	0
Obs. %	7.8%	39.1%	53.1%	100.0%
TOTAL				
% of Total	2787 8.6%	13077 40.2%	16680 51.3%	32544 100.0%

*p < .05

- denotes less than expected frequency

For the factor quantitative by institution sizes large and medium, the Likelihood-Ratio Chi-Square test produced a value of 28.168 with 2 degrees of freedom for a $p < .0000$ (Table 7). Evaluation of the approximated Z score revealed that respondents from The University of Tennessee--Knoxville (Large) answered Very Little more frequently and Somewhat less frequently than expected ($p < .05$). Respondents from The University of Tennessee--Chattanooga and Martin (Medium) answered Very Little less frequently and Somewhat more frequently than expected ($p < .05$). (Table 8)

For the factor verbal by institution sizes large and medium, the Likelihood-Ratio Chi-Square produced a value of 1617.375 with 2 degrees of freedom for a $p < .0000$ (Table 9). Evaluation of the approximated Z score revealed that respondents from The University of Tennessee--Knoxville (Large) answered Very Little less frequently, Somewhat more frequently, and Very Much less frequently than expected ($p < .05$). Respondents from The University of Tennessee--Chattanooga and Martin (Medium) answered Very Little more frequently, Somewhat less frequently, and Very Much more frequently than expected ($p < .05$). (Table 10)

For the factor cultural understanding by sizes large and medium, the Likelihood-Ratio Chi-Square produced a value of 0.675 with 2 degrees of freedom for a $p < .7136$ (Table 11 and 12) The difference, therefore, between expected and observed frequencies was not statistically significant.

Table 7
Chi-Square Test for Significance
Quantitative by Size

Statistic	Value	D.F.	Prob.
Pearson Chi-Square	27.805	2	0.0000
Likelihood-Ratio Chi-Square	28.168	2	0.0000
Phi	0.041		

calculated value to 4 decimal places

Table 8
Expected/Observed Frequency and Percent Table
Quantitative by Size

Size	Response			
	VLittle	Somewhat	VMuch	Total
LARGE				
Expected	2054.5	4930.6	4538.9	11524
Observed	2158*	4812*-	4554	11524
Difference	103.5	118.6	15.1	0
Obs. %	18.7%	41.8%	39.5%	100.0%
MEDIUM				
Expected	846.5	2031.4	1870.1	4748
Observed	743*-	2150*	1855	4748
Difference	103.5	118.6	15.1	0
Obs. %	15.6%	45.3%	39.1%	100.0%
TOTAL	2901	6962	6409	16272
% of Total	17.8%	42.8%	39.4%	100.0%

* $p < .05$

- denotes less than expected frequency

Table 9
Chi-Square Test for Significance
Verbal by Size

Statistic	Value	D.F.	Prob.
Pearson Chi-Square	1342.673	2	0.0000
Likelihood-Ratio Chi-Square	1617.375	2	0.0000
Phi	0.306		

calculated value to 4 decimal places

Table 10
Expected/Observed Frequency and Percents Table
Verbal by Size

Size	Response			
	VLittle	Somewhat	VMuch	Total
LARGE				
Expected	1411.2	4265.0	5847.8	11524
Observed	1289*-	5108*	5127*-	11524
Difference	122.2	843	720.8	0
Obs. %	11.2%	44.3%	44.5%	100.0%
MEDIUM				
Expected	348.8	1054.0	1445.2	2848
Observed	471*	211*-	2166*	2848
Difference	122.2	843	720.8	0
Obs. %	16.5%	7.4%	76.1%	100.0%
TOTAL				
% of Total	1760	5319	7293	14372
	12.2%	37.0%	50.7%	100.0%

*p < .05

- denotes less than expected frequency

Table 11

**Chi-Square Test for Significance
Cultural Understanding by Size**

Statistic	Value	D.F.	Prob.
Pearson Chi-Square	0.675	2	0.7136
Likelihood-Ratio Chi-Square	0.672	2	0.7145
Phi	0.006		

calculated value to 4 decimal places

Table 12

**Expected/Observed Frequency and Percent Table
Cultural Understanding by Size**

Size		Response		
	VLittle	Somewhat	VMuch	Total
LARGE				
Expected	3240.8	6820.8	4343.5	14405
Observed	3262	6801	4342	14405
Difference	21.2	19.8	1.5	0
Obs. %	22.6%	47.2%	30.1%	100.0%
MEDIUM				
Expected	1335.2	2810.2	1789.5	5935
Observed	1314	2830	1791	5935
Difference	21.2	19.8	1.5	0
Obs. %	22.1%	47.7%	30.2%	100.0%
TOTAL				
% of Total	4576 22.5%	9631 47.4%	6133 30.2%	20340 100.0%

* $p < .05$

- denotes less than expected frequency

Research Question 1 Summary

In summary, the results of the chi-square test for statistical difference between responses from alumni from institutions with different enrollment size in The University of Tennessee system revealed that answers from The University of Tennessee--Knoxville alumni to the factors personal/social, quantitative, and verbal are significantly different than answers from The University of Tennessee--Chattanooga and Martin alumni. Further, alumni from The University of Tennessee--Knoxville tend to believe that their education added Very Little to their personal/social and quantitative skills, and Somewhat to their verbal skills. Alumni from The University of Tennessee--Chattanooga and Martin tend to believe that their education added Very Much to their personal/social skills, Somewhat to their quantitative skills, and a mix between Very Little and Very Much to their verbal skills.

Research Question 2

Research question 2 addresses whether or not alumni with different academic majors differ in their responses to the dimensions of growth and development questions in the "Your Education and It's Impact" section of the Alumni Satisfaction Survey.

As in Research question 1, data were analyzed for each of the four factors of growth and development; personal/social, quantitative, verbal, and cultural understanding. The academic major categories and responses by major are; agriculture (202), architecture (70), business (1150), communications (283), education (414), engineering (546), human ecology (130), humanities (186), science (333), social science

560), and nursing (194). The tables which follow present both Pearson Chi-Square values and Likelihood-Ratio Chi-Square values for comparison purposes. Also, Phi values are presented as an approximation of the variance (Φ^2 approximately equal to R^2).

For the factor personal/social by academic major, the Likelihood-Ratio Chi-Square test produced a value of 222.623 with 20 degrees of freedom for a $p < .0000$ (Table 13). Evaluation of the approximated Z score produced by the ratio of log-linear parameter estimate to its standard error revealed that humanities, science, and social science majors answered Very Little more frequently than expected ($p < .05$). Agriculture, architecture, business, education, and nursing majors answered Very Little less frequently than expected ($p < .05$). Alumni with academic majors in human ecology, and humanities answered Somewhat less frequently than expected ($p < .05$). Agriculture, business, communications, education, human ecology, and nursing majors answered Very Much more frequently than expected ($p < .05$). Academic majors in humanities, science, and social science answered Very Much less frequently than expected ($p < .05$). (Table 14)

For the factor quantitative by academic major, the Likelihood-Ratio Chi-Square test produced a value of 2308.566 with 20 degrees of freedom for a $p < .0000$. (Table 15) Evaluation of the approximated Z score revealed that communications, education, human ecology, humanities, and social science majors answered Very Little more frequently than expected ($p < .05$). Agriculture, business, engineering, science,

Table 13

**Chi-Square Test for Significance
Personal/Social by Major**

Statistic	Value	D.F.	Prob.
Pearson Chi-Square	231.931	20	0.0000
Likelihood-Ratio Chi-Square	222.623	20	0.0000
Phi	0.085		

calculated value to 4 decimal places

Table 14

**Expected/Observed Frequency and Percent Table
Personal/Social by Major**

Major		Response		
	VLittle	Somewhat	VMuch	Total
Agriculture				
Expected	138.4	646.6	831.1	1616
Observed	107*-	647	862*	1616
Difference	31.4	.4	30.9	0
Obs. % of Total	6.6%	40.0%	53.3%	100.0%
Architecture				
Expected	47.9	224.1	288.0	560
Observed	35*-	235	290	560
Difference	12.9	10.9	2.0	0
Obs. % of Total	6.2%	42.0%	51.8%	100.0%
Business				
Expected	787.7	3681.0	4731.3	9200
Observed	682*-	3671	4847*	9200
Difference	105.7	10.0	115.7	0
Obs. % of Total	7.4%	39.0%	52.7%	100.0%
Communications				
Expected	193.8	905.8	1164.3	2264
Observed	184	836	1244*	2264
Difference	9.8	69.8	79.7	0
Obs. % of Total	8.1%	36.9%	54.9%	100.0%

table 14 cont'd	VLittle	Somewhat	VMuch	Total
Education				
Expected	282.7	1321.1	1698.1	3302
Observed	230*-	1271	1801*	3302
Difference	52.7	50.1	102.9	0
Obs. % of Total	7.0%	38.5%	54.5%	100.0%
Engineering				
Expected	365.4	1707.6	2194.9	4268
Observed	373	1740	2155	4268
Difference	7.6	32.4	39.9	0
Obs. % of Total	8.7%	40.8%	50.5%	100.0%
Human Ecology				
Expected	89.0	416.1	534.8	1040
Observed	80	362*-	598*	1040
Difference	9.0	54.1	63.2	0
Obs. % of Total	7.7%	34.8%	57.5%	100.0%
Humanities				
Expected	127.4	595.4	765.2	1488
Observed	212*	612*-	664*-	1488
Difference	84.6	16.6	101.2	0
Obs. % of Total	14.2%	41.1%	44.6%	100.0%
Science				
Expected	228.1	1065.9	1370.0	2664
Observed	312*	1152	1200*-	2664
Difference	83.9	86.1	170.0	0
Obs. % of Total	11.7%	43.2%	45.0%	100.0%
Social Science				
Expected	383.6	1792.5	2304.0	4480
Observed	453*	1846	2181*-	4480
Difference	69.4	53.5	123	0
Obs. % of Total	10.1%	41.2%	48.7%	100.0%
Nursing				
Expected	132.9	621.0	798.2	1552
Observed	109*-	605	838*	1552
Difference	23.9	16.0	39.8	0
Obs. % of Total	7.0%	39.0%	54.0%	100.0%
TOTAL	2777 8.6%	12977 40.0%	16680 51.4%	32434 100.0%

*p < .05

- denotes less than expected frequency

Table 15

**Chi-Square Test for Significance
Quantitative by Major**

Statistic	Value	D.F.	Prob.
Pearson Chi-Square	2358.760	20	0.0000
Likelihood-Ratio Chi-Square	2308.566	20	0.0000
Phi	0.381		

calculated value to 4 decimal places

Table 16

**Expected/Observed Frequency and Percent Table
Quantitative by Major**

Major		Response		
	VLittle	Somewhat	VMuch	Total
Agriculture				
Expected	144.1	345.9	317.9	808
Observed	93*-	385*	330*	808
Difference	51.1	39.1	12.1	0
Obs. % of Total	11.5%	47.6%	40.8%	100.0%
Architecture				
Expected	49.9	119.9	110.2	280
Observed	45	142*	93	280
Difference	4.9	22.1	17.2	0
Obs. % of Total	16.1%	50.7%	33.2%	100.0%
Business				
Expected	820.6	1969.3	1810.1	4600
Observed	636*-	2270*	1694*	4600
Difference	184.6	300.7	116.1	0
Obs. % of Total	13.8%	49.3%	36.8%	100.0%
Communications				
Expected	201.9	484.6	445.4	1132
Observed	420*	509	203*-	1132
Difference	218.1	24.4	242.4	0
Obs. % of Total	37.1%	45.0%	17.9%	100.0%

table 16 cont'd	VLittle	Somewhat	VMuch	Total
Education				
Expected	295.4	709.0	651.6	1656
Observed	333*	809*	514*-	1656
Difference	37.6	100.0	137.6	0
Obs. % of Total	20.1%	48.9%	31.0%	100.0%
Engineering				
Expected	389.6	935.0	859.4	2184
Observed	84*-	477*-	1623*	2184
Difference	305.6	458.0	763.6	0
Obs. % of Total	3.8%	21.8%	74.3%	100.0%
Human Ecology				
Expected	91.0	218.3	200.7	510
Observed	111*	229	170*-	510
Difference	20.0	10.7	30.7	0
Obs. % of Total	21.8%	44.9%	33.3%	100.0%
Humanities				
Expected	132.7	318.5	292.8	744
Observed	309*	278*-	157*-	744
Difference	176.3	40.5	135.8	0
Obs. % of Total	41.5%	37.4%	21.1%	100.0%
Science				
Expected	237.6	570.2	524.1	1332
Observed	134*-	479*-	719*	1332
Difference	103.6	91.2	194.9	0
Obs. % of Total	10.1%	36.0%	54.0%	100.0%
Social Science				
Expected	399.6	959.0	881.4	2240
Observed	621*	1030	589*-	2240
Difference	221.4	71.0	292.4	0
Obs. % of Total	27.7%	46.0%	26.3%	100.0%
Nursing				
Expected	138.4	332.2	305.4	776
Observed	115*-	354	307*	776
Difference	23.4	21.8	1.6	0
Obs. % of Total	14.8%	45.6%	39.6%	100.0%
TOTAL				
% of Total	2901	6962	6399	16262
	17.8%	42.8%	39.3%	100.0%

*p < .05

- denotes less than expected frequency

and nursing majors answered Very Little less frequently than expected ($p < .05$). The following majors answered Somewhat more frequently than expected; agriculture, architecture, business, and education ($p < .05$). Majors in engineering, humanities, and science answered Somewhat less frequently than expected ($p < .05$). Alumni with academic majors in agriculture, business, engineering, science, and nursing answered Very Much more frequently than expected ($p < .05$). Academic majors in communications, education, human ecology, humanities, and social science answered Very Much less frequently than expected ($p < .05$). (Table 16)

For the factor verbal by academic major, the Likelihood-Ratio Chi-Square test produced a value of 191.941 with 20 degrees of freedom for a $p < .0000$ (Table 17). Evaluation of the approximated Z score revealed that engineering, humanities, and science majors answered Very Little more frequently than expected ($p < .05$). Academic majors in agriculture, business, and communications answered Very Little less frequently than expected ($p < .05$). Alumni with an academic major in business, and education answered Somewhat more frequently than expected ($p < .05$). Academic majors in engineering, humanities, and science answered Somewhat less frequently than expected ($p < .05$). Alumni with an academic major in agriculture, and communications answered Very Much more frequently than expected ($p < .05$). Alumni with an academic major in engineering ($p < .05$) or science ($p < .05$) answered Very Much less frequently than expected. (Table 18)

Table 17
Chi-Square Test for Significance
Verbal by Major

Statistic	Value	D.F.	Prob.
Pearson Chi-Square	196.337	20	0.0000
Likelihood-Ratio Chi-Square	191.941	20	0.0000
Phi	0.110		

calculated value to 4 decimal places

Table 18
Expected/Observed Frequency and Percent Table
Verbal by Major

Major		Response		
	VLittle	Somewhat	VMuch	Total
Agriculture				
Expected	87.4	358.4	362.2	808
Observed	60*-	351	397*	808
Difference	27.4	7.4	34.8	0
Obs. % of Total	7.4%	43.4%	49.1%	100.0%
Architecture				
Expected	30.3	124.2	125.5	280
Observed	30	130	120	280
Difference	.3	5.8	5.5	0
Obs. % of Total	10.7%	46.4%	42.9%	100.0%
Business				
Expected	497.5	2040.6	2061.8	4600
Observed	413*-	2114*	2073	4600
Difference	84.5	73.4	11.2	0
Obs. % of Total	9.0%	46.0%	45.1%	100.0%
Communications				
Expected	122.4	502.2	507.4	1132
Observed	79*-	402	651*	1132
Difference	43.4	100.2	143.6	0
Obs. % of Total	7.0%	35.5%	57.5%	100.0%

table 18 cont'd	VLittle	Somewhat	VMuch	Total
Education				
Expected	179.1	734.6	742.3	1656
Observed	166	784*	706	1656
Difference	13.1	49.4	36.3	0
Obs. % of Total	10.0%	47.3%	42.6%	100.0%
Engineering				
Expected	236.2	968.9	978.9	2184
Observed	297*	952*-	935*-	2184
Difference	60.8	16.9	43.9	0
Obs. % of Total	13.6%	43.6%	42.8%	100.0%
Human Ecology				
Expected	56.3	231.1	233.5	521
Observed	47	229	245	521
Difference	9.3	2.1	11.5	0
Obs. % of Total	9.0%	44.0%	47.0%	100.0%
Humanities				
Expected	80.5	330.1	333.5	744
Observed	115*	290*-	339	744
Difference	34.5	40.1	5.5	0
Obs. % of Total	15.5%	39.0%	45.6%	100.0%
Science				
Expected	144.1	590.9	597.0	1332
Observed	213*	592*-	527*-	1332
Difference	68.9	1.1	70.0	0
Obs. % of Total	16.0%	44.4%	39.6%	100.0%
Social Science				
Expected	242.3	993.7	1004.0	2240
Observed	252	1019	969	2240
Difference	9.7	25.3	35.0	0
Obs. % of Total	11.2%	45.5%	43.3%	100.0%
Nursing				
Expected	83.9	344.2	347.8	776
Observed	88	356	332	776
Difference	4.1	11.8	15.8	0
Obs. % of Total	11.3%	45.9%	42.8%	100.0%
TOTAL				
Expected	1760	7219	7294	16273
% of Total	10.8%	44.4%	44.8%	100.0%

*p < .05

- denotes less than expected frequency

For the factor cultural understanding by academic major, the Likelihood-Ratio Chi-Square test produced a value of 673.746 with 20 degrees of freedom for a $p < .0000$ (Table 19). Evaluation of the approximated Z score revealed that agriculture ($p < .05$), business ($p < .05$), education ($p < .05$), engineering ($p < .05$), and science ($p < .05$) majors answered Very Little more frequently than expected. Architecture ($p < .05$), communications ($p < .05$), human ecology ($p < .05$), humanities ($p < .05$), and social science ($p < .05$) majors answered Very Little less frequently than expected. Academic majors in business ($p < .05$), communications ($p < .05$), and nursing ($p < .05$) answered Somewhat more frequently than expected. Academic majors in humanities ($p < .05$) answered Somewhat less frequently than expected. The following academic majors answered Very Much more frequently than expected; architecture ($p < .05$), communications ($p < .05$), human ecology ($p < .05$), humanities ($p < .05$), and social science ($p < .05$). The following academic majors answered Very Much less frequently than expected; agriculture ($p < .05$), business ($p < .05$), education ($p < .05$), engineering ($p < .05$), science ($p < .05$), and nursing ($p < .05$). (Table 20)

Table 19

**Chi-Square Test for Significance
Cultural Understanding by Major**

Statistic	Value	D.F.	Prob.
Pearson Chi-Square	678.844	20	0.0000
Likelihood-Ratio Chi-Square	673.746	20	0.0000
Phi	0.183		

calculated value to 4 decimal places

Table 20

**Expected/Observed Frequency and Percent Table
Cultural Understanding by Major**

Major		Response		
	VLittle	Somewhat	VMuch	Total
Agriculture				
Expected	227.6	475.7	306.7	1010
Observed	255*	487	268*-	1010
Difference	27.4	11.3	38.7	0
Obs. % of Total	25.2%	48.2%	26.5%	100.0%
Architecture				
Expected	78.9	164.8	106.3	350
Observed	51*-	141	158*	350
Difference	27.9	23.8	51.7	0
Obs. % of Total	14.6%	40.3%	45.1%	100.0%
Business				
Expected	1290.5	2696.7	1738.8	5726
Observed	1482*	2823*	1421*-	5726
Difference	191.5	126.3	317.8	0
Obs. % of Total	25.9%	49.3%	24.8%	100.0%
Communications				
Expected	318.9	666.4	429.7	1415
Observed	234*-	689*	492*	1415
Difference	84.9	22.6	62.3	0
Obs. % of Total	16.5%	48.7%	34.8%	100.0%

table 20 cont'd	VLittle	Somewhat	VMuch	Total
Education				
Expected	438.8	917.0	591.2	1947
Observed	445*	889	613*-	1947
Difference	6.2	28.0	21.8	0
Obs. % of Total	22.9%	45.7%	31.5%	100.0%
Engineering				
Expected	615.3	1285.7	829.0	2730
Observed	850*	1297	583*-	2730
Difference	234.7	11.3	246.0	0
Obs. % of Total	31.1%	47.5%	21.4%	100.0%
Human Ecology				
Expected	146.5	306.1	197.4	650
Observed	104*-	305	241*	650
Difference	42.5	1.1	43.6	0
Obs. % of Total	16.0%	46.9%	37.1%	100.0%
Humanities				
Expected	210.5	439.9	283.6	934
Observed	144*-	361*-	429*	934
Difference	66.5	78.9	145.4	0
Obs. % of Total	15.4%	38.7%	45.9%	100.0%
Science				
Expected	375.3	784.2	505.6	1665
Observed	394*	783	488*-	1665
Difference	18.7	1.2	17.6	0
Obs. % of Total	23.7%	47.0%	29.3%	100.0%
Social Science				
Expected	631.1	1318.7	850.2	2800
Observed	414*-	1225	1161*	2800
Difference	217.1	93.7	310.8	0
Obs. % of Total	14.8%	43.7%	41.5%	100.0%
Nursing				
Expected	218.6	456.8	294.5	970
Observed	179	512*	279*-	970
Difference	39.6	55.2	15.5	0
Obs. % of Total	18.5%	52.8%	28.8%	100.0%
TOTAL				
% of Total	4552	9512	6133	20197
	22.5%	47.1%	30.4%	100.0%

*p < .05

- denotes less than expected frequency

Research Question 2 Summary

In summary, the results of the chi-square test for statistical difference between responses from alumni with different academic majors revealed that there is a significant difference between responses to the growth and development questions. Agriculture majors tend to believe that their education added Very Much to their personal/social skills, Somewhat and Very Much to their quantitative skills, Very Much to their verbal skills, and Very Little to their cultural understanding skills. Architecture majors tend to believe that their education added Very Little to their personal/social skills, Somewhat to their quantitative skills, and Very Much to their cultural understanding skills. Business majors tend to believe that their education added Very Much to their personal/social skills, Somewhat and Very Much to their quantitative skills, Somewhat to their verbal skills, and Very Little and Somewhat to their cultural understanding skills. Communication majors tend to believe that their education added Very Much to their personal/social skills, Very Little to their quantitative skills, Very Much to their verbal skills, and Somewhat and Very Much to their cultural understanding skills. Education majors tend to believe that their education added Very Much to their personal/social skills, Very Little and Somewhat to their quantitative skills, Somewhat to their verbal skills, and Very Little to their cultural understanding skills. Engineering majors tend to believe that their education added Very Much to their quantitative skills, Very Little to their verbal skills, and Very Little to their cultural understanding skills. Human ecology majors tend to believe that their education added Very Much to their personal/social skills, Very Little to their quantitative skills, and Very Much to their cultural

understanding skills. Humanities majors tend to believe that their education added Very Little to their personal/social skills, Very Little to their quantitative skills, Very Little to their verbal skills, and Very Much to their cultural understanding. Science majors tend to believe that their education added Very Little to their personal/social skills, Very Much to their quantitative skills, Very Little to their verbal skills, and Very Little to their cultural understanding skills. Social science majors tend to believe that their education added Very Little to their personal/social skills, Very Little to their quantitative skills, and Very Much to their cultural understanding skills. Nursing majors tend to believe that their education added Very Much to their personal/social skills, Very Much to their quantitative skills, and Somewhat to their cultural understanding. Responses to research question 2 are summarized in Table 21.

Research Question 3

Research question 3 addresses whether or not alumni from institutions of different enrollment size in The University of Tennessee system and with different academic majors differ in their responses to the dimensions of growth and development questions in the "Your Education and It's Impact" section of the Alumni Satisfaction Survey.

As in the previous research questions, data were analyzed for each of the four factors of growth and development; personal/social, quantitative, verbal, and cultural understanding. Data were also analyzed by institution size; large and medium. The tables which follow present all models used in the Long-Linear analysis. In each of the following analyses the most parsimonious model to explain the data was the saturated

Table 21

**Summary of Findings
Research Question 2**

Majors		Responses		
	Personal Social	Quantitative	Verbal	Cultural Understanding
Agriculture	VMuch	Somewhat VMuch	VMuch	VLittle
Architecture	VLittle	Somewhat		VMuch
Business	VMuch	Somewhat VMuch	Somewhat	VLittle Somewhat
Communication	VMuch	VLittle	VMuch	Somewhat VMuch
Education	VMuch	VLittle Somewhat	Somewhat	VLittle
Engineering		VMuch	VLittle	VLittle
Human Ecology	VMuch	VLittle		VMuch
Humanities	VLittle	VLittle	VLittle	VMuch
Science	VLittle	VMuch	VLittle	VLittle
Social Science	VLittle	VLittle		VMuch
Nursing	VMuch	VMuch		Somewhat

model (AM,AS,MS). Each Summary Table of Goodness of Fit presents the Likelihood-Ratio Chi-Square value, the probability, the change in degrees of freedom from the previous model, the change in Likelihood-Ratio Chi-Square value from the previous model, and the probability of the change.

For the following analyses, the academic major architecture was not included for comparisons because neither The University Tennessee--Chattanooga or The University of Tennessee--Martin offer the architecture major.

For the factor personal/social by major by size, the saturated Log-Linear model produced a value of 164.49 with 18 degrees of freedom for a $p < .0000$ (Table 22). Evaluation of the approximated Z score produced by the ratio of log-linear parameter estimate to its standard error revealed for the Large institution that education, science, and social science majors answered Very Little more frequently than expected ($p < .05$). Engineering, human ecology, and nursing majors answered Very Little less frequently than expected ($p < .05$). Agriculture majors answered Somewhat more frequently than expected, and communications, and education majors

Table 22

**Summary Table of Goodness of Fit of the Log-Linear Models
Personal/Social by Major by Size**

Model	DF	LR Chi-Sq	Prob.	Delta DF	Delta LR Chi-Sq	Prob.
A,MS	38	854.00	0.0000	18	672.89	0.0000
MS,AM	20	181.11	0.0000	2	16.62	0.0000
AM,AS,MS	18	164.49	0.0000	18	164.49	0.0000
AMS	0	0.00	0.0000		0.00	0.0000

Table 23

**Expected/Observed Frequency and Percent Table
Personal/Social by Major by Size--Large**

Major		Response		
	VLittle	Somewhat	VMuch	Total
Agriculture				
Expected	75.9	442.3	577.9	1096
Observed	75	488*	533*-	1096
Difference	.9	45.7	44.9	0
Obs. %	6.8%	44.5%	48.6%	100.0%
Business				
Expected	494.6	2571.8	3333.6	6400
Observed	463	2565	3372	6400
Difference	31.6	6.8	38.4	0
Obs. %	7.2%	40.1%	52.7%	100.0%
Communications				
Expected	159.3	379.7	1407.9	1947
Observed	153	338*-	1456*	1947
Difference	6.3	41.7	48.1	0
Obs. %	7.9%	17.4%	74.8%	100.0%
Education				
Expected	152.0	768.8	1063.2	1984
Observed	167*	745*-	1072	1984
Difference	15.0	23.8	8.8	0
Obs. %	8.4%	37.6%	54.0%	100.0%
Engineering				
Expected	324.6	1575.1	1828.3	3728
Observed	309*-	1575	1844	3728
Difference	15.6	.1	15.7	0
Obs. %	8.3%	42.2%	49.5%	100.0%
Human Ecology				
Expected	65.2	288.4	470.4	824
Observed	57*-	273	494*	824
Difference	8.2	15.4	23.6	0
Obs. %	6.9%	33.1%	60.0%	100.0%

table 23 cont'd	VLittle	Somewhat	VMuch	Total
Humanities				
Expected	181.4	514.2	552.4	1248
Observed	189	530	529*-	1248
Difference	7.6	15.8	23.4	0
Obs. %	15.1%	42.5%	42.4%	100.0%
Science				
Expected	172.5	602.2	609.3	1384
Observed	205*	621	558*-	1384
Difference	32.5	18.8	51.3	0
Obs. %	14.8%	44.9%	40.3%	100.0%
Social Science				
Expected	309.2	1210.5	1400.3	2920
Observed	332*	1235	1353*-	2920
Difference	22.8	24.5	47.3	0
Obs. %	11.4%	42.3%	46.3%	100.0%
Nursing				
Expected	73.2	390.1	528.7	992
Observed	58*-	373	561*	992
Difference	15.2	17.1	32.3	0
Obs. %	5.8%	37.6%	56.6%	100.0%
TOTAL	2008	8743	11772	22523
% of Total	8.9%	38.8%	52.3%	100.0%

* $p < .05$

- denotes less than expected frequency

Table 24

**Expected/Observed Frequency and Percent Table
Personal/Social by Major by Size--Medium**

Major			Response	
	VLittle	Somewhat	VMuch	Total
Agriculture				
Expected	31.1	204.7	284.1	520
Observed	32	159*-	329*	520
Difference	.9	45.7	44.9	0
Obs. %	6.2%	30.6%	63.3%	100.0%
Business				
Expected	187.4	1099.2	1513.4	2800
Observed	219	1106	1475	2800
Difference	31.6	6.8	38.4	0
Obs. %	7.8%	39.5%	52.7%	100.0%
Communications				
Expected	24.7	66.3	261.1	352
Observed	31	108*	213*-	352
Difference	6.3	41.7	48.1	0
Obs. %	8.8%	30.7%	60.5%	100.0%
Education				
Expected	88.0	502.2	737.8	1328
Observed	73*-	526*	729	1328
Difference	15.0	23.8	8.8	0
Obs. %	5.5%	39.6%	54.9%	100.0%
Engineering				
Expected	48.4	265.0	326.7	640
Observed	64*	265	311	640
Difference	15.6	.0	15.7	0
Obs. %	10.0%	41.4%	48.6%	100.0%
Human Ecology				
Expected	14.8	73.6	127.6	216
Observed	23*	89	104*-	216
Difference	8.2	15.4	23.6	0
Obs. %	10.6%	41.2%	48.1%	100.0%

table 24 cont'd	VLittle	Somewhat	VMuch	Total
Humanities				
Expected	30.6	97.8	111.6	240
Observed	23	82	135*	240
Difference	7.6	15.8	23.4	0
Obs. %	9.6%	34.2%	56.2%	100.0%
Science				
Expected	139.5	549.7	590.7	1280
Observed	107*-	531	642*	1280
Difference	32.5	18.7	51.3	0
Obs. %	8.4%	41.5%	50.2%	100.0%
Social Science				
Expected	143.8	635.5	780.7	1560
Observed	121*-	611	828*	1560
Difference	22.8	24.5	47.3	0
Obs. %	7.8%	39.2%	53.1%	100.0%
Nursing				
Expected	35.8	214.9	309.3	560
Observed	51*	232	277*-	560
Difference	15.2	17.1	32.3	0
Obs. %	9.1%	41.4%	49.5%	100.0%
TOTAL	744	3709	5043	9496
% of Total	7.8%	39.1%	53.1%	100.0%

*p < .05

- denotes less than expected frequency

answered Somewhat less frequently than expected ($p < .05$). Communications, human ecology, and nursing majors answered Very Much more frequently than expected ($p < .05$). Agriculture, humanities, science, and social science majors answered Very Much less frequently than expected ($p < .05$). (Table 23)

For the factor personal/social by major for Medium size institutions engineering, human ecology, and nursing majors answered Very Little more frequently than expected ($p < .05$). Education, science, and social science majors answered Very Little less frequently than expected ($p < .05$). Communications and education majors answered Somewhat more frequently than expected, and agriculture majors answered Somewhat less frequently than expected ($p < .05$). Agriculture, humanities, science, and social science majors answered Very Much more frequently than expected ($p < .05$). Communications, human ecology, and nursing majors answered Very Much less frequently than expected ($p < .05$). (Table 24)

For the factor quantitative by major by size, the saturated Log-Linear model produced a value of 72.90 with 18 degrees of freedom for a $p < .0000$ (Table 25). Evaluation of the approximated Z score for the Large institution revealed that communication and social science majors answered Very Little more frequently than expected, and human ecology majors answered Very Little less frequently than expected ($p < .05$). Science majors answered Somewhat more frequently than expected, and communications and social science majors answered Somewhat less frequently than expected ($p < .05$). Engineering and human ecology majors answered Very Much more frequently than expected, and agriculture, and humanities majors answered Very Much

less frequently than expected ($p < .05$). (Table 26)

For the factor quantitative by major for Medium size institutions human ecology majors answered Very Little more frequently than expected, and communications, and social science majors answered Very Little less frequently than expected ($p < .05$). Communications, and social science majors answered Somewhat more frequently than expected, and science majors answered Somewhat less frequently than expected ($p < .05$). Agriculture majors answered Very Much more frequently than expected, and engineering, and human ecology majors answered Very Much less frequently than expected ($p < .05$). (Table 27)

Table 25

**Summary Table of Goodness of Fit of the Log-Linear Models
Quantitative by Major by Size**

Model	DF	LR Chi-Sq	Prob.	Delta DF	Delta LR Chi-Sq	Prob.
A,MS	38	2388.60	0.0000	18	2298.23	0.0000
MS,AM	20	90.37	0.0000	2	17.47	0.0000
AM,AS,MS	18	72.90	0.0000	18	72.90	0.0000
AMS	0	0.00	0.0000		0.00	0.0000

Table 26

**Expected/Observed Frequency and Percent Table
Quantitative by Major by Size--Large**

Major		Response		
	VLittle	Somewhat	VMuch	Total
Agriculture				
Expected	66.6	259.1	222.3	548
Observed	67	276	205*-	548
Difference	.4	16.9	17.3	0
Obs. %	12.2%	50.4%	37.4%	100.0%
Business				
Expected	465.3	1565.3	1169.4	3200
Observed	466	1565	1169	3200
Difference	.7	.3	.4	0
Obs. %	14.6%	48.9%	36.5%	100.0%
Communications				
Expected	361.6	424.8	169.5	956
Observed	377*	413*-	166	956
Difference	15.4	11.8	3.5	0
Obs. %	39.4%	43.2%	17.4%	100.0%
Education				
Expected	212.3	476.5	303.2	992
Observed	218	474	300	992
Difference	5.7	2.5	3.2	0
Obs. %	22.0%	47.8%	30.2%	100.0%
Engineering				
Expected	73.6	406.5	1383.9	1864
Observed	66	388	1410*	1864
Difference	7.6	18.5	26.1	0
Obs. %	3.5%	20.8%	75.6%	100.0%
Human Ecology				
Expected	90.8	179.8	141.4	412
Observed	74*-	181	157*	412
Difference	16.8	1.2	15.6	0
Obs. %	18.0%	43.9%	38.1%	100.0%

table 26 cont'd	VLittle	Somewhat	VMuch	Total
Humanities				
Expected	264.1	230.0	130.0	624
Observed	265	237	122*-	624
Difference	.9	7.0	8.0	0
Obs. %	42.5%	38.0%	19.6%	100.0%
Science				
Expected	75.7	246.2	370.2	692
Observed	68	271*	353	692
Difference	7.7	24.8	17.2	0
Obs. %	9.8%	39.2%	51.0%	100.0%
Social Science				
Expected	425.1	658.1	376.8	1460
Observed	442*	644*-	374	1460
Difference	16.9	14.1	2.8	0
Obs. %	30.3%	44.1%	25.6%	100.0%
Nursing				
Expected	78.0	223.7	194.3	496
Observed	70	221	205	496
Difference	8.0	2.7	10.7	0
Obs. %	14.1%	44.6%	41.3%	100.0%
TOTAL	2113	4670	4461	11244
% of Total	18.8%	41.5%	39.7%	100.0%

*p < .05

- denotes less than expected frequency

Table 27

**Expected/Observed Frequency and Percent Table
Quantitative by Major by Size--Medium**

Major		Response		
	VLittle	Somewhat	VMuch	Total
Agriculture				
Expected	26.4	125.9	107.7	260
Observed	26	109	125*	260
Difference	.4	16.9	17.3	0
Obs. %	10.0%	41.9%	48.1%	100.0%
Business				
Expected	170.7	704.7	524.6	1400
Observed	170	705	525	1400
Difference	.7	.3	.4	0
Obs. %	12.1%	50.4%	37.5%	100.0%
Communications				
Expected	58.4	84.2	33.5	176
Observed	43*-	96*	37	176
Difference	15.4	11.8	3.5	0
Obs. %	24.4%	54.5%	21.0%	100.0%
Education				
Expected	120.7	332.5	210.8	644
Observed	115	335	214	644
Difference	5.7	2.5	3.2	0
Obs. %	17.3%	50.5%	32.2%	100.0%
Engineering				
Expected	10.4	70.5	239.1	320
Observed	18	89	213*-	320
Difference	7.6	18.5	26.1	0
Obs. %	5.6%	27.8%	66.6%	100.0%
Human Ecology				
Expected	20.2	49.2	38.6	108
Observed	37*	48	23*-	108
Difference	16.8	1.2	15.6	0
Obs. %	34.3%	44.4%	21.3%	100.0%

table 27 cont'd	VLittle	Somewhat	VMuch	Total
Humanities				
Expected	44.9	48.0	27.0	120
Observed	44	41	35	120
Difference	.9	7.0	8.0	0
Obs. %	36.7%	34.2%	29.2%	100.0%
Science				
Expected	58.3	232.8	348.8	640
Observed	66	208*-	366	640
Difference	7.7	24.8	17.2	0
Obs. %	10.3%	32.5%	57.2%	100.0%
Social Science				
Expected	195.9	371.9	212.2	780
Observed	179*-	386*	215	780
Difference	16.9	14.1	2.8	0
Obs. %	22.9%	49.5%	27.6%	100.0%
Nursing				
Expected	37.0	130.3	112.7	280
Observed	45	133	102	280
Difference	8.0	2.7	10.7	0
Obs. %	16.1%	47.5%	36.4%	100.0%
TOTAL	743	2150	1855	4748
% of Total	15.6%	45.3%	39.1%	100.0%

* $p < .05$

- denotes less than expected frequency

For the factor verbal by major by size, the saturated Log-Linear model produced a value of 62.01 with 18 degrees of freedom for a $p < .0000$ (Table 28). Evaluation of the approximated Z score for the Large institution revealed that education, science, and social science majors answered Very Little more frequently than expected, and nursing majors answered Very Little less frequently than expected ($p < .05$). Agriculture majors answered Somewhat more frequently than expected, and education majors answered Somewhat less frequently than expected ($p < .05$). Human ecology, and nursing majors answered Very Much more frequently than expected, and engineering, science, and social science majors answered Very Much less frequently than expected ($p < .05$). (Table 29)

For the factor verbal by major for Medium size institutions nursing majors answered Very Little more frequently than expected, and education, science, and social science majors answered Very Little less frequently than expected ($p < .05$).

Table 28

**Summary Table of Goodness of Fit of the Log-Linear Models
Verbal by Major by Size**

Model	DF	LR Chi-Sq	Prob.	Delta DF	Delta LR Chi-Sq	Prob.
A,MS	38	263.74	0.0000	18	191.33	0.0000
MS,AM	20	72.41	0.0000	2	10.31	0.0000
AM,AS,MS	18	62.01	0.0000	18	62.01	0.0000
AMS	0	0.00	0.0000		0.00	0.0000

Table 29

**Expected/Observed Frequency and Percent Table
Verbal by Major by Size--Large**

Major		Response		
	VLittle	Somewhat	VMuch	Total
Agriculture				
Expected	42.6	239.9	265.5	548
Observed	37	257*	254	548
Difference	5.6	17.1	11.5	0
Obs. %	6.8%	46.9%	46.4%	100.0%
Business				
Expected	299.5	1479.3	1421.3	3200
Observed	284	1491	1425	3200
Difference	15.5	11.7	3.7	0
Obs. %	8.9%	46.6%	44.5%	100.0%
Communications				
Expected	68.3	341.2	546.6	956
Observed	69	334	553	956
Difference	.7	7.2	6.4	0
Obs. %	7.2%	34.9%	57.8%	100.0%
Education				
Expected	104.9	472.6	414.4	992
Observed	113*	451*-	428	992
Difference	8.1	21.6	13.6	0
Obs. %	11.4%	45.5%	43.1%	100.0%
Engineering				
Expected	258.4	814.2	791.5	1864
Observed	262	829	773*-	1864
Difference	3.6	14.8	18.5	0
Obs. %	14.1%	44.5%	41.5%	100.0%
Human Ecology				
Expected	38.3	182.2	191.4	412
Observed	33	175	204*	412
Difference	5.3	7.2	12.6	0
Obs. %	8.0%	42.5%	49.5%	100.0%

table 29 cont'd	VLittle	Somewhat	VMuch	Total
Humanities				
Expected	98.5	243.8	281.8	624
Observed	91	245	288	624
Difference	7.5	1.2	6.2	0
Obs. %	14.6%	39.3%	46.2%	100.0%
Science				
Expected	117.5	308.5	266.0	692
Observed	140*	304	248*-	692
Difference	22.5	4.5	18.0	0
Obs. %	20.2%	43.9%	35.8%	100.0%
Social Science				
Expected	172.0	667.7	620.3	1460
Observed	184*	663	613*-	1460
Difference	12.0	4.7	7.3	0
Obs. %	12.6%	45.4%	42.0%	100.0%
Nursing				
Expected	59.0	228.7	208.2	496
Observed	46*-	229	221*	496
Difference	13.0	.3	12.8	0
Obs. %	9.3%	46.2%	44.6%	100.0%
TOTAL	1259	4978	5007	11244
% of Total	11.2%	44.3%	44.5%	100.0%

* $p < .05$

- denotes less than expected frequency

Table 30

**Expected/Observed Frequency and Percent Table
Verbal by Major by Size--Medium**

Major		Response		
	VLittle	Somewhat	VMuch	Total
Agriculture				
Expected	17.4	111.1	131.5	260
Observed	23	94*-	143	260
Difference	5.6	17.1	11.5	0
Obs. %	8.8%	36.2%	55.0%	100.0%
Business				
Expected	113.5	634.7	651.8	1400
Observed	129	623	648	1400
Difference	15.5	11.7	3.8	0
Obs. %	9.2%	44.5%	46.3%	100.0%
Communications				
Expected	10.8	60.9	104.3	176
Observed	10	68	98	176
Difference	.8	7.1	6.3	0
Obs. %	5.7%	38.6%	55.7%	100.0%
Education				
Expected	61.0	311.3	291.7	644
Observed	53*-	333*	278	644
Difference	8.0	21.7	13.7	0
Obs. %	8.0%	50.2%	41.9%	100.0%
Engineering				
Expected	38.7	138.0	143.3	320
Observed	35	123	162*	320
Difference	3.7	15.0	18.7	0
Obs. %	10.9%	38.4%	50.6%	100.0%
Human Ecology				
Expected	8.7	46.8	52.5	108
Observed	14	54	40	108
Difference	5.3	7.2	12.5	0
Obs. %	13.0%	54.0%	37.0%	100.0%

table 30 cont'd				
Humanities				
Expected	16.5	46.3	57.2	120
Observed	24	45	51	120
Difference	7.5	1.3	6.2	0
Obs. %	20.0%	37.5%	42.5%	100.0%
Science				
Expected	95.4	283.4	261.2	640
Observed	73*-	288	279*	640
Difference	22.4	4.6	17.8	0
Obs. %	11.4%	45.0%	43.6%	100.0%
Social Science				
Expected	80.0	351.3	348.8	780
Observed	68*-	356	356*	780
Difference	12.0	5.3	7.2	0
Obs. %	8.7%	45.6%	45.6%	100.0%
Nursing				
Expected	29.0	127.2	123.8	280
Observed	42*	127	111*-	280
Difference	13.0	.2	12.8	0
Obs. %	15.0%	45.4%	39.6%	100.0%
TOTAL	471	2111	2166	4748
% of Total	9.9%	44.5%	45.6%	100.0%

*p < .05

- denotes less than expected frequency

Education majors answered Somewhat more frequently than expected, and agriculture majors answered Somewhat less frequently than expected ($p < .05$). Engineering, science, and social science majors answered Very Much more frequently than expected, and nursing answered Very Much less frequently than expected ($p < .05$). (Table 30)

For the factor cultural understanding by major by size, the saturated Log-Linear model produced a value of 61.66 with 18 degrees of freedom for a $p < .0000$. (Table 31) Evaluation of the approximated Z score for the Large institution revealed that business, communications, and education majors answered Very Little more frequently than expected, and human ecology and nursing majors answered Very Little less frequently than expected ($p < .05$). Business and social science majors answered Somewhat less frequently than expected ($p < .05$). Human ecology, social science, and nursing majors answered Very Much more frequently than expected, and communication majors answered Very Much less frequently than expected ($p < .05$). (Table 32)

Table 31

**Summary Table of Goodness of Fit of the Log-Linear Models
Cultural Understanding by Major by Size**

<u>Model</u>	<u>DF</u>	<u>LR Chi-Sq</u>	<u>Prob.</u>	<u>Delta DF</u>	<u>Delta LR Chi-Sq</u>	<u>Prob.</u>
A,MS	38	617.61	0.0000	18	552.88	0.0000
MS,AM	20	64.73	0.0000	2	3.07	0.0000
AM,AS,MS	18	61.66	0.0000	18	61.66	0.0000
AMS	0	0.00	0.0000		0.00	0.0000

Table 32

**Expected/Observed Frequency and Percent Table
Cultural Understanding by Major by Size--Large**

Major		Response		
	VLittle	Somewhat	VMuch	Total
Agriculture				
Expected	144.6	297.2	171.2	613
Observed	143	312	158	613
Difference	1.6	15.2	13.2	0
Obs. %	23.3%	50.9%	25.8%	100.0%
Business				
Expected	866.2	1765.2	920.6	3552
Observed	889*	1747*-	916	3552
Difference	22.8	18.2	4.6	0
Obs. %	25.0%	49.2%	25.8%	100.0%
Communications				
Expected	169.8	538.2	382.0	1090
Observed	178*	544	368*-	1090
Difference	8.2	5.8	14.0	0
Obs. %	16.3%	49.9%	33.8%	100.0%
Education				
Expected	231.3	543.1	341.6	1116
Observed	242*	537	337	1116
Difference	10.7	6.1	4.6	0
Obs. %	21.7%	48.1%	30.2%	100.0%
Engineering				
Expected	627.3	1040.1	468.6	2136
Observed	627	1052	457	2136
Difference	.3	11.9	11.6	0
Obs. %	29.4%	49.3%	21.4%	100.0%
Human Ecology				
Expected	70.4	217.6	177.0	465
Observed	60*-	217	188*	465
Difference	10.4	.6	11.0	0
Obs. %	12.9%	46.7%	40.4%	100.0%

table 32 cont'd	VLittle	Somewhat	VMuch	Total
Humanities				
Expected	108.4	274.9	317.7	701
Observed	107	285	309	701
Difference	1.4	10.1	8.7	0
Obs. %	15.3%	40.7%	44.1%	100.0%
Science				
Expected	174.9	365.1	232.0	772
Observed	182	369	221	772
Difference	7.1	3.9	11.0	0
Obs. %	23.6%	47.8%	28.6%	100.0%
Social Science				
Expected	227.8	695.8	694.4	1618
Observed	215	662*-	741*	1618
Difference	12.8	33.8	46.4	0
Obs. %	13.3%	40.9%	45.8%	100.0%
Nursing				
Expected	101.1	295.9	168.0	565
Observed	79*-	308	178*	565
Difference	22.1	12.1	10.0	0
Obs. %	14.0%	54.5%	31.5%	100.0%
TOTAL	2722	6033	3873	12628
% of Total	21.6%	47.8%	30.7%	100.0%

* $p < .05$

- denotes less than expected frequency

Table 33

**Expected/Observed Frequency and Percent Table
Cultural Understanding by Major by Size--Medium**

Major		Response		
	VLittle	Somewhat	VMuch	Total
Agriculture				
Expected	80.4	156.8	87.8	325
Observed	82	142	101	325
Difference	1.6	14.8	13.2	0
Obs. %	25.2%	43.7%	31.1%	100.0%
Business				
Expected	446.8	864.8	438.4	1750
Observed	424*-	883*	443	1750
Difference	22.8	18.2	4.6	0
Obs. %	24.2%	50.5%	25.3%	100.0%
Communications				
Expected	36.1	108.8	75.1	220
Observed	28*-	103	89*	220
Difference	8.1	5.8	13.9	0
Obs. %	12.7%	46.8%	40.5%	100.0%
Education				
Expected	180.7	402.9	246.3	830
Observed	170*-	409	251	830
Difference	10.7	6.1	4.7	0
Obs. %	20.5%	49.3%	30.2%	100.0%
Engineering				
Expected	122.5	193.0	84.5	400
Observed	123	181	96	400
Difference	.5	12.0	11.5	0
Obs. %	30.7%	45.2%	24.0%	100.0%
Human Ecology				
Expected	21.6	63.4	50.1	135
Observed	32*	64	39*-	135
Difference	10.4	.6	11.1	0
Obs. %	23.7%	47.4%	28.9%	100.0%

table 33 cont'd	VLittle	Somewhat	VMuch	Total
Humanities				
Expected	24.5	59.1	66.4	150
Observed	26	49	75	150
Difference	1.5	10.1	8.6	0
Obs. %	17.3%	32.7%	50.0%	100.0%
Science				
Expected	190.2	376.9	232.9	800
Observed	183	373	244	800
Difference	7.2	3.9	11.1	0
Obs. %	22.9%	46.6%	30.5%	100.0%
Social Science				
Expected	145.2	421.2	408.6	975
Observed	158	455*	362*-	975
Difference	12.8	33.8	46.6	0
Obs. %	16.2%	46.7%	37.1%	100.0%
Nursing				
Expected	65.9	183.1	101.0	350
Observed	88*	171	91*-	350
Difference	22.1	12.1	10.0	0
Obs. %	25.1%	48.9%	26.0%	100.0%
TOTAL	1314	2830	1791	5935
% of Total	22.1%	47.7%	30.2%	100.0%

* $p < .05$

- denotes less than expected frequency

For the factor cultural understanding by major by Medium size institutions human ecology, and nursing majors answered Very Little more frequently than expected, and business, communications, and education majors answered Very Little less frequently than expected ($p < .05$). Business and social science majors answered Somewhat more frequently than expected ($p < .05$). Communication majors answered Very Much more frequently than expected, and human ecology, social science, and nursing majors answered Very Much less frequently than expected ($p < .05$). (Table 33)

Research Question 3 Summary

In summary, the results of the Log-Linear test for statistical difference between responses from alumni of institutions with different enrollment size and with different academic majors revealed that there is a significant difference between responses to the growth and development questions. In the Large size institution, agriculture majors tend to believe that their education added Somewhat to their personal/social and verbal skills. In the Medium size institutions, agriculture majors tend to believe that their education added Very Much to their personal/social and quantitative skills. In the Large size institution, business majors tend to believe that their education added Very Little to their cultural understanding. In the Medium size institutions, business majors tend to believe that their education added Somewhat to their cultural understanding skills. In the Large size institution, communications majors tend to believe that their education added Very Little to their quantitative and cultural understanding skills, and Very Much to their personal/social skills. In the Medium size institutions, communications majors tend to

believe that their education added Somewhat to their personal/social and quantitative skills, and Very Much to their cultural understanding skills. In the Large size institution, education majors tend to believe that their education added Very Little to their personal/social, verbal, and cultural understanding skills. In the Medium size institutions, education majors tended to believe that their education added Somewhat to their personal/social and verbal skills. In the Large size institution, engineering majors tend to believe that their education added Very Much to their quantitative skills. In the Medium size institutions, engineering majors tend to believe that their education added Very Little to their personal/social skills and Very Much to their verbal skills. In the Large size institution, human ecology majors tend to believe that their education added Very Much to their personal/social, quantitative, verbal, and cultural understanding skills. In the Medium size institutions, human ecology majors tended to believe that their education added Very Little to their personal/social, quantitative, and cultural understanding skills. In the Medium size institutions, humanities majors tend to believe that their education added Very Much to their personal/social skills. In the Large size institution, science majors tended to believe that their education added Very Little to their personal/social and verbal skills, and Somewhat to their quantitative skills. In the Medium size institutions, science majors tended to believe that their education added Very Much to their personal/social and verbal skills. In the Large size institution, social science majors tend to believe that their education added Very Little to their personal/social, quantitative, and verbal skills, and Very Much to their cultural understanding skills. In the Medium size institutions, social science majors tend to

believe that their education added Very Much to their personal/social and verbal skills, and Somewhat to their quantitative and cultural understanding skills. In the Large size institution, nursing majors tend to believe that their education added Very Much to their personal/social, verbal, and cultural understanding skills. In the Medium size institutions, nursing majors tend to believe that their education added Very Little to their personal/social, verbal, and cultural understanding skills. Responses to research question 3 are summarized in Table 34.

Table 34

**Summary Table of Findings
Research Question 3**

Size	Major		Response		
		Per/Soc	Quant	Verbal	Cultural
Large	Agriculture	Some		Some	
	Business				VLittle
	Communication	VMuch	VLittle		VLittle
	Education	VLittle		VLittle	VLittle
	Engineering		VMuch		
	Human Ecology	VMuch	VMuch	VMuch	VMuch
	Humanities				
	Science	VLittle	Some	VLittle	
	Social Science	VLittle	VLittle	VLittle	VMuch
	Nursing	VMuch		VMuch	VMuch
Medium	Agriculture	VMuch	VMuch		
	Business				Some
	Communication	Some	Some		VMuch
	Education	Some		Some	
	Engineering	VLittle		VMuch	
	Human Ecology	VLittle	VLittle		VLittle
	Humanities	VMuch			
	Science	VMuch		VMuch	
	Social Science	VMuch	Some	VMuch	Some
	Nursing	VLittle		VLittle	VLittle

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter provides a summary of the study. Conclusions are drawn from the findings, and recommendations for future research in alumni perceptions of educational impact are presented.

Summary

The purpose of this study was to compare the responses of alumni with different academic majors and from institutions of different enrollment size in The University of Tennessee system on the dimensions of growth and development from questions in the "Your Education and Its Impact" section of the Alumni Satisfaction Survey. Comparisons were made by institution size, by academic major, and by institution size and academic major.

The rationale for conducting this study was the inconclusiveness of research findings relative to relating alumni academic major and/or institutional size to the impact of a college education. The recent proliferation of state mandated outcomes assessment requirements is indicative of a sentiment of accountability for higher education. Further, the Performance Funding initiative causes Tennessee to be regularly under scrutiny for effectiveness of evaluating educational systems. This study demonstrates the perceptions of alumni from the only state employing a performance based incentive in funding.

Three research questions were asked in this study. They were; (1) Do alumni from institutions of different enrollment size differ in their responses to the questions in

the "Your Education and Its Impact" section of the Alumni Satisfaction Survey? (2) Do alumni with different academic majors differ in their responses to the "Your Education and Its Impact" section of the Alumni Satisfaction Survey? and (3) Do alumni from institutions of different enrollment size, and with different academic majors differ in their responses to the questions in the "Your Education and Its Impact" section of the Alumni Satisfaction Survey?

The population for this study was all 1986 and 1988 alumni (graduates of the baccalaureate degree programs from The University of Tennessee--Knoxville, Chattanooga, and Martin. Data were collected by each institution using the uniformly adopted Alumni Satisfaction Survey. The data were reported in a consistent manner to the Tennessee Higher Education Commission to be considered for eligibility for performance based funding. Permission was obtained from Dr. Arliss L. Roaden, Executive Director of THEC, and President Joseph Johnson of The University of Tennessee to use the data to answer the aforementioned research questions. The Data were procured from the division of Assessment and Program Review at THEC.

The data were classified according to institution size, academic major, and growth and development factor (personal/social, quantitative, verbal, and cultural understanding). Frequencies were calculated and data were analyzed using Likelihood-Ratio Chi-Square and Log-Linear analysis. The ratio of log-linear parameter estimate to its standard error was calculated to determine the interaction effect of the variables (multivariate test).

All of the research questions could be answered in the affirmative for a significant difference in responses by alumni based upon institution size, academic major, and

institution size and academic major at the $p < .05$ level. More specifically, the statistical analysis revealed the following:

1. Alumni from the Large institution (The University of Tennessee--Knoxville) tend to believe that their education added Very Little to their personal/social and quantitative skills, and Somewhat to their verbal skills.

2. Alumni from Medium institutions (The University of Tennessee--Chattanooga and Martin) tend to believe that their education added Very Much to their personal/social skills, Somewhat to their quantitative skills, and a mix between Very Little and Very Much to their verbal skills.

3. All alumni with academic majors in agriculture, business, communications, education, human ecology, and nursing tend to believe that their education added Very Much to their personal/social skills.

4. All alumni with academic majors in architecture, humanities, science, and social science tend to believe that their education added Very Little to their personal social skills.

5. All alumni with academic majors in agriculture, business, engineering, science, and nursing tend to believe that their education added Very Much to their quantitative skills.

6. All alumni with academic majors in agriculture, architecture, business, and education tend to believe that their education added Somewhat to their quantitative skills.

7. All alumni with academic majors in communications, education, human ecology, humanities, and social science tend to believe that their education added Very

Little to their quantitative skills.

8. All alumni with academic majors in agriculture, and communications tend to believe that their education added Very Much to their verbal skills.

9. All alumni with academic majors in business and education tend to believe that their education added Somewhat to their verbal skills.

10. All alumni with academic majors in engineering, humanities, and science tend to believe that their education added Very Little to their verbal skills.

11. All alumni with academic majors in architecture, communications, human ecology, humanities, and social science tend to believe that their education added Very Much to their cultural understanding skills.

12. All alumni with academic majors in business, communications, and nursing tend to believe that their education added Somewhat to their cultural understanding skills.

13. All alumni with academic majors in agriculture, business, education, engineering, and science tend to believe that their education added Very Little to their cultural understanding skills.

14. Alumni graduating from the Large size institution with an academic major in communications, human ecology and nursing tend to believe that their education added Very Much to their personal/social skills. Alumni graduating from Medium size institutions with an academic major in agriculture, humanities, science, and social science tend to believe that their education added Very Much to their personal/social skills.

15. Alumni graduating from the Large size institution with an academic major in agriculture tend to believe that their education added Somewhat to their personal/social

skills. Alumni graduating from Medium size institutions with an academic major in communications, and education tend to believe that their education added Somewhat to their personal/social skills.

16. Alumni graduating from the Large size institution with an academic major in education, science, and social science tend to believe that their education added Very Little to their personal/social skills. Alumni graduating from Medium size institutions with an academic major in engineering, human ecology, and nursing tend to believe that their education added Very Little to their personal/social skills.

17. Alumni graduating from the Large size institution with an academic major in engineering, and human ecology tend to believe that their education added Very Much to their quantitative skills. Alumni graduating from Medium size institutions with an academic major in agriculture tend to believe that their education added Very Much to their quantitative skills.

18. Alumni graduating from the Large size institution with an academic major in science tend to believe that their education added Somewhat to their quantitative skills. Alumni graduating from Medium size institutions with an academic major in communications and social science tend to believe that their education added Somewhat to their quantitative skills.

19. Alumni graduating from the Large size institution with an academic major in communications and social science tend to believe that their education added Very Little to their quantitative skills. Alumni graduating from Medium size institutions with an academic major in human ecology tend to believe that their education added Very

Little to their quantitative skills.

20. Alumni graduating from the Large size institution with an academic major in human ecology and nursing tend to believe that their education added Very Much to their verbal skills. Alumni graduating from Medium size institutions with an academic major in engineering, science, and social science tend to believe that their education added Very Much to their verbal skills.

21. Alumni graduating from the Large size institution with an academic major in agriculture tend to believe that their education added Somewhat to their verbal skills. Alumni graduating from Medium size institutions with an academic major in education tend to believe that their education added Somewhat to their verbal skills.

22. Alumni graduating from the Large size institution with an academic major in education, science, and social science tend to believe that their education added Very Little to their verbal skills. Alumni graduating from Medium size institutions with an academic major in nursing tend to believe that their education added Very Little to their verbal skills.

23. Alumni graduating from the Large size institution with an academic major in human ecology, social science, and nursing tend to believe that their education added Very Much to their cultural understanding skills. Alumni graduating from Medium size institutions with an academic major in communications tend to believe that their education added Very Much to their cultural understanding skills.

24. Alumni graduating from Medium size institutions with an academic major in business, and social science tend to believe that their education added Somewhat to

their cultural understanding skills.

25. Alumni graduating from the Large size institution with an academic major in education, science, and social science tend to believe that their education added Very Little to their cultural understanding skills. Alumni graduating from Medium size institutions with an academic major in human ecology, and nursing tend to believe that their education added Very Little to their cultural understanding skills.

Conclusions

Based upon the analysis of data, several conclusions may be drawn relative to alumni perceptions of the impact of their education upon the growth and development factors. The conclusions reached are valid only to the extent that the instrumentation and data analysis were valid and reliable.

There is a significant difference between the responses of alumni from the Large institution (The University of Tennessee--Knoxville) and the alumni from Medium size institutions (The University of Tennessee--Chattanooga and Martin). Because of the relatively large difference in the size of these institutions, it may be concluded that institution size is a contributing factor to the difference in the responses of alumni to the "Your Education and It's Impact" questions (the contribution of their education to their personal/social skills, quantitative skills, verbal skills, and cultural understanding skills). This finding supports Chickering's (1969) theory of redundancy and skill development, and research findings from Barker and Gump, (1964) and Haugen, (1988).

There is a significant difference between the responses of alumni with different academic majors to the "Your Education and It's Impact" questions. Therefore, we may conclude that educational experiences in academic majors are a contributing factor to the differences in perceived contribution of education to the growth and development factors. It is evident in the findings of this study that some academic majors such as communications, human ecology, and nursing facilitate growth and development in personal/social skills. This finding supports Haugen's, (1988) finding about alumni with academic majors in health. Some academic majors such as engineering and science facilitate growth and development in quantitative skills. The educational experience that communications majors receive tends to develop verbal skills. And, cultural understanding skills tend to be developed in human ecology and social science majors.

There is a significant difference between the responses of alumni from institutions of different enrollment size, and with different academic majors to the "Your Education and It's Impact" questions. Although some of the findings in this question reinforce the earlier mentioned findings (i.e., engineering majors and quantitative skills), there are some inconsistencies such as the responses of human ecology, social science and nursing majors at the Large size institution compared with those same majors at Medium size institutions. Some of these differences may be attributed to a variety of factors such as; academic program development at the individual school, self-selection of the students in the academic major, student expectations of the outcomes of a particular academic major, mean demographic background of the student population (particularly as it relates to development of personal/social skills), commuter/resident mix of the student population,

or student attributes (entering g.p.a. or ACT score) as entering freshmen. Each of these, as well as countless other variables, may confound any generalized conclusions for this research question.

Based upon the varied findings of this study, the formative assessment goal of this research was achieved. This study will serve as a beginning point for evaluation of both curricular and institutional strengths and weaknesses in The University of Tennessee system. Also, this study makes a contribution to the growing body of literature surrounding educational impact.

Implications

Although the curriculum, and possibly the ethos, of an academic department is likely to reinforce certain dimensions of growth and development more than others, it appears that the strongest influence may be the context of the collegiate experience. That is to say, the combination of factors such as institution enrollment size, individual faculty members, the goals or mission of the academic department, student cohort group, unique curriculum attributes of the academic major or general education requirements impact the student more than any singularly identifiable variable. Consequently, the strength of this study, and any studies which follow, may lie in it's contribution to the assessment of the educational program under consideration.

Recommendations for Additional Research

The following recommendations for additional research are based upon the findings of this study, and the limitations which emerged as a result of it's conduct:

1. A replicative study should be conducted with a broader alumni population from institutions of varying size (i.e., all post-secondary institutions in the state of Tennessee).

2. A study comparing responses of Tennessee alumni with national norms established by ACT for the same growth and development questions should be conducted. This would establish any difference between Tennessee graduates and the vast pool of graduates represented by the national norms.

3. Further research should be conducted relative to the socialization influences that occur within specific academic majors, and how they effect post-graduate perception of skill growth and development.

4. Studies should be conducted in each of the institutions in The University of Tennessee system to confirm or dismiss the findings of this study, as they may relate to curriculum.

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APPENDIXES

APPENDIX A
ALUMNI SURVEY

PERFORMANCE FUNDING
FOR PUBLIC HIGHER EDUCATIONAL INSTITUTIONS
Standard IV: Alumni Survey

1987-88 Baccalaureate and Associate Degree Graduates

TENNESSEE HIGHER EDUCATION COMMISSION
Parkway Towers, Suite 1900
404 James Robertson Parkway
Nashville, Tennessee 37219
(615) 741-7564

INSTRUCTIONS

The Alumni Survey consists of information supplied by each person who graduated with a baccalaureate or associate degree in the year 1987-88. The year 1987-88 is defined as the terms summer 1987 through spring 1988. This information shall be collected using the instrument contained in the Appendix section of this document.

Although the survey instrument contains questions about the alumni's employment and background, these are optional questions and the reporting institution should not report these answers to the Tennessee Higher Education Commission. Only the questions dealing with the alumni's experiences at the reporting institution should be reported.

```
*****
* The alumni survey reporting is to be submitted in tape format *
* and is due to the Tennessee Higher Education Commission no   *
* later than May 1, 1990.                                       *
*                                                                 *
* The data submitted may be either 1600 BPI or 6250 BPI. The    *
* tape should be non-labelled and must be EBCDIC.               *
*                                                                 *
* Please label the institutional name(s) or system (if all      *
* institutions of one governing board are contained) and the    *
* tape characteristics used to create the tape on an outside   *
* label affixed to the tape.                                     *
*****
```

If an alumnus does not respond to all questions being reported, please leave those columns blank. Do not zero fill those columns.

BLANK STATE UNIVERSITY
ALUMNI SURVEY

In this questionnaire, you will frequently be asked to think back to your days at Blank State University. We would like for you to respond in regard to your undergraduate experiences. Please circle your choice of response.

1. As you look back, how satisfied were you at the time you graduated with the educational experience you had at BSU?

1 VERY DISSATISFIED 2 DISSATISFIED 3 SATISFIED 4 VERY SATISFIED

2. Now, how satisfied are you with the educational experience you had at BSU?

1 VERY DISSATISFIED 2 DISSATISFIED 3 SATISFIED 4 VERY SATISFIED

3. Now, how do you rate the following aspects of your BSU experience?

	POOR	FAIR	GOOD	EXCELLENT
a. Your academic experience	1	2	3	4
b. Your social experience	1	2	3	4
c. Your cultural experience	1	2	3	4
d. Your overall experience	1	2	3	4

4. How often would you say you did each of the following while you were attending BSU?

	NEVER	SELDOM	OCCASIONALLY	OFTEN
a. Used the Library as a quiet place to read or study	1	2	3	4
b. Developed a bibliography or set of references for a term paper	1	2	3	4
c. Used Library reference materials	1	2	3	4
d. Went to an art gallery or exhibit on campus	1	2	3	4
e. Attended a concert or	1	2	3	4

other musical performance
on campus

- | | | | | |
|--|---|---|---|---|
| f. Saw a play on campus | 1 | 2 | 3 | 4 |
| g. Worked on a paper or project where you used a computer | 1 | 2 | 3 | 4 |
| h. Tried to explain a scientific theory to another student | 1 | 2 | 3 | 4 |

5. Since graduating from BSU, how many times would you say you have...

- | | NEVER | ONCE | TWO OR THREE
TIMES | MORE THAN
THREE TIMES |
|--|-------|------|-----------------------|--------------------------|
| a. Gone to meetings of, or contributed money to organizations promoting social/political points of view? | 1 | 2 | 3 | 4 |
| b. Gone to meetings of, or contributed money to civic organizations? | 1 | 2 | 3 | 4 |
| c. Gone to meetings of, or contributed money to a professional organization? | 1 | 2 | 3 | 4 |
| d. Volunteered for community service? | 1 | 2 | 3 | 4 |
| e. Gone to a play or a musical? | 1 | 2 | 3 | 4 |
| f. Read a book for pleasure? | 1 | 2 | 3 | 4 |
| g. Gone to a popular music concert? | 1 | 2 | 3 | 4 |
| h. Gone to a classical music concert (band, orchestra, opera)? | 1 | 2 | 3 | 4 |

6. Since graduating from BSU, have you voted in an election for a public official at the local, state, or national level?

- 1 NO 2 YES

7. While you were at BSU, with how many faculty members did you develop a close relationship? (Such that you felt you could ask them for a letter of recommendation)
- 0 NONE 1 ONE 2 TWO 3 THREE OR MORE
8. While you were at BSU, with how many students did you develop a close friendship?
- 0 NONE 1 ONE 2 TWO 3 THREE OR MORE
9. Now, how many close friendships do you maintain with people you met while you were a student at BSU?
- 0 NONE 1 ONE 2 TWO 3 THREE OR MORE
10. If you could start college again, would you enroll at BSU?
- 1 DEFINITELY NOT 2 PROBABLY NOT 3 PROBABLY YES 4 DEFINITELY YES

YOUR EDUCATION AND ITS IMPACT

11. In answering the questions in this section, please think of your overall experience at BSU, and any effect it may have had on each item. Please indicate the degree to which your education at BSU added to your skills in each of the following areas.

	VERY LITTLE	SOMEWHAT	VERY MUCH
a. Practical skills necessary to obtain employment in your field	1	2	3
b. Getting along with people of different races and ethnic groups	1	2	3
c. Ability to grow and learn as a person	1	2	3
d. Ability to lead or guide others	1	2	3
e. Ability to adjust to new job demands	1	2	3
f. Self-confidence in expressing your ideas	1	2	3
g. Appreciation of different cultures	1	2	3
h. Planning and carrying out projects	1	2	3

i. Speaking effectively	1	2	3
j. Writing effectively	1	2	3
k. Understanding written information	1	2	3
l. Understanding graphic information	1	2	3
m. Learning on your own	1	2	3
n. Defining and solving problems	1	2	3
o. Working cooperatively in a group	1	2	3
p. Ability to understand mathematical concepts	1	2	3
q. Understanding the interaction between people and the environment	1	2	3
r. Understanding and appreciating the arts	1	2	3
s. Understanding and applying scientific principles and methods	1	2	3
t. Understanding different philosophies and cultures	1	2	3
u. Ability to use mathematics in everyday life	1	2	3

A number of the above items were provided with the kind permission of ACT.

SPECIFIC QUESTIONS RELATED TO THE MAJOR

12. In this section we would like to ask you questions about programs in your major area. Thinking about your major, please rate the quality of each, and its importance to you.

What was your major? _____

How would you rate the quality of each?

	POOR	FAIR	GOOD	EXCELLENT	NOT APPLICABLE
a. Availability of your advisor	1	2	3	4	5
b. Willingness of your advisor to help	1	2	3	4	5
c. Quality of courses for providing a good general education	1	2	3	4	5
d. Quality of courses for preparing for employment	1	2	3	4	5
e. Fairness of grading in the major	1	2	3	4	5
f. Quality of instruction in the major	1	2	3	4	5
g. Opportunities for interaction with faculty in the major	1	2	3	4	5
h. Availability of professional activities or clubs in the major	1	2	3	4	5
i. Quality of courses in the major in preparing for graduate or professional school	1	2	3	4	5
j. Availability of faculty to help students outside of class	1	2	3	4	5
k. Availability of faculty to talk informally	1	2	3	4	5
l. Expertise of faculty in the major	1	2	3	4	5

13. If you could choose your major over again, would you choose the same major?

EMPLOYMENT AND BACKGROUND INFORMATION

In this section, you will be asked optional questions about your employment, along with other questions which will allow your responses to be compared to those of others. Again, all your responses are completely confidential.

- | | | | | | | | |
|--|--|-----------------|------------------|------------------|-----------------|------------------|------------------|
| <p>14. Which of the following best describes your present employment situation?</p> <p>1 WORKING FULL-TIME (NOT SELF-EMPLOYED)
 2 WORKING PART-TIME (NOT SELF-EMPLOYED)
 3 SELF-EMPLOYED
 4 SERVING IN THE ARMED FORCES
 5 CARING FOR A HOME AND FAMILY
 6 UNEMPLOYED</p> | <p>19. How do you feel about the pay in your job?</p> <p>1 VERY DISSATISFIED
 2 DISSATISFIED
 3 SATISFIED
 4 VERY SATISFIED
 5 NOT APPLICABLE</p> | | | | | | |
| <p>15. Are you presently enrolled in a college or university?</p> <p>1 NO
 2 YES, PART-TIME UNDERGRADUATE
 3 YES, FULL-TIME UNDERGRADUATE
 4 YES, PART-TIME GRADUATE / PROFESSIONAL
 5 YES, FULL-TIME GRADUATE / PROFESSIONAL</p> | <p>20. Did you work while you were attending BSU?</p> <p>1 NO
 2 YES ON CAMPUS
 3 YES OFF CAMPUS</p> | | | | | | |
| <p>16. Are you employed in the field in which you were educated? If not, why not? Choose the best response.</p> <p>1 I WAS (AM) EMPLOYED IN MY MAJOR FIELD
 2 I COULD NOT FIND A JOB IN MY FIELD
 3 I DEVELOPED NEW CAREER INTERESTS SINCE LEAVING COLLEGE
 4 THE JOBS IN MY FIELD DID NOT PAY WELL
 THE JOBS IN MY FIELD DID NOT OFFER OPPORTUNITIES FOR ADVANCEMENT
 6 I AM NOT PRESENTLY EMPLOYED</p> | <p>21. If you worked, while attending BSU, on average, about how many hours did you work?</p> <table border="0"> <tbody> <tr> <td>1 FEWER THAN 10</td> <td>3 30 TO 40 HOURS</td> </tr> <tr> <td>2 10 TO 19 HOURS</td> <td>4 OVER 40 HOURS</td> </tr> <tr> <td>3 20 TO 29 HOURS</td> <td>5 I DID NOT WORK</td> </tr> </tbody> </table> <p>22. Are you now looking for another job?</p> <p>1 NO 2 YES</p> | 1 FEWER THAN 10 | 3 30 TO 40 HOURS | 2 10 TO 19 HOURS | 4 OVER 40 HOURS | 3 20 TO 29 HOURS | 5 I DID NOT WORK |
| 1 FEWER THAN 10 | 3 30 TO 40 HOURS | | | | | | |
| 2 10 TO 19 HOURS | 4 OVER 40 HOURS | | | | | | |
| 3 20 TO 29 HOURS | 5 I DID NOT WORK | | | | | | |
| <p>17. How did you become aware of the opening which became your</p> | <p>23. What is your current annual salary?</p> | | | | | | |

first job after graduation?

- 1 WAS ALREADY WORKING IN THE JOB
- 2 COOPERATIVE EDUCATION PROJECT
- 3 COLLEGE PLACEMENT OFFICE
- 4 PROFESSIONAL PLACEMENT OFFICE
- 5 NEWSPAPER ADVERTISEMENT
- 6 DIRECT CONTACT WITH EMPLOYER
- 7 FACULTY CONTACT OR REFERENCE
- 8 CONTACT THROUGH FRIEND OR RELATIVE
- 9 PUBLIC OR PRIVATE EMPLOYMENT AGENCY
- 10 OTHER - PLEASE SPECIFY _____

- 1 LESS THAN \$10,000
- 2 \$10,000 - \$14,999
- 3 \$15,000 - \$19,999
- 4 \$20,000 - \$24,999
- 5 \$25,000 - \$29,999
- 6 \$30,000 - \$34,999
- 7 \$35,000 - \$39,999
- 8 \$40,000 - \$49,999
- 9 \$50,000 - \$59,999
- 10 \$60,000 - \$70,000
- 11 OVER \$70,000
- 12 NOT APPLICABLE

18. How do you feel about the type of work you do in your job?

- 1 VERY DISSATISFIED
- 2 DISSATISFIED
- 3 SATISFIED
- 4 VERY SATISFIED
- 5 NOT APPLICABLE

24. Where did you live for the greatest amount of time when you attended BSU?

- 1 DORMITORY
- 2 FRATERNITY/SORORITY HOUSE
- 3 APARTMENT, HOUSE, TRAILER
- 4 HOME WITH PARENTS

25. For the most part, were you a part-time or full-time student while attending BSU?

- 1 PART-TIME
- 2 FULL-TIME

34. Where was your home before you began at BSU?

- 1 EAST TENNESSEE
- 2 MIDDLE TENNESSEE
- 3 WEST TENNESSEE
- 4 OTHER SOUTHEASTERN STATE
- 5 NORTHEAST
- 6 MIDWEST
- 7 SOUTHWEST
- 8 WEST OR NORTHWEST
- 9 OUTSIDE THE US

26. How old were you when you began college?

27. How old are you now?

35. Where is your home now?

- 1 EAST TENNESSEE
- 2 MIDDLE TENNESSEE
- 3 WEST TENNESSEE
- 4 OTHER SOUTHEASTERN STATE
- 5 NORTHEAST
- 6 MIDWEST
- 7 SOUTHWEST
- 8 WEST OR NORTHWEST
- 9 OUTSIDE THE US

28. What is your sex?

- 1 FEMALE 2 MALE

29. What is your race?

36. Was your home less than, or greater than 30 miles from BSU

- 1 BLACK 3 OTHER
2 WHITE
- when you began there?
1 CLOSER THAN 30 MILES
2 GREATER THAN 30 MILES
30. How would you characterize your undergraduate preparation for graduate work in your field?
- 1 POOR
2 FAIR
3 GOOD
4 EXCELLENT
5 NOT APPLICABLE
31. How would you characterize preparation you received at BSU for further undergraduate work at another institution?
- 1 POOR
2 FAIR
3 GOOD
4 EXCELLENT
5 NOT APPLICABLE
32. Which of the following best describes your mother's level of education?
- 1 LESS THAN HIGH SCHOOL GRADUATE
2 HIGH SCHOOL GRADUATE
3 SOME COLLEGE
4 COLLEGE GRADUATE
5 GRADUATE TRAINING
33. Which of the following best describes your father's level of education?
- 1 LESS THAN HIGH SCHOOL GRADUATE
2 HIGH SCHOOL GRADUATE
3 SOME COLLEGE
4 COLLEGE GRADUATE
5 GRADUATE TRAINING
37. What was the size of the community where you spent most of your life before you were sixteen?
- 1 A FARM
2 RURAL AREA, BUT NOT A FARM
3 TOWN LESS THAN 2,500
4 TOWN 2,500 - 24,500
5 SMALL CITY 25,000 - 100,000
6 LARGE CITY OVER 100,000
38. Please circle the number next to each activity in which you participated.
- | | |
|----------------------|--------------------------|
| 1 STUDENT GOVT. | 8 HONOR SOCIETIES |
| 2 HONORS PROGRAM | 9 FRATERNITY OR SORORITY |
| 3 CO-OP PROGRAM | 10 INTERNSHIP IN MAJOR |
| 4 CLUB IN YOUR MAJOR | 11 VARSITY SPORTS |
| 5 ART/MUSIC/DRAMA | |
| 6 INTRAMURAL SPORTS | |
| 7 EDUCATIONAL TRAVEL | |
39. Had a member of your immediate family attended BSU before you began?
- 1 NO
2 YES
40. Outside of class, approximately how many hours did you spend on campus each week while you were attending BSU?
- | | |
|-----------------|-----------------------|
| 1 LESS THAN TEN | 3 TWENTY TO THIRTY |
| 2 TEN TO TWENTY | 4 GREATER THAN THIRTY |

If you have any other comments to make about your experience at Blank State University and its effect on your personal or professional life, please use the

space below.

Please take a few minutes and check that you have answered all the questions on every page. Once you have completed the questionnaire, please refold it and mail it to us in the enclosed postage-paid envelope. Thank you very much for your help.

COMMENTS AND DIRECTIONS FOR THE ALUMNI SURVEY

The Performance Funding Advisory Committee, made up of campus representatives and governing board staff members from both the UT and TBR systems, has recommended significant changes in the Alumni Survey instrument. Changes have been made in the wording of the main part of the instrument in an effort to reflect the varying missions of colleges and universities across the state. In addition, wording of the final part of the document has been made optional in an effort to make the survey more useful. Since only the first 13 questions are scored for performance funding purposes, these are the only ones which must be worded exactly as they are on the enclosed disk. The remaining section, "EMPLOYMENT AND BACKGROUND INFORMATION," may be edited or changed in any way the institution wishes. It may even be taken out of the instrument entirely although some of the information gained by these sections might prove valuable for other uses.

NOTE: The enclosed disk contains an ASCII (text) file titled survey.txt which may be read into any full-featured word processing program. This file contains the complete instrument, including the optional section. Since it is in ASCII form, with hard spaces and hard returns, it might be difficult to reformat. It was originally formatted with 1/2 inch margins on both sides with 12 pitch spacing. All that should be necessary is to do a search-and-replace procedure for "Blank State University" and "BSU," make any realignments due to line-length changes, and paginate the document in order to make it ready to print. Two-year institutions will wish to change references of "University" to "College" or "Institute."

1. The Instrument.

The instruments used by different campuses are identical except that the name of the institution or its acronym appears in various places in the instrument. If an institution wishes to ask questions that do not appear on this instrument, an additional separate question sheet may be added. In no event, however, should the first 13 questions on this instrument be modified other than correcting the name and acronym of the institution.

Reproduction of the instrument should be by photocopy on white paper. An institution may use the instrument in the form provided (but on double-sided copy) or in booklet form.

The institution is responsible for putting two things on the instrument:

- a. An encoded removable label. This label should begin with the CIP code (xx.xx.xxxx.xx) of the major of the alumnus or alumna. For example, the code for Spanish is 10.16.0905.00. This code should be followed by an identifying number to permit the institution to know which alumni have responded.
- b. An "Exciting Picture" for the cover of the instrument. This picture should show the campus or some theme of higher education.

2. The Population.

The instrument should be sent to all baccalaureate graduates of 4-year institutions and all associate-degree graduates who obtained their degrees during the terms beginning with summer term 1987 and continuing through spring term 1988. If an institution wishes to send this instrument to others, permission should be obtained directly from ACT. Dr. Michael Valiga is ACT's responsible official: (319) 337-1000.

3. The Survey Process.

- a. Initial mailing. The instrument should be mailed, with a cover letter, to all appropriate alumni. The institution may develop its own cover letter, but a sample is included here.
- b. 1st follow-up. A follow-up request should be sent to non-respondents roughly two weeks after the initial mailing. We suggest a postcard (see sample).
- c. 2nd follow-up. A second follow-up request should be sent to non-respondents remaining two weeks after the first follow-up request was sent. We suggest including another copy of the instrument at this time (see sample).

4. Handling of Responses.

When a completed instrument is received, the institution should mark off the respondent, so that he or she will not be sent subsequent follow-up requests. Then the CIP code should be written on the front of the survey, and the identifying number should be removed. A record number (e.g., reflecting the order of receipt) of no more than 5 digits should also be written on the front of the survey.

The data for each instrument should be entered twice and any discrepancies should be carefully checked so correct entries can be made. The final data should be put in a format that will be provided to the campuses. The complete data should be sent to the governing board staff, who will merge the data into one tape for UT and one tape for TBR. These tapes will then be forwarded to the Commission staff.

5. Schedule.

We have set the following tentative schedule for the administration and reporting of the survey:

February 15, 1990	initial mailing
February 28, 1990	1st follow-up
March 15, 1990	2nd follow-up
March 30, 1990	final date for entry of responses
April 16, 1990	data tapes due at governing board
May 1, 1990	merged tapes due at Commission
June 1, 1990	statewide results reported to governing

boards for dissemination to campuses.

6. Scoring.

Only the first 13 questions, excluding question 4, will count in the scoring which will be based on norms, established separately, for 2 and 4 year institutions. In all but the sub-items marked with an asterisk on the attached page, the norms will be the state norms. For those sub-items, the norms will still be state norms for 2-year institutions, but they will depend on the enrollment for 4-year institutions and will reflect national ACT data as shown on the attachment. On a given item or sub-item, an institution will be considered successful if its results are better than the norm.

There are three kinds of norms as shown below:

Items and Sub-Items	Norm and Condition for Success
1-3, 6-9, 12, 13	Mean value of responses (1 for worst...4 for best). An institution will be successful if its mean exceeds the norm.
5, 10	Percentage of respondents entering "Never" or "No." An institution will be successful if its percentage is less than the norm.
11	Percentage of respondents entering "Very Much." An institution will be successful if its percentage exceeds the norm.

YOUR EDUCATION AND ITS IMPACT

11. In answering the questions in this section, please think of your overall experience at BSU, and any effect it may have had on each item. Please indicate the degree to which your education at BSU added to your skills in each of the following areas.

	Very Little	Somewhat	Very Much	4-YEAR SCHOOLS	
				Under 8K	8K or More
Practical skills necessary to obtain employment in your field	1	2	3		
Getting along with people of different races and ethnic groups	1	2	3		
Ability to grow and learn as a person	1	2	3		
* Ability to lead or guide others	1	2	3	33.5	31.5
Ability to adjust to new job demands	1	2	3		
Self-confidence in expressing your ideas	1	2	3		
* Planning and carrying out projects	1	2	3	43.1	41.2
* Speaking effectively	1	2	3	33.4	32.4
* Writing effectively	1	2	3	35.8	38.3
* Understanding written information	1	2	3	40.7	40.7
* Understanding graphic information	1	2	3	22.2	22.5
* Learning on your own	1	2	3	52.2	49.2
* Defining and solving problems	1	2	3	42.5	42.6
* Working cooperatively in a group	1	2	3	38.1	38.1

Ability to understand mathematical concepts	1	2	3		
* Understanding the interaction between people and the environment	1	2	3	26.1	25.0
* Understanding and appreciating the arts	1	2	3	25.1	21.1
* Understanding and applying scientific principles and methods	1	2	3	29.6	30.9
* Understanding different philosophies and cultures	1	2	3	31.7	27.5
* Ability to use mathematics in everyday life	1	2	3	20.0	17.7

A number of the above items were provided with the kind permission of ACT

---SAMPLE COVER LETTER---

insert date here

name of alumnus
street address
city, state zip

Dear _____:

Educational quality has become an important issue in Tennessee and in the nation. In an effort to ascertain the quality of your education, the Tennessee Higher Education Commission has suggested that all those who graduated from Tennessee colleges and universities in 1987-88 be surveyed, so that graduates would have a chance to evaluate their experiences. In the spirit of this effort, Blank State University would like to ask for your help. We at BSU are attempting to assess past students' reactions to their experiences at Blank State University and to see how well the University has prepared them for employment and their roles in a democratic society.

In order for the results to truly represent the thoughts of all BSU alumni it is important that each questionnaire be completed and returned. You may be assured of complete confidentiality. The questionnaire has an identification number for mailing purposes only. This is so we can remove your name from the mailing list when yours is returned. Your name will never be placed on the questionnaire, and will never be associated with your responses.

The results of this research will be made available to top university administrators to assist them in planning program changes.

Thank you very much for your assistance.

Sincerely,

Appropriate Person
Title

---SAMPLE FOLLOW-UP POSTCARD (Initial Follow-up)---

About a week ago we mailed a questionnaire seeking your opinions about your experiences at Blank State University.

If you have already completed and returned it to us, please accept our sincere thanks. If not, we would like to ask you to fill it out and send it back to us. It is extremely important that we receive your questionnaire for the results to accurately reflect the opinions of BSU graduates.

If by chance you did not receive the questionnaire, or it has become misplaced, please call _____ and you will be sent a replacement.

Sincerely,

Appropriate Person
Title

---SAMPLE FOLLOW-UP LETTER (Final Follow-Up)---

insert date here

name of alumnus
street address
city, state zip

Dear _____:

A few weeks ago, we mailed a questionnaire seeking your opinions about your experiences at Blank State University. We have not yet received your response. This letter is to remind you again to send in your questionnaire. We have enclosed another in case the original has become misplaced.

Educational quality has become an important issue in Tennessee and in the nation. In an effort to ascertain the quality of your education, the Tennessee Higher Education Commission has suggested that all those who graduated from Tennessee colleges and universities in 1987-88 be surveyed, so that graduates would have a chance to evaluate their experiences. In the spirit of this effort, Blank State University would like to ask for your help. We at BSU are attempting to assess past students' reactions to their experiences at Blank State University and to see how well the University has prepared them for employment and their roles in a democratic society.

In order for the results to truly represent the thoughts of all BSU alumni, it is important that each questionnaire be completed and returned. You may be assured of complete confidentiality. The questionnaire has an identification number for mailing purposes only. This is so we can remove your name from them mailing list when yours is returned. Your name will never be placed on the questionnaire, and will never be associated with your responses.

The results of this research will be made available to top university administrators to assist them in planning program changes.

Thank you very much for your assistance.

Sincerely,

Appropriate Person
Title

APPENDIX B
LETTERS OF PERMISSION



Department of Technological and Adult Education

402 Claxton Addition

Knoxville, Tennessee 37996-3400

(615) 974-2574

October 23, 1991

*Dr. Arliss L. Roaden
Executive Director
Tennessee Higher Education Commission
Parkway Towers, Suite 1900
404 James Robertson Parkway
Nashville, TN 37243-0830*

Dear Dr. Roaden

I am writing you to introduce Wm. Eddie Richardson, and to inform you that I am serving as major professor for his doctoral research and program of study. Eddie has been admitted by the Graduate School of the University of Tennessee, Knoxville as a candidate for the Ph.D. degree in Education. He is now actively engaged in developing a research prospectus.

Eddie and I have discussed his interest in conducting research in the area of performance funding in higher education, and alumni surveys. I believe that he is competent to pursue this type of research and has adequate academic preparation to conduct a significant study. I will be supervising his work and serving as his advisor.

If you have any questions regarding this matter, please contact me at (615) 974-2574. Thank you for your consideration.

Sincerely


*Gregory C. Petty, Ph.D.
Associate Professor*

304 Lebanon Street
Knoxville, Tennessee 37919
October 29, 1991

Dr. Arliss L. Roaden
Executive Director
Tennessee Higher Education Commission
Parkway Towers, Suite 1900
404 James Robertson Parkway
Nashville, TN 37243-0830

Dear Dr. Roaden

I am writing to request that you grant permission for me to use data from the 1988 and 1990 Tennessee Alumni Satisfaction Surveys in a dissertation research study. The title of my proposed study will be "The Impact of Higher Education on Alumni as Determined by the Tennessee Performance Funding Alumni Survey."

The data to be used will involve question number 11 ("Your Education and It's Impact"), the academic major of respondents, and the alumni institution. No individual responses will be identified in any manner in this study. Results will be reported in the aggregate for the institution and the state.

The results of my study will be made available for use by the Tennessee Higher Education Commission, and interested institutions. I believe that this study will make a significant contribution to higher education in Tennessee by promoting formative state-wide assessment. Thank you for your consideration in this matter.

Respectfully

A handwritten signature in dark ink, appearing to read "Eddie Richardson", written over the word "Respectfully".

Wm. Eddie Richardson



ARLISS L. ROADEN
Executive Director

PEACHES G. SIMPKINS
Chairman

THOMAS C. JESSEE
JOE E. LANCASTER
JOHN L. PARISH
HERMAN POSTMA
C. BRENT POULTON
JAMES M. POWERS, SR.
HUNTER WELLES
A C WHARTON, JR.
ROBERT F. WORTHINGTON, JR.

STATE OF TENNESSEE
HIGHER EDUCATION COMMISSION
NASHVILLE, TENNESSEE 37243-0830
(615) 741-3605
FAX: (615) 741-6230

NED MCWHERTER
Governor

October 30, 1991

Mr. Wm. Eddie Richardson
304 Lebanon Street
Knoxville, TN 37919

Dear Mr. Richardson:

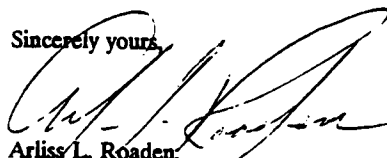
I enjoyed meeting with you on Tuesday to discuss your dissertation project. After our discussion and my examination of your abstract, I think this will be a worthwhile project.

You may use alumni data gathered through our performance funding program. Although we cannot fund any of the computer time necessary to analyze the data, we can make the data available to you on tapes for your use on the UTK computer system. Please coordinate with Myra Robinson to secure the necessary tapes.

Although I recognize that you do not intend to identify individual institutions, this identity may be apparent simply through the categories chosen. Because of this, I suggest that you discuss the project with Chancellor Otis Floyd of the Tennessee Board of Regents and President Joe Johnson of The University of Tennessee and secure their approval before proceeding.

I look forward to seeing the results of your study.

Sincerely yours,



Arliss L. Roaden,
Executive Director

304 Lebanon Street
Knoxville, Tennessee 37919
November 12, 1991

Dr. Joseph E. Johnson, President
The University of Tennessee
800 Andy Holt Tower
Knoxville, Tennessee 37996

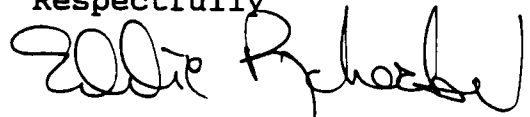
Dear President Johnson

I am writing you at the recommendation of Dr. Arliss Roaden of THEC to request that you grant permission for me to use data collected by the Center for Assessment, Research, and Development in my dissertation research study. The data that I am interested in using is from the 1988 and 1990 Tennessee Alumni Satisfaction Survey. The title of my proposed study will be "The Impact of Higher Education on Alumni as Determined by the Tennessee Performance Funding Alumni Survey." Pending your approval, Dr. Roaden will make the data available to me for use in my study.

The data to be used will involve question number 11 ("Your Education and It's Impact"), and question number 12 regarding the academic major of University of Tennessee, Knoxville graduates. This data will be combined with all other post-secondary institutions in Tennessee for analysis and reporting. No individual responses will be identified in any manner in this study. Results will be reported in the aggregate for all institutions including UTK.

The results of my study will be available for use by the University of Tennessee, the Tennessee Higher Education Commission, the Tennessee Board of Regents, and interested institutions. I believe that this study will make a significant contribution to higher education in Tennessee by promoting formative state-wide assessment. Thank you for your consideration in this matter.

Respectfully

A handwritten signature in dark ink, appearing to read "Wm. Eddie Richardson". The signature is fluid and cursive, with the first name "Wm." and last name "Richardson" clearly distinguishable.

Wm. Eddie Richardson

November 21, 1991

Office of the President
800 Andy Holt Tower
Knoxville 37996-0180
Telephone (615) 974-2241
Fax (615) 974-3753

Mr. Wm. Eddie Richardson
304 Lebanon Street
Knoxville, TN 37919

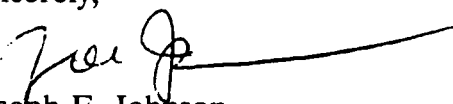
Dear Mr. Richardson:

Thank you for your letter requesting permission to use data collected by the Center for Assessment, Research, and Development in your dissertation. The University of Tennessee is pleased to grant permission for you to use the 1988 and 1990 Tennessee Alumni Satisfaction Survey data. We do request, as you indicated in your letter, that no individual responses will be identified and that all data will be reported in the aggregate.

Dr. Gary Pike, Associate Director of the Center for Assessment, Research and Development; and Dr. Bill Lyons, Professor of Political Science, have both indicated that they will be happy to assist you in obtaining the data, should you require any help.

Good luck to you as you pursue your Ph.D.

Sincerely,


Joseph E. Johnson
President

cc: Dr. Trudy Banta
Dr. Gary Pike
Dr. William Lyons
Dr. Arliss Roaden

APPENDIX C

**RATIO OF THE LOG-LINEAR PARAMETER ESTIMATE
TO ITS STANDARD ERROR**

**Ratio of the Log-Linear Parameter Estimate to Its Standard Error
Personal/Social by Size**

Size		Response	
	VLittle	Somewhat	VMuch
Large	2.880	0.112	-4.569
Medium	-2.880	-0.112	4.569

**Ratio of the Log-Linear Parameter Estimate to Its Standard Error
Quantitative by Size**

Size		Response	
	VLittle	Somewhat	VMuch
Large	4.605	-4.868	-1.019
Medium	-4.605	4.868	1.019

**Ratio of the Log-Linear Parameter Estimate to Its Standard Error
Verbal by Size**

Size		Response	
	VLittle	Somewhat	VMuch
Large	-15.521	29.516	-24.151
Medium	15.521	-29.516	24.152

**Ratio of the Log-Linear Parameter Estimate to Its Standard Error
Cultural Understanding by Size**

Size		Response	
	VLittle	Somewhat	VMuch
Large	0.753	-0.664	-0.217
Medium	-0.754	0.664	0.217

**Ratio of the Log-Linear Parameter Estimate to Its Standard Error
Personal/Social by Major**

Major	Response		
	VLittle	Somewhat	VMuch
Agriculture	-2.692	1.742	2.509
Architecture	-2.003	1.938	1.248
Business	-2.959	1.769	2.805
Communications	-0.323	-1.801	2.402
Education	-2.888	0.692	3.869
Engineering	0.734	0.352	-1.485
Human Ecology	-0.663	-1.968	3.150
Humanities	8.105	-2.957	-8.013
Science	5.928	-0.393	-8.072
Social Science	3.806	-0.843	-4.800
Nursing	-2.005	0.719	2.437

**Ratio of the Log-Linear Parameter Estimate to Its Standard Error
Quantitative by Major**

Major		Response	
	VLittle	Somewhat	VMuch
Agriculture	-4.984	3.056	3.840
Architecture	-0.739	1.966	0.912
Business	-6.224	6.123	2.072
Communications	16.922	-0.105	-14.686
Education	2.641	2.165	-4.985
Engineering	-14.442	-4.429	29.161
Human Ecology	2.476	-0.604	-2.222
Humanities	16.410	-4.479	-10.492
Science	-7.444	-2.023	12.880
Social Science	11.578	-0.667	-11.449
Nursing	-2.367	0.985	2.079

**Ratio of the Log-Linear Parameter Estimate to Its Standard Error
Verbal by Major**

Major		Response	
	VLittle	Somewhat	VMuch
Agriculture	-3.165	1.603	3.280
Architecture	0.016	0.676	-0.690
Business	-3.364	3.492	1.455
Communications	-3.953	-1.576	7.934
Education	-0.871	2.493	-1.208
Engineering	4.151	-2.031	-3.633
Human Ecology	-1.322	0.712	1.251
Humanities	4.356	-4.018	-1.642
Science	6.148	-2.094	-5.908
Social Science	0.824	0.705	-1.865
Nursing	0.616	0.583	-1.441

**Ratio of the Log-Linear Parameter Estimate to Its Standard Error
Cultural Understanding by Major**

Major		Response	
	VLittle	Somewhat	VMuch
Agriculture	4.572	0.372	-5.043
Architecture	-2.892	-1.383	5.241
Business	10.020	2.137	-12.596
Communications	-3.468	2.034	2.314
Education	3.014	-1.487	-1.969
Engineering	14.265	0.284	-14.029
Human Ecology	-2.872	0.730	2.878
Humanities	-3.906	-3.364	8.546
Science	3.814	-0.411	-3.751
Social Science	-7.165	-0.738	9.904
Nursing	-0.960	3.697	-2.190

**Ratio of the Log-Linear Parameter Estimate to Its Standard Error
Personal/Social by Major by Size**

Size	Major		Response	
		VLittle	Somewhat	VMuch
Large	Agriculture	-0.213	3.619	-3.516
	Business	-1.869	1.346	1.494
	Communication	-0.146	-4.116	4.863
	Education	2.587	-2.430	-1.603
	Engineering	-2.119	1.411	1.697
	Human Ecology	-2.192	-0.470	3.753
	Humanities	1.831	1.046	-3.827
	Science	4.330	-0.731	-5.529
	Social Science	2.772	-0.166	-4.035
	Nursing	-2.955	0.729	3.855
Medium	Agriculture	0.214	-3.618	3.518
	Business	1.871	-1.343	-1.490
	Communication	0.147	4.117	-4.861
	Education	-2.585	2.432	1.605
	Engineering	2.121	-1.409	-1.695
	Human Ecology	2.192	0.471	-3.752
	Humanities	-1.830	-1.045	3.829
	Science	-4.329	0.734	5.532
	Social Science	-2.771	0.168	4.038
	Nursing	2.956	-0.727	-3.853

**Ratio of the Log-Linear Parameter Estimate to Its Standard Error
Verbal by Major by Size**

Size	Major		Response	
		VLittle	Somewhat	VMuch
Large	Agriculture	-1.294	2.694	-0.810
	Business	-0.495	0.880	-0.158
	Communication	0.779	-1.208	-0.009
	Education	2.133	-2.565	-0.584
	Engineering	1.378	0.825	-2.822
	Human Ecology	-1.808	-0.347	2.820
	Humanities	-1.669	0.779	1.284
	Science	4.181	-1.881	-3.683
	Social Science	2.563	-1.483	-2.231
	Nursing	-2.618	1.222	2.384
Medium	Agriculture	1.294	-2.694	0.810
	Business	0.495	-0.880	0.159
	Communication	0.779	1.208	0.009
	Education	-2.132	2.565	0.585
	Engineering	-1.378	-0.824	2.823
	Human Ecology	1.809	0.348	-2.820
	Humanities	1.669	-0.778	-1.283
	Science	-4.180	1.882	3.683
	Social Science	-2.563	1.483	2.232
	Nursing	2.618	-1.222	-2.384

**Ratio of the Log-Linear Parameter Estimate by Its Standard Error
Quantitative by Major by Size**

Size	Major		Response	
		VLittle	Somewhat	VMuch
Large	Agriculture	0.795	1.478	-2.579
	Business	1.465	-0.973	-0.930
	Communication	3.466	-2.215	-1.506
	Education	1.859	-1.075	-1.155
	Engineering	-1.719	-0.545	3.405
	Human Ecology	-4.337	0.246	3.946
	Humanities	1.229	1.345	-2.414
	Science	-0.790	2.326	-1.301
	Social Science	2.843	-1.990	-1.234
	Nursing	-1.096	-0.216	1.586
Medium	Agriculture	-0.795	-1.478	2.579
	Business	-1.464	0.974	0.931
	Communication	-3.466	2.216	1.506
	Education	-1.858	1.075	1.155
	Engineering	1.719	0.546	-3.404
	Human Ecology	4.337	-0.245	-3.945
	Humanities	-1.229	-1.344	2.414
	Science	0.791	-2.325	1.302
	Social Science	-2.843	1.991	1.235
	Nursing	1.097	0.216	-1.586

**Ratio of the Log-Linear Parameter Estimate to Its Standard Error
Cultural Understanding by Major by Size**

Size	Major		Response	
		VLittle	Somewhat	VMuch
Large	Agriculture	0.611	1.375	-1.887
	Business	2.344	-2.311	-0.446
	Communication	2.284	-0.509	-2.504
	Education	1.962	-1.684	-0.655
	Engineering	1.027	0.559	-1.475
	Human Ecology	-2.707	-0.081	2.976
	Humanities	-0.085	1.304	-1.282
	Science	1.702	-0.637	-1.264
	Social Science	-0.722	-2.740	3.568
	Nursing	-3.535	1.534	2.571
Medium	Agriculture	-0.610	-1.374	1.888
	Business	-2.343	2.313	0.448
	Communication	-2.284	0.509	2.505
	Education	-1.961	1.685	0.657
	Engineering	-1.027	-0.558	1.476
	Human Ecology	2.707	-0.080	-2.975
	Humanities	0.085	-1.303	1.283
	Science	-1.701	0.638	1.265
	Social Science	0.723	2.742	-3.567
	Nursing	3.536	-1.533	-2.570

APPENDIX D

**RESPONSES BY YEAR AND ACADEMIC MAJOR
RESPONSES BY YEAR, ACADEMIC MAJOR AND SIZE OF INSTITUTION**

**Respondents by Major
1986 and 1988**

Major		Response	
	1986	1988	Total
Agriculture	96	106	202
Architecture	29	41	70
Business	523	627	1150
Communications	152	131	283
Education	185	229	414
Engineering	313	233	546
Human Ecology	66	64	130
Humanities	88	98	186
Science	165	168	333
Social Science	230	330	560
Nursing	106	88	194
TOTAL	1953	2115	4068

**Respondents by Major by Size
1986 and 1988**

Size	Major	Responses		
		1986	1988	Total
Large	Agriculture	65	72	137
	Business	352	448	800
	Communication	134	105	239
	Education	124	124	248
	Engineering	272	194	466
	Human Ecology	53	50	103
	Humanities	77	79	156
	Science	80	93	173
	Social Science	158	207	365
	Nursing	69	55	124
	Subtotal	1413	1468	2881
Medium	Agriculture	31	34	65
	Business	171	179	350
	Communication	18	26	44
	Education	61	105	166
	Engineering	41	39	80
	Human Ecology	13	14	27
	Humanities	11	19	30
	Science	85	75	160
	Social Science	72	123	195
	Nursing	37	33	70
	Subtotal	540	647	1187
	TOTAL	1953	2115	4068

VITA

William Eddie Richardson was born September 14, 1954 in Nashville, Tennessee to Cody Edgar Richardson, Sr. and Thelma Brake Richardson. He attended primary and secondary schools in Nashville and graduated from Hillwood High School in June, 1972. He earned an Associate of Science degree from Cumberland College of Tennessee in 1974, a Bachelor of Science degree with a major in Business Education from Belmont University in 1977, and a Master of Business Education degree from Middle Tennessee State University in 1982.

After graduating from Middle Tennessee State University in 1982, Mr. Richardson accepted a faculty position in the Department of Business at Cumberland College of Tennessee. In 1985, Mr. Richardson accepted a position as Accounting Manager at Care Supply Company, Inc. in Nashville, Tennessee.

After five years in corporate accounting at Care Supply Company, Mr. Richardson entered The University of Tennessee at Knoxville as a full-time student to pursue the degree Doctor of Philosophy with a major emphasis in Education.

In 1992 Mr. Richardson accepted a position with Wofford College in Spartanburg, South Carolina as Director of Institutional Research. He and his family presently reside in Spartanburg.